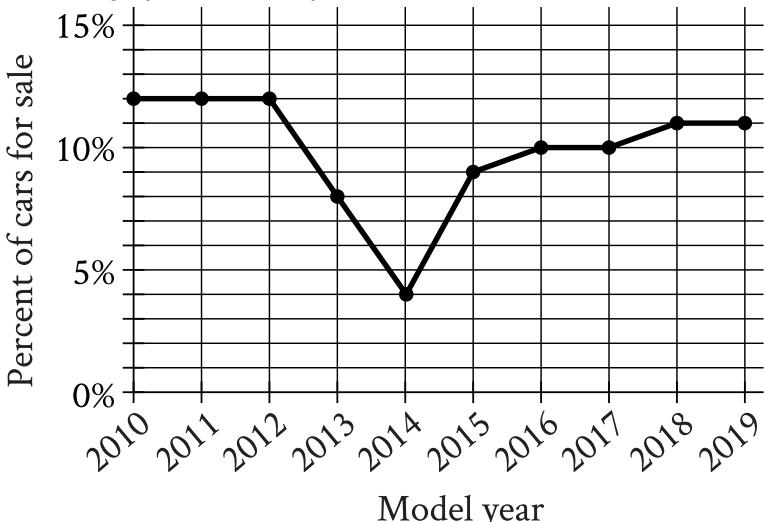


# Question ID 4a2264b3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

**ID: 4a2264b3**

The line graph shows the percent of cars for sale at a used car lot on a given day by model year.



For what model year is the percent of cars for sale the smallest?

- A. 2012
- B. 2013
- C. 2014
- D. 2015

**ID: 4a2264b3 Answer**

**Correct Answer:**

C

**Rationale**

Choice C is correct. For the given line graph, the percent of cars for sale at a used car lot on a given day is represented on the vertical axis. The percent of cars for sale is the smallest when the height of the line graph is the lowest. The lowest height of the line graph occurs for cars with a model year of **2014**.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

**Question Difficulty:**

Easy

# Question ID e3d49511

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: e3d49511

The number of raccoons in a **131**-square-mile area is estimated to be **2,358**. What is the estimated population density, in raccoons per square mile, of this area?

- A. **18**
- B. **131**
- C. **149**
- D. **2,376**

ID: e3d49511 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that there are **2,358** raccoons in a **131**-square-mile area. The estimated population density, in raccoons per square mile, is the estimated number of raccoons divided by the number of square miles. Therefore, the estimated population density of this area is  $\frac{2,358 \text{ raccoons}}{131 \text{ square miles}}$ , or **18** raccoons per square mile.

Choice B is incorrect. This is the number of square miles in the area, not the estimated number of raccoons per square mile in this area.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID b680e76d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: b680e76d

A survey taken by 1,000 students at a school asked whether they played school sports. The table below summarizes all 1,000 responses from the students surveyed.

	Males	Females
Play a school sport	312	220
Do not play a school sport	?	216

How many of the males surveyed responded that they do not play a school sport?

- A. 109
- B. 252
- C. 468
- D. 688

ID: b680e76d Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The table summarizes all 1,000 responses from the students surveyed. If 312 are males who play a sport, 220 are females who play a sport, and 216 are females who do not play a sport, then  $1,000 - 312 - 220 - 216 = 252$  males who do not play a sport.

Choices A, C, and D are incorrect. If 109 males who do not play a sport responded, then the table summary would be  $109 + 312 + 220 + 216 = 857$  total student responses rather than 1,000. If 468 males who do not play a sport responded, then the table summary would be  $468 + 312 + 220 + 216 = 1,216$  total student responses rather than 1,000. If 688 males who do not play a sport responded, then the table summary would be  $688 + 312 + 220 + 216 = 1,436$  total student responses rather than 1,000.

**Question Difficulty:**

Easy

# Question ID 53d97af5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

**ID: 53d97af5**

A study was done on the weights of different types of fish in a pond. A random sample of fish were caught and marked in order to ensure that none were weighed more than once. The sample contained 150 largemouth bass, of which 30% weighed more than 2 pounds. Which of the following conclusions is best supported by the sample data?

- A. The majority of all fish in the pond weigh less than 2 pounds.
- B. The average weight of all fish in the pond is approximately 2 pounds.
- C. Approximately 30% of all fish in the pond weigh more than 2 pounds.
- D. Approximately 30% of all largemouth bass in the pond weigh more than 2 pounds.

**ID: 53d97af5 Answer**

**Correct Answer:**

D

**Rationale**

Choice D is correct. The sample of 150 largemouth bass was selected at random from all the largemouth bass in the pond, and since 30% of the fish in the sample weighed more than 2 pounds, it can be concluded that approximately 30% of all largemouth bass in the pond weigh more than 2 pounds.

Choices A, B, and C are incorrect. Since the sample contained 150 largemouth bass, of which 30% weighed more than 2 pounds, this result can be generalized only to largemouth bass in the pond, not to all fish in the pond.

**Question Difficulty:**

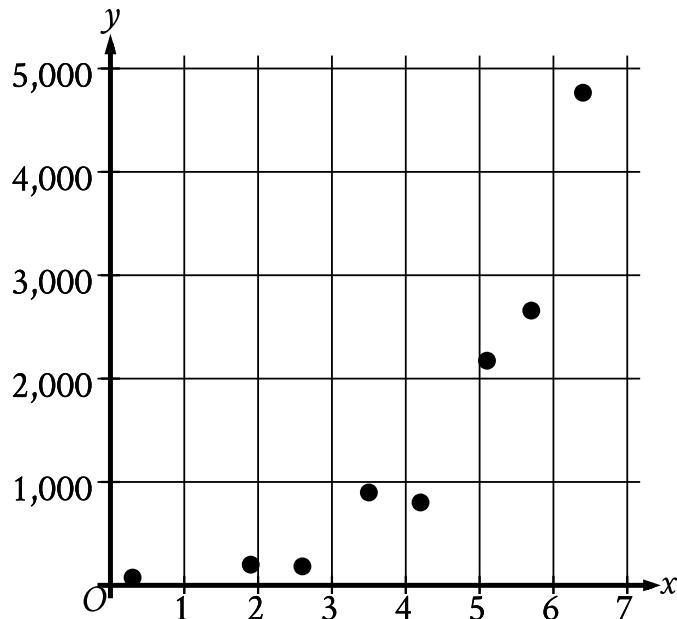
Medium

# Question ID 15ce8207

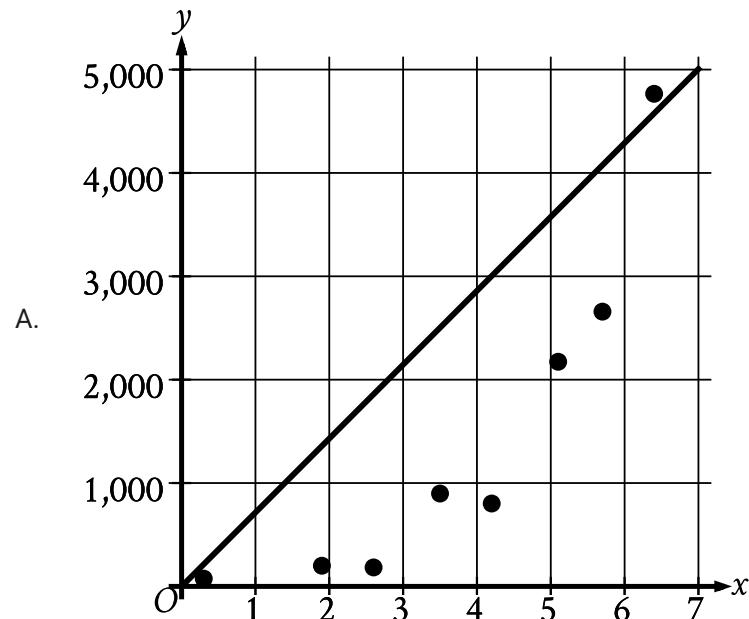
Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 15ce8207

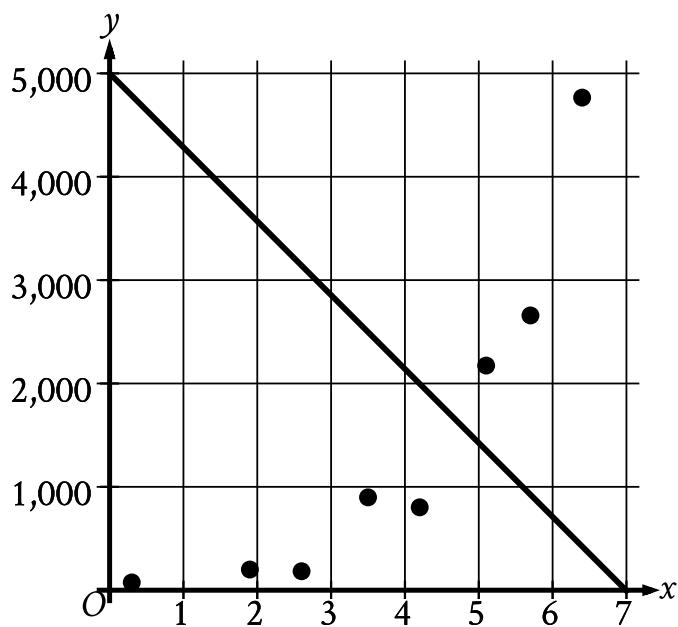
The scatterplot shows the relationship between two variables,  $x$  and  $y$ .



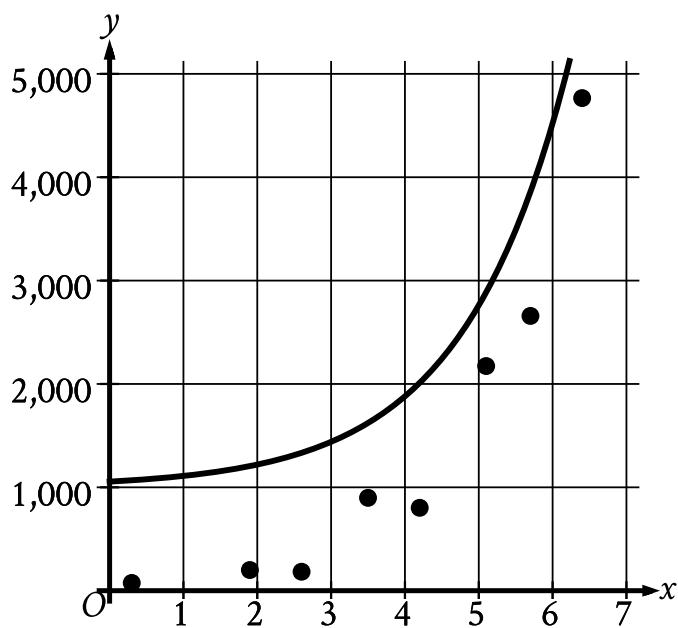
Which of the following graphs shows the most appropriate model for the data?



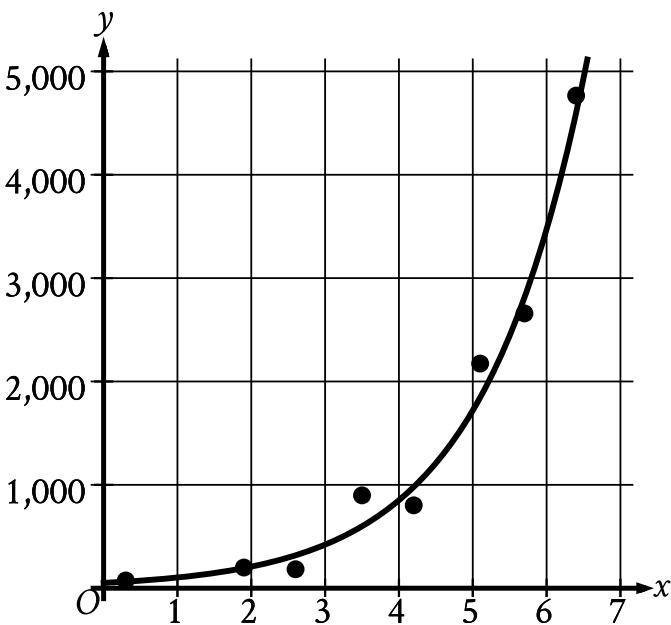
B.



C.



D.



### ID: 15ce8207 Answer

**Correct Answer:**

D

### Rationale

Choice D is correct. An appropriate model should follow the trend of the data points and should have data points both above and below the model. The scatterplot shows that the data points have an increasing trend that is curved. Therefore, an appropriate model should be an increasing curve with data points both above and below the model. Of the given choices, only the model in choice D is an increasing curve with data points both above and below the model.

Choice A is incorrect. Since the trend of the data points isn't linear, a line isn't the most appropriate model for the data.

Choice B is incorrect. Since the trend of the data points is increasing and isn't linear, a decreasing line isn't the most appropriate model for the data.

Choice C is incorrect. All the data points are below the model shown in this graph.

### Question Difficulty:

Easy

# Question ID d4413871

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: d4413871

	Blood type			
Rhesus factor	A	B	AB	O
+	33	9	3	37
-	7	2	1	x

Human blood can be classified into four common blood types—A, B, AB, and O. It is also characterized by the presence (+) or absence (−) of the rhesus factor. The table above shows the distribution of blood type and rhesus factor for a group of people. If one of these people who is rhesus negative (−) is chosen at random, the probability

that the person has blood type B is  $\frac{1}{9}$ . What is the value of x ?

ID: d4413871 Answer

## Rationale

The correct answer is 8. In this group,  $\frac{1}{9}$  of the people who are rhesus negative have blood type B. The total number of people who are rhesus negative in the group is  $7 + 2 + 1 + x$ , and there are 2 people who are rhesus negative with blood type B. Therefore,

$$\frac{2}{(7+2+1+x)} = \frac{1}{9}$$
 . Combining like terms on the left-hand side of the equation yields  $\frac{2}{(10+x)} = \frac{1}{9}$  . Multiplying both sides of this equation by 9 yields  $\frac{18}{(10+x)} = 1$  , and multiplying both sides of this equation by  $(10+x)$  yields  $18 = 10 + x$  . Subtracting 10 from both sides of this equation yields  $8 = x$  .

## Question Difficulty:

Hard

# Question ID 0301c5dc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 0301c5dc

The table below shows the number of state parks in a certain state that contain camping facilities and bicycle paths.

	Has bicycle paths	Does not have bicycle paths
Has camping facilities	20	5
Does not have camping facilities	8	4

If one of these state parks is selected at random, what is the probability that it has camping facilities but does not have bicycle paths?

A.  $\frac{5}{37}$

B.  $\frac{5}{25}$

C.  $\frac{8}{28}$

D.  $\frac{5}{9}$

ID: 0301c5dc Answer

Correct Answer:

A

Rationale

Choice A is correct. The total number of state parks in the state is  $20 + 5 + 8 + 4 = 37$ . According to the table, 5 of these have camping facilities but not bicycle paths. Therefore, if a state park is selected at random, the probability that it has camping facilities but not bicycle paths is  $\frac{5}{37}$ .

Choice B is incorrect. This is the probability that a state park selected at random from the state parks with camping facilities does not have bicycle paths. Choice C is incorrect. This is the probability that a state park selected at random from the state parks with bicycle paths does not have camping facilities. Choice D is incorrect. This is the probability that a state park selected at random from the state parks without bicycle paths does have camping facilities.

Question Difficulty:

Medium

# Question ID 0ae37ff3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 0ae37ff3

In a bag, there are **7** red, **4** white, **33** blue, and **33** yellow cubes. If one of these cubes is selected at random, what is the probability of selecting a cube that is neither blue nor yellow?

- A.  $\frac{6}{7}$
- B.  $\frac{7}{11}$
- C.  $\frac{1}{3}$
- D.  $\frac{1}{7}$

ID: 0ae37ff3 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that there are **7** red, **4** white, **33** blue, and **33** yellow cubes in the bag. Therefore, there are a total of **7 + 4 + 33 + 33**, or **77**, cubes in the bag. If the cube is neither blue nor yellow, then it must be either red or white. Therefore, the probability of selecting a cube that is neither blue nor yellow is equivalent to the probability of selecting a cube that is either red or white. If one of these cubes is selected at random, the probability of selecting a cube that is either red or white is equal to the sum of the number of red cubes and white cubes divided by the total number of cubes in the bag. There are **7** red cubes, **4** white cubes, and **77** total cubes in the bag. Therefore, the probability of selecting a red or white cube is  $\frac{7+4}{77}$ , which is equivalent to  $\frac{11}{77}$ , or  $\frac{1}{7}$ . Thus, if one cube is selected at random, the probability of selecting a cube that is neither blue nor yellow is  $\frac{1}{7}$ .

Choice A is incorrect. This is the probability of selecting a cube that is either blue or yellow, rather than the probability of selecting a cube that is neither blue nor yellow.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Medium

# Question ID c88e0663

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

**ID: c88e0663**

For a school fund-raiser, 10 students sold a total of 90 boxes of cookies. Which of the following can be calculated from this information?

- A. The average number of boxes sold per student
- B. The median number of boxes sold per student
- C. The greatest number of boxes sold by one student
- D. The least number of boxes sold by one student

**ID: c88e0663 Answer**

**Correct Answer:**

A

**Rationale**

Choice A is correct. The average can be found by dividing the total number of boxes sold by the number of students, which is

$$\frac{90}{10} = 9$$

Choices B, C, and D are incorrect. Each results from choosing measures that require the results of individual students, which are not given.

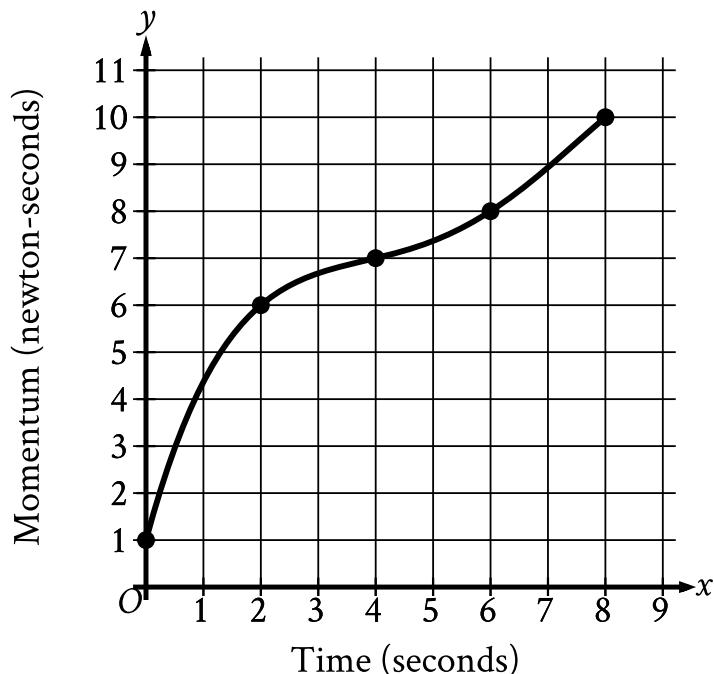
**Question Difficulty:**

Easy

# Question ID 9bb4107c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #006699; height: 10px;"></div> <div style="width: 60%; background-color: #CCCCCC; height: 10px;"></div>

ID: 9bb4107c



The graph shows the momentum  $y$ , in newton-seconds, of an object  $x$  seconds after the object started moving, for  $0 \leq x \leq 8$ . What is the average rate of change, in newton-seconds per second, in the momentum of the object from  $x = 2$  to  $x = 6$ ?

ID: 9bb4107c Answer

Correct Answer:

0.5, 1/2

Rationale

The correct answer is  $\frac{1}{2}$ . For the graph shown,  $x$  represents time, in seconds, and  $y$  represents momentum, in newton-seconds. Therefore, the average rate of change, in newton-seconds per second, in the momentum of the object between two  $x$ -values is the difference in the corresponding  $y$ -values divided by the difference in the  $x$ -values. The graph shows that at  $x = 2$ , the corresponding  $y$ -value is 6. The graph also shows that at  $x = 6$ , the corresponding  $y$ -value is 8. It follows that the average rate of change, in newton-seconds per second, from  $x = 2$  to  $x = 6$  is  $\frac{8-6}{6-2}$ , which is equivalent to  $\frac{2}{4}$ , or  $\frac{1}{2}$ . Note that 1/2 and .5 are examples of ways to enter a correct answer.

Question Difficulty:

Medium

# Question ID 3f2ee20a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a99; height: 10px;"></div> <div style="width: 25%; background-color: #005a99; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

**ID: 3f2ee20a**

The results of two independent surveys are shown in the table below.

Men's Height

Group	Sample size	Mean (centimeters)	Standard deviation (centimeters)
A	2,500	186	12.5
B	2,500	186	19.1

Which statement is true based on the table?

- A. The Group A data set was identical to the Group B data set.
- B. Group B contained the tallest participant.
- C. The heights of the men in Group B had a larger spread than the heights of the men in Group A.
- D. The median height of Group B is larger than the median height of Group A.

**ID: 3f2ee20a Answer**

**Correct Answer:**

C

**Rationale**

Choice C is correct. Standard deviation is a measure of spread, so data sets with larger standard deviations tend to have larger spread. The standard deviation of the heights of the men in Group B is larger than the standard deviation of the heights of the men in Group A. Therefore, the heights of the men in Group B had a larger spread than the heights of the men in Group A.

Choice A is incorrect. If two data sets are identical, they will have equivalent means and equivalent standard deviations. Since the two data sets have different standard deviations, they cannot be identical. Choice B is incorrect. Without knowing the maximum value for each data set, it's impossible to know which group contained the tallest participant. Choice D is incorrect. Since the means of the two groups are equivalent, the medians could also be the same or could be different, but it's impossible to tell from the given information.

**Question Difficulty:**

Medium

# Question ID 993000da

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 993000da

The positive number  $a$  is 230% of the number  $b$ , and  $a$  is 60% of the number  $c$ . If  $c$  is  $p\%$  of  $b$ , which of the following is closest to the value of  $p$ ?

- A. 138
- B. 217
- C. 283
- D. 383

ID: 993000da Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that  $a$  is 230% of  $b$ . It follows that  $a = \frac{230}{100}b$ . It's also given that  $a$  is 60% of  $c$ . It follows that  $a = \frac{60}{100}c$ . Since  $a = \frac{230}{100}b$  and  $a = \frac{60}{100}c$ , it follows that  $\frac{230}{100}b = \frac{60}{100}c$ . Multiplying each side of this equation by  $\frac{100}{60}$  yields  $\frac{23}{6}b = c$ . If  $c$  is  $p\%$  of  $b$ , then  $c = \frac{p}{100}b$ . It follows that  $\frac{23}{6}b = \frac{p}{100}b$ . Multiplying each side of this equation by 100 yields  $\frac{2,300}{6} = p$ . It follows that the value of  $p$  is approximately 383.33. Therefore, of the given choices, 383 is closest to the value of  $p$ .

Choice A is incorrect. This is closest to the value of  $p$  if  $b$  is 230% of  $a$ , rather than if  $a$  is 230% of  $b$ , and if  $b$  is  $p\%$  of  $c$ , rather than if  $c$  is  $p\%$  of  $b$ .

Choice B is incorrect. This is closest to the value of  $p$  if  $a$  is 230% greater than  $b$ , rather than 230% of  $b$ .

Choice C is incorrect. This is closest to the value of  $p$  if  $c$  is  $p\%$  greater than  $b$ , rather than  $p\%$  of  $b$ .

Question Difficulty:

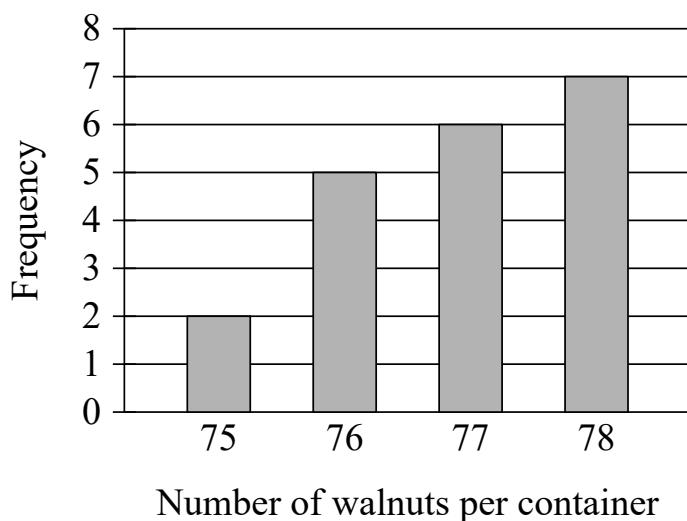
Hard

# Question ID fe6a49d6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 10%; background-color: #cccccc; height: 10px;"></div>

ID: fe6a49d6

The bar graph shows the distribution of the number of walnuts per container for 20 containers at a grocery store.



How many of these containers of walnuts contain exactly 78 walnuts?

- A. 2
- B. 7
- C. 20
- D. 78

ID: fe6a49d6 Answer

Correct Answer:

B

## Rationale

Choice B is correct. The height of each bar in the graph shown represents the number of containers that contain the number of walnuts specified at the bottom of the bar. The bar for 78 walnuts has a height of 7. Therefore, 7 of these containers of walnuts contain exactly 78 walnuts.

Choice A is incorrect. This is the number of containers that contain exactly 75 walnuts, not 78 walnuts.

Choice C is incorrect. This is the total number of containers of walnuts represented in the bar graph, not the number that contain exactly 78 walnuts.

Choice D is incorrect. This is the number of walnuts in a container that contains exactly **78** walnuts, not the number of containers that contain exactly **78** walnuts.

**Question Difficulty:**

Easy

# Question ID d0efc1dd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: d0efc1dd

15, 14, 18, 17, x

The mean and the median of the five numbers above are equal. Which of the following is NOT a possible value of x ?

- A. 6
- B. 11
- C. 16
- D. 21

ID: d0efc1dd Answer

Correct Answer:

A

Rationale

Choice A is correct. If x is 6, then the five numbers in the given list are 15, 14, 18, 17, 6. The mean of these five numbers is the sum

$$\frac{15+14+18+17+6}{5} = \frac{70}{5} = 14$$

of all the values divided by the number of values, or

The median of these five numbers can be found by ordering the numbers from least to greatest and determining the middle value. When ordered from least to greatest, the numbers in the given list are 6, 14, 15, 17, 18, and the middle value is 15. Since the mean is 14 and the median is 15, the mean and median aren't equal when x is 6.

Choices B, C, and D are incorrect. If any of these values is substituted for x, the mean and median of the data set would be equal.

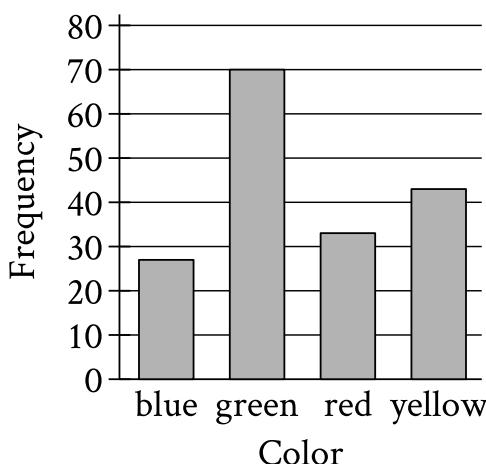
Question Difficulty:

Medium

# Question ID 80f1f3a9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 80f1f3a9



A data set consists of **173** colors. The bar graph shows the number of times each color appears in the data set. Which color appears **70** times?

- A. Blue
- B. Green
- C. Red
- D. Yellow

ID: 80f1f3a9 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that a data set consists of **173** colors and the bar graph shows the number of times each color appears in the data set. Therefore, for each color specified at the bottom of the bar, the frequency corresponds to the number of times that color appears in the data set. The color that appears **70** times in the data set has a frequency of **70** on the bar graph. Since the bar with a frequency of **70** corresponds to green, green is the color that appears **70** times.

Choice A is incorrect. The color blue appears about **27** times, not **70** times.

Choice C is incorrect. The color red appears about **33** times, not **70** times.

Choice D is incorrect. The color yellow appears about **43** times, not **70** times.

Question Difficulty:

Easy

# Question ID e9fb7774

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: e9fb7774

What percentage of 300 is 75?

- A. 25%
- B. 50%
- C. 75%
- D. 225%

ID: e9fb7774 Answer

Correct Answer:

A

Rationale

Choice A is correct. Let  $x$  represent the percentage of 300 that is 75. This can be written as  $\frac{x}{100}(300) = 75$ , or  $3x = 75$ . Dividing both sides of this equation by 3 yields  $x = 25$ . Therefore, 25% of 300 is 75.

Choice B is incorrect. 50% of 300 is 150, not 75.

Choice C is incorrect. 75% of 300 is 225, not 75.

Choice D is incorrect. 225% of 300 is 675, not 75.

Question Difficulty:

Easy

# Question ID 190be2fc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 190be2fc

Data set A consists of **10** positive integers less than **60**. The list shown gives **9** of the integers from data set A.

**43, 45, 44, 43, 38, 39, 40, 46, 40**

The mean of these **9** integers is **42**. If the mean of data set A is an integer that is greater than **42**, what is the value of the largest integer from data set A?

ID: 190be2fc Answer

Correct Answer:

52

Rationale

The correct answer is **52**. The mean of a data set is calculated by dividing the sum of the data values by the number of values. It's given that data set A consists of **10** values, **9** of which are shown. Let  $x$  represent the **10th** data value in data set A, which isn't shown. The mean of data set A can be found using the expression  $\frac{43+45+44+43+38+39+40+46+x}{10}$ , or  $\frac{378+x}{10}$ . It's given that the mean of the **9** values shown is **42** and that the mean of all **10** numbers is greater than **42**. Consequently, the **10th** data value,  $x$ , is larger than **42**. It's also given that the data values in data set A are positive integers less than **60**. Thus,  $42 < x < 60$ . Finally, it's given that the mean of data set A is an integer. This means that the sum of the **10** data values,  $378 + x$ , is divisible by **10**. Thus,  $378 + x$  must have a ones digit of **0**. It follows that  $x$  must have a ones digit of **2**. Since  $42 < x < 60$  and  $x$  has a ones digit of **2**, the only possible value of  $x$  is **52**. Since **52** is larger than any of the integers shown, the largest integer from data set A is **52**.

Question Difficulty:

Hard

# Question ID 3f236a64

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 3f236a64

x	y
1	4
3	12
5	20
40	k

In the table above, the ratio of y to x for each ordered pair is constant. What is the value of k?

- A. 28
- B. 36
- C. 80
- D. 160

ID: 3f236a64 Answer

Correct Answer:

D

Rationale

Choice D is correct. Since the ratio of y to x is constant for each ordered pair in the table, the first row can be used to determine that the ratio of y to x is 4 to 1. The proportion  $\frac{4}{1} = \frac{k}{40}$  can be used to solve for k. Multiplying each side of the equation by 40 yields  $160 = k$ .

Choice A is incorrect. This is the value of y when the value of x is 7, not 40. Choice B is incorrect and may result from subtracting 4 from 40 instead of multiplying 40 by 4. Choice C is incorrect and may result from incorrectly setting up the proportion.

Question Difficulty:

Easy

# Question ID 8705ecba

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

## ID: 8705ecba

The cost of a certain shirt is \$20 before a 5% sales tax is added. What is the total cost, including sales tax, to purchase the shirt?

- A. \$20.05
- B. \$20.50
- C. \$21.00
- D. \$25.00

## ID: 8705ecba Answer

**Correct Answer:**

C

### Rationale

Choice C is correct. The total cost to purchase the shirt is the \$20 cost of the shirt plus the 5% sales tax. The value of the 5% sales tax on the \$20 shirt is equivalent to  $(0.05)(\$20)$ , or \$1. Therefore, the total cost to purchase the shirt is  $\$20 + \$1$ , or \$21.

Choice A is incorrect and may result from neglecting to multiply by \$20 when finding the value of the sales tax. Choice B is incorrect and may result from dividing by 10, instead of by 100, and then neglecting to multiply by \$20 when finding the sales tax. Choice D is incorrect and may result from interpreting the sales tax of 5% as \$5.

### Question Difficulty:

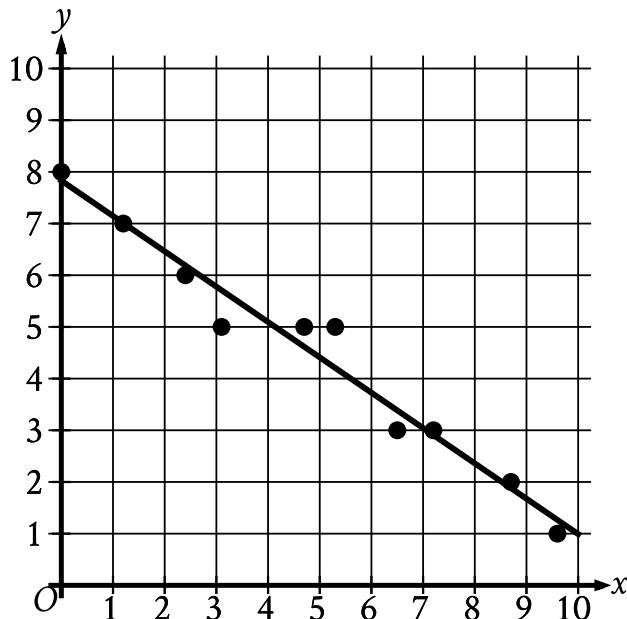
Easy

# Question ID 2e74e403

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 2e74e403

In the given scatterplot, a line of best fit for the data is shown.



Which of the following is closest to the slope of this line of best fit?

- A. 7
- B. 0.7
- C. -0.7
- D. -7

ID: 2e74e403 Answer

Correct Answer:

C

Rationale

Choice C is correct. A line of best fit is shown in the scatterplot such that as the value of  $x$  increases, the value of  $y$  decreases. It follows that the slope of the line of best fit shown is negative. The slope of a line in the  $xy$ -plane that passes through the points  $(x_1, y_1)$  and  $(x_2, y_2)$  can be calculated as  $\frac{y_2 - y_1}{x_2 - x_1}$ . The line of best fit shown passes approximately through the points  $(0, 8)$  and  $(10, 1)$ . Substituting  $(0, 8)$  for  $(x_1, y_1)$  and  $(10, 1)$  for  $(x_2, y_2)$  in  $\frac{y_2 - y_1}{x_2 - x_1}$  yields the slope of the line being approximately  $\frac{1-8}{10-0}$ , which is equivalent to  $-\frac{7}{10}$ , or  $-0.7$ . Therefore, of the given choices,  $-0.7$  is the closest to the slope of this line of best fit.

Choice A is incorrect. The line of best fit shown has a negative slope, not a positive slope.

Choice B is incorrect. The line of best fit shown has a negative slope, not a positive slope.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Medium

# Question ID f8f79e11

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 50%; background-color: #D9D9D9; height: 10px;"></div>

ID: f8f79e11

A park ranger asked a random sample of visitors how far they hiked during their visit.

Based on the responses, the estimated mean was found to be 4.5 miles, with an associated margin of error of 0.5 miles. Which of the following is the best conclusion from these data?

- A. It is likely that all visitors hiked between 4 and 5 miles.
- B. It is likely that most visitors hiked exactly 4.5 miles.
- C. It is not possible that any visitor hiked less than 3 miles.
- D. It is plausible that the mean distance hiked for all visitors is between 4 and 5 miles.

ID: f8f79e11 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The given estimated mean has an associated margin of error because from sample data, the population mean can't be determined precisely. Rather, from the sample mean, an interval can be determined within which it's plausible that the population's mean is likely to lie. Since the estimated mean is 4.5 miles with an associated margin of error of 0.5 miles, it follows that between  $4.5 - 0.5$  miles and  $4.5 + 0.5$  miles, or between 4 and 5 miles, is plausibly the mean distance hiked for all visitors.

Choices A, B, and C are incorrect. Based on the estimated mean, no determination can be made about the number of miles hiked for all visitors to the park.

**Question Difficulty:**

Medium

# Question ID da9ffcf6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: da9ffcf6

The ratio of the length of line segment  $XY$  to the length of line segment  $ZV$  is **6 to 1**. If the length of line segment  $XY$  is **102** inches, what is the length, in inches, of line segment  $ZV$ ?

- A. **17**
- B. **96**
- C. **102**
- D. **612**

ID: da9ffcf6 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the ratio of the length of line segment  $XY$  to the length of line segment  $ZV$  is **6 to 1**, which means  $\frac{XY}{ZV} = \frac{6}{1}$ . It's given that the length of line segment  $XY$  is **102** inches. If the length, in inches, of line segment  $ZV$  is represented by  $\ell$ , the value of  $\ell$  can be calculated by solving the equation  $\frac{102}{\ell} = \frac{6}{1}$ , or  $\frac{102}{\ell} = 6$ . Multiplying each side of this equation by  $\ell$  yields  $102 = 6\ell$ . Dividing each side of this equation by **6** yields  $17 = \ell$ . Therefore, the length of line segment  $ZV$  is **17** inches.

Choice B is incorrect. This is the length, in inches, of line segment  $ZV$  if the length of line segment  $XY$  is **576**, not **102**, inches.

Choice C is incorrect. This is the length, in inches, of line segment  $XY$ , not line segment  $ZV$ .

Choice D is incorrect. This is the length, in inches, of line segment  $ZV$  if the ratio of the length of line segment  $XY$  to the length of line segment  $ZV$  is **1 to 6**, not **6 to 1**.

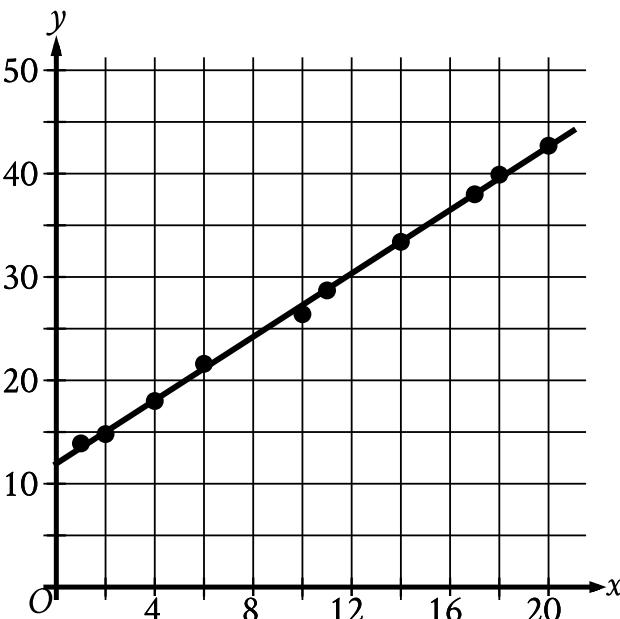
Question Difficulty:

Easy

# Question ID 2e8027b0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div>

ID: 2e8027b0



The scatterplot shows the relationship between two variables,  $x$  and  $y$ , for data set E. A line of best fit is shown. Data set F is created by multiplying the  $y$ -coordinate of each data point from data set E by 3.9. Which of the following could be an equation of a line of best fit for data set F?

- A.  $y = 46.8 + 5.9x$
- B.  $y = 46.8 + 1.5x$
- C.  $y = 12 + 5.9x$
- D.  $y = 12 + 1.5x$

ID: 2e8027b0 Answer

Correct Answer:

A

Rationale

Choice A is correct. An equation of a line of best fit for data set F can be written in the form  $y = a + bx$ , where  $a$  is the  $y$ -coordinate of the  $y$ -intercept of the line of best fit and  $b$  is the slope. The line of best fit shown for data set E has a  $y$ -intercept at approximately  $(0, 12)$ . It's given that data set F is created by multiplying the  $y$ -coordinate of each data point from data set E by 3.9. It follows that a line of best fit for data set F has a  $y$ -intercept at approximately  $(0, 12(3.9))$ , or  $(0, 46.8)$ . Therefore, the value of  $a$  is approximately 46.8. The slope of a line that passes through points  $(x_1, y_1)$  and  $(x_2, y_2)$  can be calculated as  $\frac{y_2 - y_1}{x_2 - x_1}$ . Since the line of best fit shown for data set E passes approximately through the point  $(12, 30)$ , it follows that a line of best fit for data set F passes approximately through the point  $(12, 30(3.9))$ , or  $(12, 117)$ . Substituting  $(0, 46.8)$  and  $(12, 117)$  for  $(x_1, y_1)$  and

$(x_2, y_2)$ , respectively, in  $\frac{y_2 - y_1}{x_2 - x_1}$  yields  $\frac{117 - 46.8}{12 - 0}$ , which is equivalent to  $\frac{70.2}{12}$ , or **5.85**. Therefore, the value of  $b$  is approximately **5.85**, or approximately **5.9**. Thus,  $y = 46.8 + 5.9x$  could be an equation of a line of best fit for data set F.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect. This could be an equation of a line of best fit for data set E, not data set F.

**Question Difficulty:**

Hard

# Question ID c178d4da

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: c178d4da

Value	Data set A frequency	Data set B frequency
30	2	9
34	4	7
38	5	5
42	7	4
46	9	2

Data set A and data set B each consist of **27** values. The table shows the frequencies of the values for each data set. Which of the following statements best compares the means of the two data sets?

- A. The mean of data set A is greater than the mean of data set B.
- B. The mean of data set A is less than the mean of data set B.
- C. The mean of data set A is equal to the mean of data set B.
- D. There is not enough information to compare the means of the data sets.

ID: c178d4da Answer

Correct Answer:

A

Rationale

Choice A is correct. The mean value of a data set is the sum of the values of the data set divided by the number of values in the data set. When a data set is represented in a frequency table, the sum of the values in the data set is the sum of the products of each value and its frequency. For data set A, the sum of products of each value and its frequency is  $30(2) + 34(4) + 38(5) + 42(7) + 46(9)$ , or **1,094**. It's given that there are **27** values in data set A. Therefore, the mean of data set A is  $\frac{1,094}{27}$ , or approximately **40.52**. Similarly, the mean of data B is  $\frac{958}{27}$ , or approximately **35.48**. Therefore, the mean of data set A is greater than the mean of data set B.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

## Question ID 2c76bcce

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 2c76bcce

A company designs and makes handbags. To estimate the mean weight of the handbags made by the company on a particular day, a sample of the handbags made by the company on that day was selected at random. Based on the sample, it is estimated that the mean weight of all handbags made by the company on that day is **27.8 ounces (oz)**, with an associated margin of error of **0.02 oz**. Based on this estimate and associated margin of error, which of the following is the most plausible conclusion?

- A. The mean weight of all handbags made by the company on that day is between **27.78 oz** and **27.82 oz**.
- B. The actual weights of all handbags made by the company on that day are between **27.78 oz** and **27.82 oz**.
- C. The actual weights of all handbags from the sample are between **27.78 oz** and **27.82 oz**.
- D. The mean weight of all handbags made by the company on that day is **27.8 oz**.

ID: 2c76bcce Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the estimated mean weight of all handbags made by the company on a particular day is **27.8 oz**, with an associated margin of error of **0.02 oz**. It follows that plausible values for the mean weight are between **(27.8 – 0.02) oz** and **(27.8 + 0.02) oz**. Therefore, the most plausible conclusion is that the mean weight of all handbags made by the company on that day is between **27.78 oz** and **27.82 oz**.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Easy

# Question ID 9fa781f8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: 9fa781f8

The ratio  $x$  to  $y$  is equivalent to the ratio 9 to 5. If the value of  $x$  is 162, what is the value of  $y$ ?

ID: 9fa781f8 Answer

Correct Answer:

90

Rationale

The correct answer is 90. It's given that the ratio of  $x$  to  $y$  is equivalent to the ratio 9 to 5. It follows that  $\frac{x}{y} = \frac{9}{5}$ . Multiplying each side of this equation by  $5y$  yields  $\frac{(5y)x}{y} = \frac{9(5y)}{5}$ , or  $5x = 9y$ . Dividing each side of this equation by 9 yields  $\frac{5x}{9} = y$ . Substituting 162 for  $x$  in this equation yields  $\frac{5(162)}{9} = y$ , which is equivalent to  $\frac{810}{9} = y$ , or  $90 = y$ . Therefore, if the value of  $x$  is 162, the value of  $y$  is 90.

Question Difficulty:

Medium

# Question ID 9a144a01

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 9a144a01

Which of the following is true about the values of  $2^x$  and

$2x + 2$  for  $x > 0$ ?

- A. For all  $x > 0$ , it is true that  $2^x < 2x + 2$ .
- B. For all  $x > 0$ , it is true that  $2^x > 2x + 2$ .
- C. There is a constant  $c$  such that if  $0 < x < c$ , then  $2^x < 2x + 2$ , but if  $x > c$ , then  $2^x > 2x + 2$ .
- D. There is a constant  $c$  such that if  $0 < x < c$ , then  $2^x > 2x + 2$ , but if  $x > c$ , then  $2^x < 2x + 2$ .

ID: 9a144a01 Answer

Correct Answer:

C

Rationale

Choice C is correct. At  $x = 0$ , the value of  $2^x$  is less than the value of  $2x + 2$ :  $2^0 < 2(0) + 2$ , which is equivalent to  $1 < 2$ . As the value of  $x$  increases, the value of  $2^x$  remains less than the value of  $2x + 2$  until  $x = 3$ , which is when the two values are equal:  $2^3 = 2(3) + 2$ , which is equivalent to  $8 = 8$ . Then, for  $x > 3$ , the value of  $2^x$  is greater than the value of  $2x + 2$ . So there is a constant, 3, such that when  $0 < x < 3$ , then  $2^x < 2x + 2$ , but when  $x > 3$ , then  $2^x > 2x + 2$ .

Choice A is incorrect because  $2^x > 2x + 2$  when  $x > 3$ . Choice B is incorrect because  $2^x < 2x + 2$  when  $0 < x < 3$ . Choice D is incorrect because  $2^x < 2x + 2$  when  $0 < x < 3$  and  $2^x > 2x + 2$  when  $x > 3$ .

Question Difficulty:

Medium

# Question ID 022e9894

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: 022e9894

An insurance company offers a series of three information sessions. **1,250** people attended the first information session. **72%** of the people who attended the first information session attended the second information session, and **36%** of the people who attended the first and second information sessions attended the third information session. How many people attended all three information sessions?

ID: 022e9894 Answer

Correct Answer:

324

Rationale

The correct answer is **324**. It's given that **1,250** people attended the first information session, and that **72%** of the people who attended the first information session attended the second information session. Therefore, the number of people who attended the first and second information sessions can be found by calculating **72%** of **1,250**, which is equal to  $1,250 \left( \frac{72}{100} \right)$ , or **900**. It's also given that **36%** of the people who attended the first and second information sessions attended the third information session. Since **900** people attended the first and second information sessions, the number of people who attended the first, second, and third information sessions can be found by calculating **36%** of **900**, which is equal to  $900 \left( \frac{36}{100} \right)$ , or **324**. Therefore, **324** people attended all three information sessions.

Question Difficulty:

Medium

# Question ID 457d2f2c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%;"><div style="width: 100px; height: 10px; background-color: #005a99;"></div></div>

**ID: 457d2f2c**

A data set of 27 different numbers has a mean of 33 and a median of 33. A new data set is created by adding 7 to each number in the original data set that is greater than the median and subtracting 7 from each number in the original data set that is less than the median. Which of the following measures does NOT have the same value in both the original and new data sets?

- A. Median
- B. Mean
- C. Sum of the numbers
- D. Standard deviation

**ID: 457d2f2c Answer**

**Correct Answer:**

D

**Rationale**

Choice D is correct. When a data set has an odd number of elements, the median can be found by ordering the values from least to greatest and determining the middle value. Out of the 27 different numbers in this data set, 13 numbers are below the median, one number is exactly 33, and 13 numbers are above the median. When 7 is subtracted from each number below the median and added to each number above the median, the data spread out from the median. Since the median of this data set, 33, is equivalent to the mean of the data set, the data also spread out from the mean. Since standard deviation is a measure of how spread out the data are from the mean, a greater spread from the mean indicates an increased standard deviation.

Choice A is incorrect. All the numbers less than the median decrease and all the numbers greater than the median increase, but the median itself doesn't change. Choices B and C are incorrect. The mean of a data set is found by dividing the sum of the values by the number of values. The net change from subtracting 7 from 13 numbers and adding 7 to 13 numbers is zero. Therefore, neither the mean nor the sum of the numbers changes.

**Question Difficulty:**

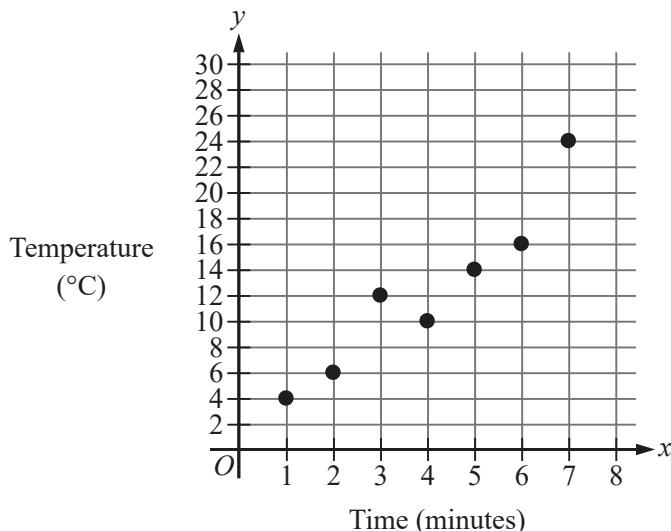
Hard

# Question ID e24765e6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: e24765e6

During a study, the temperature, in degrees Celsius ( $^{\circ}\text{C}$ ), of the air in a chamber was recorded to the nearest integer at certain times. The scatterplot shows the recorded temperature  $y$ , in  $^{\circ}\text{C}$ , of the air in the chamber  $x$  minutes after the start of the study.



What was the average rate of change, in  $^{\circ}\text{C}$  per minute, of the recorded temperature of the air in the chamber from  $x = 5$  to  $x = 7$ ?

ID: e24765e6 Answer

Correct Answer:

5

Rationale

The correct answer is 5. For the graph shown,  $x$  represents time, in minutes, and  $y$  represents temperature, in degrees Celsius ( $^{\circ}\text{C}$ ). Therefore, the average rate of change, in  $^{\circ}\text{C}$  per minute, of the recorded temperature of the air in the chamber between two  $x$ -values is the difference in the corresponding  $y$ -values divided by the difference in the  $x$ -values. The graph shows that at  $x = 5$ , the corresponding  $y$ -value is 14. The graph also shows that at  $x = 7$ , the corresponding  $y$ -value is 24. It follows that the average rate of change, in  $^{\circ}\text{C}$  per minute, from  $x = 5$  to  $x = 7$  is  $\frac{24-14}{7-5}$ , which is equivalent to  $\frac{10}{2}$ , or 5.

Question Difficulty:

Medium

# Question ID 47624288

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 47624288

The table gives the distribution of votes for a new school mascot and grade level for 80 students.

Mascot	Grade level			
	Sixth	Seventh	Eighth	Total
Badger	4	9	9	22
Lion	9	2	9	20
Longhorn	4	6	4	14
Tiger	6	9	9	24
<b>Total</b>	<b>23</b>	<b>26</b>	<b>31</b>	<b>80</b>

If one of these students is selected at random, what is the probability of selecting a student whose vote for new mascot was for a lion?

- A.  $\frac{1}{9}$
- B.  $\frac{1}{5}$
- C.  $\frac{1}{4}$
- D.  $\frac{2}{3}$

ID: 47624288 Answer

Correct Answer:

C

Rationale

Choice C is correct. If one of these students is selected at random, the probability of selecting a student whose vote for the new mascot was for a lion is given by the number of votes for a lion divided by the total number of votes. The given table indicates that the number of votes for a lion is 20 votes, and the total number of votes is 80 votes. The table gives the distribution of votes for 80 students, and the table shows a total of 80 votes were counted. It follows that each of the 80 students voted exactly once. Thus, the probability of selecting a student whose vote for the new mascot was for a lion is  $\frac{20}{80}$ , or  $\frac{1}{4}$ .

Choice A is incorrect and may result from conceptual or computational errors.

Choice B is incorrect and may result from conceptual or computational errors.

Choice D is incorrect and may result from conceptual or computational errors.

Question Difficulty:

Easy

# Question ID 6310adbc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 6310adbc

The ratio of  $t$  to  $u$  is 1 to 2, and  $t = 10$ .

What is the value of  $u$ ?

- A. 2
- B. 5
- C. 10
- D. 20

ID: 6310adbc Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that the ratio of  $t$  to  $u$  is 1 to 2. Since  $t = 10$ , it follows that the ratio of 10 to  $u$  is also 1 to 2. The relationship between these ratios can be represented by the proportion  $\frac{10}{u} = \frac{1}{2}$ . Multiplying both sides of this equation by 2 and then by  $u$  yields  $20 = u$ .

Choice A is incorrect. This is the value of  $u$  when  $t = 1$ . Choice B is incorrect. This would be the value of  $u$  if the ratio of  $t$  to  $u$  were 2 to 1. Choice C is incorrect. This is the value of  $t$ , not  $u$ .

Question Difficulty:

Easy

# Question ID e438ec3f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: e438ec3f

A grove has **6** rows of birch trees and **5** rows of maple trees. Each row of birch trees has **8** trees **20** feet or taller and **6** trees shorter than **20** feet. Each row of maple trees has **9** trees **20** feet or taller and **7** trees shorter than **20** feet. A tree from one of these rows will be selected at random. What is the probability of selecting a maple tree, given that the tree is **20** feet or taller?

- A.  $\frac{9}{164}$
- B.  $\frac{3}{10}$
- C.  $\frac{15}{31}$
- D.  $\frac{9}{17}$

ID: e438ec3f Answer

Correct Answer:

C

Rationale

Choice C is correct. If a tree from one of these rows is selected at random, the probability of selecting a maple tree, given that the tree is **20** feet or taller, is equal to the number of maple trees that are **20** feet or taller divided by the total number of trees that are **20** feet or taller. It's given that there are **6** rows of birch trees, and each row of birch trees has **8** trees that are **20** feet or taller. This means that there are a total of **6(8)**, or **48**, birch trees that are **20** feet or taller. It's given that there are **5** rows of maple trees, and each row of maple trees has **9** trees that are **20** feet or taller. This means that there are a total of **5(9)**, or **45**, maple trees that are **20** feet or taller. It follows that there are a total of **48 + 45**, or **93**, trees that are **20** feet or taller. Therefore, the probability of selecting a maple tree, given that the tree is **20** feet or taller, is  $\frac{45}{93}$ , or  $\frac{15}{31}$ .

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

# Question ID 63573fea

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 63573fea

During the first month of sales, a company sold 1,300,000 units of a certain type of smartphone. During the same month, 15% of the units sold were returned. If sales and the return rate remain the same for each of the next 5 months, about how many units of this smartphone will be returned to the company during this 6-month period?

- A. 195,000
- B. 975,000
- C. 1,170,000
- D. 6,630,000

ID: 63573fea Answer

Correct Answer:

C

Rationale

Choice C is correct. Of the 1,300,000 units sold during the first month, 15% were returned, so  $(1,300,000)(0.15) = 195,000$  units were returned during the first month. If the units were sold and returned at the same rate for the next 5 months, then a total of  $(195,000)(6) = 1,170,000$  smartphone units were returned during the 6-month period.

Choice A is incorrect. This is the number of units that were returned in 1 month. Choice B is incorrect. This is the number of units that were returned in 5 months. Choice D is incorrect. This is the number of units sold and not returned during the first 6 months.

Question Difficulty:

Medium

# Question ID 191d167b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 191d167b

Last year, **200** students enrolled in an interior design program. This year, the number of students enrolled is **147%** of last year's number. How many students are enrolled in the interior design program this year?

- A. **247**
- B. **294**
- C. **347**
- D. **394**

ID: 191d167b Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that the number of students enrolled in an interior design program this year is **147%** of last year's number, which is **200**. **147%** of **200** can be expressed as  $(\frac{147}{100})(200)$ , or  $(1.47)(200)$ , which is equivalent to **294**. Therefore, **294** students are enrolled in the interior design program this year.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

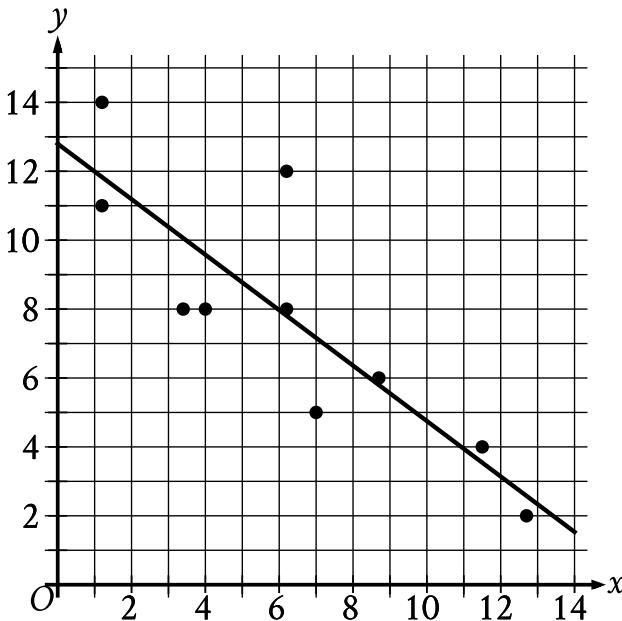
Easy

# Question ID 03a16790

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: 03a16790

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit is also shown.



Which of the following is closest to the slope of the line of best fit shown?

- A.  $-2.4$
- B.  $-0.8$
- C.  $0.8$
- D.  $2.4$

ID: 03a16790 Answer

Correct Answer:

B

Rationale

Choice B is correct. A line of best fit is shown in the scatterplot such that as the value of  $x$  increases, the value of  $y$  decreases. Thus, the slope of the line of best fit shown is negative. The slope of a line passing through two points,  $(x_1, y_1)$  and  $(x_2, y_2)$ , can be calculated as  $\frac{y_2 - y_1}{x_2 - x_1}$ . The line of best fit shown passes approximately through the points  $(1, 12)$  and  $(11, 4)$ . Substituting  $(1, 12)$  and  $(11, 4)$  for  $(x_1, y_1)$  and  $(x_2, y_2)$ , respectively, in  $\frac{y_2 - y_1}{x_2 - x_1}$  gives  $\frac{4 - 12}{11 - 1}$ , which is equivalent to  $-\frac{8}{10}$ , or  $-0.8$ . Therefore, of the given choices,  $-0.8$  is closest to the slope of the line of best fit shown.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. The line of best fit shown has a negative slope, not a positive slope.

Choice D is incorrect. The line of best fit shown has a negative slope, not a positive slope.

**Question Difficulty:**

Medium

# Question ID 60caadfd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 60caadfd

Each rock in a collection of **70** rocks was classified as either igneous, metamorphic, or sedimentary, as shown in the frequency table.

Classification	Frequency
igneous	<b>10</b>
metamorphic	<b>33</b>
sedimentary	<b>27</b>

If one of these rocks is selected at random, what is the probability of selecting a rock that is igneous?

- A.  $\frac{10}{27}$
- B.  $\frac{10}{33}$
- C.  $\frac{10}{60}$
- D.  $\frac{10}{70}$

ID: 60caadfd Answer

Correct Answer:

D

Rationale

Choice D is correct. If one of the rocks in the collection is selected at random, the probability of selecting a rock that is igneous is equal to the number of igneous rocks in the collection divided by the total number of rocks in the collection. According to the table, there are **10** igneous rocks in the collection, and it's given that there's a total of **70** rocks in the collection. Therefore, if one of the rocks in the collection is selected at random, the probability of selecting a rock that is igneous is  $\frac{10}{70}$ .

Choice A is incorrect. This is the number of igneous rocks in the collection divided by the number of sedimentary rocks in the collection, not divided by the total number of rocks in the collection.

Choice B is incorrect. This is the number of igneous rocks in the collection divided by the number of metamorphic rocks in the collection, not divided by the total number of rocks in the collection.

Choice C is incorrect. This is the number of igneous rocks in the collection divided by the number of rocks in the collection that aren't igneous, not divided by the total number of rocks in the collection.

Question Difficulty:

Easy

# Question ID c3d65f93

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: c3d65f93

Five *Eretmochelys imbricata*, a type of sea turtle, each have a nest. The table shows an original data set of the number of eggs that each turtle laid in its nest.

Nest	Number of eggs
A	149
B	144
C	148
D	136
E	139

A sixth nest with 121 eggs is added to create a new data set. Which of the following correctly compares the means of the two data sets?

- A. The mean of the original data set is greater than the mean of the new data set.
- B. The mean of the original data set is less than the mean of the new data set.
- C. The means of both data sets are equal.
- D. There is not enough information to compare the means.

ID: c3d65f93 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the table shows an original data set of 5 values. It's also given that a sixth value is added to create a new data set. The new data set consists of the 5 values in the original data set and one additional value, 121. Since the additional value, 121, is less than any value in the original data set, the mean of the original data set is greater than the mean of the new data set.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Easy

# Question ID b4f5a7ca

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 25%; background-color: #005a99; height: 10px;"></div> <div style="width: 25%; background-color: #005a99; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

## ID: b4f5a7ca

A survey was conducted using a sample of history professors selected at random from the California State Universities. The professors surveyed were asked to name the publishers of their current texts. What is the largest population to which the results of the survey can be generalized?

- A. All professors in the United States
- B. All history professors in the United States
- C. All history professors at all California State Universities
- D. All professors at all California State Universities

## ID: b4f5a7ca Answer

### Correct Answer:

C

### Rationale

Choice C is correct. Selecting a sample at random when conducting a survey allows the results to be generalized to the population from which the sample was selected, but not beyond this population. In this situation, the population that the sample was selected from is history professors from the California State Universities. Therefore, the largest population to which the results of the survey can be generalized is all history professors at all California State Universities.

Choices A, B, and D are incorrect. Since the sample was selected at random from history professors from the California State Universities, the results of the survey can't be generalized to all professors in the United States, all history professors in the United States, or all professors at all California State Universities. All three of these populations may use different texts and therefore may name different publishers.

### Question Difficulty:

Medium

# Question ID 93724cc6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 93724cc6

21 is 21% of what number?

- A. 0
- B. 1
- C. 42
- D. 100

ID: 93724cc6 Answer

Correct Answer:

D

Rationale

Choice D is correct. Let  $x$  represent the number that 21 is 21% of. It follows that  $\frac{21}{x} = \frac{21}{100}$ . Multiplying each side of this equation by  $x$  yields  $21 = \frac{21x}{100}$ . Multiplying each side of this equation by 100 yields  $2,100 = 21x$ . Dividing each side of this equation by 21 yields  $100 = x$ . Therefore, 21 is 21% of 100.

Choice A is incorrect. 21% of 0 is 0, not 21.

Choice B is incorrect. 21% of 1 is 0.21, not 21.

Choice C is incorrect. 21% of 42 is 8.82, not 21.

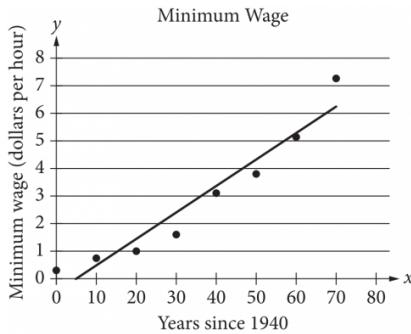
Question Difficulty:

Easy

# Question ID d6af3572

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: d6af3572



The scatterplot above shows the federal-mandated minimum wage every 10 years between 1940 and 2010. A line of best fit is shown, and its equation is

$y = 0.096x - 0.488$ . What does the line of best fit predict about the increase in the minimum wage over the 70-year period?

- A. Each year between 1940 and 2010, the average increase in minimum wage was 0.096 dollars.
- B. Each year between 1940 and 2010, the average increase in minimum wage was 0.49 dollars.
- C. Every 10 years between 1940 and 2010, the average increase in minimum wage was 0.096 dollars.
- D. Every 10 years between 1940 and 2010, the average increase in minimum wage was 0.488 dollars.

ID: d6af3572 Answer

Correct Answer:

A

## Rationale

Choice A is correct. The given equation is in slope-intercept form, or  $y = mx + b$ , where  $m$  is the value of the slope of the line of best fit. Therefore, the slope of the line of best fit is 0.096. From the definition of slope, it follows that an increase of 1 in the  $x$ -value corresponds to an increase of 0.096 in the  $y$ -value. Therefore, the line of best fit predicts that for each year between 1940 and 2010, the minimum wage will increase by 0.096 dollar per hour.

Choice B is incorrect and may result from using the  $y$ -coordinate of the  $y$ -intercept as the average increase, instead of the slope. Choice C is incorrect and may result from using the 10-year increments given on the  $x$ -axis to incorrectly interpret the slope of the line of best fit. Choice D is incorrect and may result from using the  $y$ -coordinate of the  $y$ -intercept as the average increase, instead of the slope, and from using the 10-year increments given on the  $x$ -axis to incorrectly interpret the slope of the line of best fit.

## Question Difficulty:

Hard

## Question ID 2d16d62c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 2d16d62c

A special camera is used for underwater ocean research. When the camera is at a depth of **58** fathoms, what is the camera's depth in feet? (**1 fathom = 6 feet**)

ID: 2d16d62c Answer

**Correct Answer:**

348

**Rationale**

The correct answer is **348**. It's given that **1** fathom is equivalent to **6** feet. Therefore, **58** fathoms is equivalent to  $(58 \text{ fathoms}) \left( \frac{6 \text{ feet}}{1 \text{ fathom}} \right)$ , or **348** feet. Thus, when the camera is at a depth of **58** fathoms, the camera's depth, in feet, is **348**.

**Question Difficulty:**

Easy

# Question ID 69f6717f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: 69f6717f

A sample of oak has a density of **807** kilograms per cubic meter. The sample is in the shape of a cube, where each edge has a length of **0.90** meters. To the nearest whole number, what is the mass, in kilograms, of this sample?

- A. **588**
- B. **726**
- C. **897**
- D. **1,107**

ID: 69f6717f Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that the sample is in the shape of a cube with edge lengths of **0.9** meters. Therefore, the volume of the sample is **0.90<sup>3</sup>**, or **0.729**, cubic meters. It's also given that the sample has a density of **807** kilograms per **1** cubic meter.

Therefore, the mass of this sample is **0.729 cubic meters**  $\left(\frac{807 \text{ kilograms}}{1 \text{ cubic meter}}\right)$ , or **588.303** kilograms. Rounding this mass to the nearest whole number gives **588** kilograms. Therefore, to the nearest whole number, the mass, in kilograms, of this sample is **588**.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Hard

# Question ID 35bec412

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 35bec412

73, 74, 75, 77, 79, 82, 84, 85, 91

What is the median of the data shown?

ID: 35bec412 Answer

Correct Answer:

79

Rationale

The correct answer is **79**. The median of a data set with an odd number of values is the middle value of the set when the values are ordered from least to greatest. Because the given data set consists of nine values that are ordered from least to greatest, the median is the fifth value in the data set. Therefore, the median of the data shown is **79**.

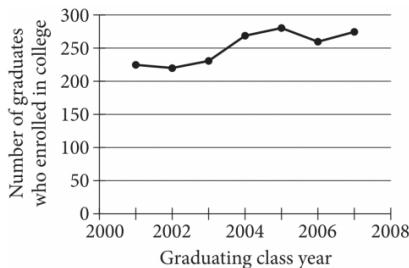
Question Difficulty:

Easy

# Question ID 74dee52b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #002060; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 74dee52b



The line graph shows the number of graduates from the classes of 2001 through 2007 at a certain school who enrolled in college within 24 months of graduation. Of the following, which class had the fewest graduates who enrolled in college within 24 months of graduation?

- A. 2002
- B. 2004
- C. 2005
- D. 2007

ID: 74dee52b Answer

Correct Answer:

A

Rationale

Choice A is correct. The year with the fewest graduates who enrolled in college within 24 months of graduation is the point with the lowest value on the vertical axis. This occurs at 2002.

Choice B, C, and D are incorrect. The years 2004, 2005, and 2007 each had a greater number of graduates who enrolled in college within 24 months of graduation than did the year 2002.

Question Difficulty:

Easy

# Question ID c3d78831

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: c3d78831

At a particular track meet, the ratio of coaches to athletes is **1** to **26**. If there are  $x$  coaches at the track meet, which of the following expressions represents the number of athletes at the track meet?

- A.  $\frac{x}{26}$
- B.  $26x$
- C.  $x + 26$
- D.  $\frac{26}{x}$

ID: c3d78831 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that at a particular track meet, the ratio of coaches to athletes is **1** to **26**. If one number in a ratio is multiplied by a value, the other number must be multiplied by the same value in order to maintain the same ratio. If there are  $x$  coaches at the track meet, multiplying both numbers in the ratio by  $x$  yields  $1(x)$  to  $26(x)$ , or  $x$  to  $26x$ . Therefore, the expression  $26x$  represents the number of athletes at the track meet.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Medium

# Question ID fea831fc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: fea831fc

On April 18, 1775, Paul Revere set off on his midnight ride from Charlestown to Lexington. If he had ridden straight to Lexington without stopping, he would have traveled 11 miles in 26 minutes. In such a ride, what would the average speed of his horse have been, to the nearest tenth of a mile per hour?

ID: fea831fc Answer

## Rationale

The correct answer is 25.4. The average speed is the total distance divided by the total time. The total distance is 11 miles and the total time is 26 minutes. Thus, the average speed is  $\frac{11}{26}$  miles per minute. The question asks for the average speed in miles per hour, and there are 60 minutes in an hour; converting miles per minute to miles per hour gives the following:

$$\text{Average speed} = \frac{11 \text{ miles}}{26 \text{ minutes}} \times \frac{60 \text{ minutes}}{1 \text{ hour}}$$

$$= \frac{660}{26} \text{ miles per hour}$$

$$\approx 25.38 \text{ miles per hour}$$

Therefore, to the nearest tenth of a mile per hour, the average speed of Paul Revere's ride would have been 25.4 miles per hour. Note that 25.4 and  $127/5$  are examples of ways to enter a correct answer.

## Question Difficulty:

Medium

# Question ID aeeaec96

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: aeeaec96

How many yards are equivalent to **612** inches? (**1 yard = 36 inches**)

- A. **0.059**
- B. **17**
- C. **576**
- D. **22,032**

ID: aeeaec96 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that **1 yard = 36 inches**. Therefore, **612** inches is equivalent to **612 inches**  $\left(\frac{1 \text{ yard}}{36 \text{ inches}}\right)$ , which can be rewritten as  $\frac{612 \text{ yards}}{36}$ , or **17** yards.

Choice A is incorrect. This is the number of yards that are equivalent to **2.124** inches.

Choice C is incorrect. This is the number of yards that are equivalent to **20,736** inches.

Choice D is incorrect. This is the number of yards that are equivalent to **793,152** inches.

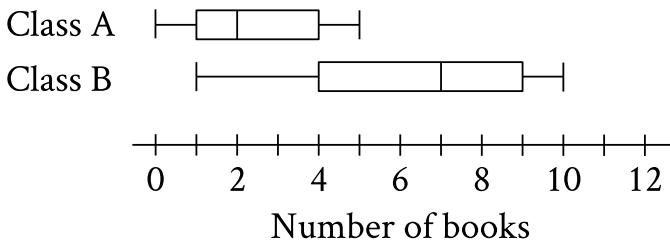
Question Difficulty:

Easy

# Question ID 6c9444cd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; height: 10px; background-color: #005a9f;"></div>

ID: 6c9444cd



The two box plots show the distribution of number of books read over the summer by the students in two different English classes. What is the positive difference between the ranges of number of books read over the summer for the two classes?

ID: 6c9444cd Answer

Correct Answer:

4

Rationale

The correct answer is **4**. It's given that the two boxplots show the distribution of number of books read over the summer by the students in two different English classes. In a boxplot, the first vertical line represents the minimum value of the data set and the last vertical line represents the maximum value of the data set. The range of a data set is the difference between its maximum value and its minimum value. In class A, the maximum number of books read is **5** and the minimum number of books read is **0**. The difference between those values is **5 – 0**, or **5**. Therefore, the range of the number of books read in class A is **5**. In class B, the maximum number of books read is **10** and the minimum number of books read is **1**. The difference between those values is **10 – 1**, or **9**. Therefore, the range of the number of books read in class B is **9**. To find the positive difference between the ranges of the number of books read for the two classes, the smaller range must be subtracted from the larger range. Therefore, the positive difference between the ranges of number of books read over the summer for the two classes is **9 – 5**, or **4**.

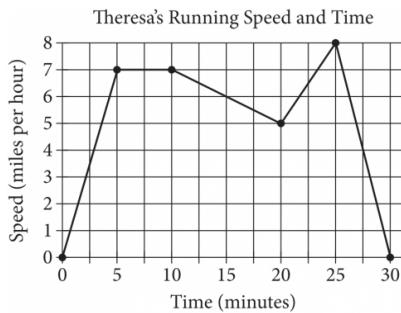
Question Difficulty:

Hard

# Question ID 9d88a3e3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 9d88a3e3



Theresa ran on a treadmill for thirty minutes, and her time and speed are shown on the graph above. According to the graph, which of the following statements is NOT true concerning Theresa's run?

- A. Theresa ran at a constant speed for five minutes.
- B. Theresa's speed was increasing for a longer period of time than it was decreasing.
- C. Theresa's speed decreased at a constant rate during the last five minutes.
- D. Theresa's speed reached its maximum during the last ten minutes.

ID: 9d88a3e3 Answer

Correct Answer:

B

Rationale

Choice B is correct. Theresa's speed was increasing from 0 to 5 minutes and from 20 to 25 minutes, which is a total of 10 minutes. Theresa's speed was decreasing from 10 minutes to 20 minutes and from 25 to 30 minutes, which is a total of 15 minutes. Therefore, Theresa's speed was NOT increasing for a longer period of time than it was decreasing.

Choice A is incorrect. Theresa ran at a constant speed for the 5-minute period from 5 to 10 minutes. Choice C is incorrect. Theresa's speed decreased at a constant rate during the last 5 minutes, which can be seen since the graph is linear during that time. Choice D is incorrect. Theresa's speed reached its maximum at 25 minutes, which is within the last 10 minutes.

Question Difficulty:

Easy

# Question ID e03f3477

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: e03f3477

A sample consisting of **720** adults who own televisions was selected at random for a study. Based on the sample, it is estimated that **32%** of all adults who own televisions use their televisions to watch nature shows, with an associated margin of error of **3.41%**. Which of the following is the most plausible conclusion about all adults who own televisions?

- A. More than **35.41%** of all adults who own televisions use their televisions to watch nature shows.
- B. Between **28.59%** and **35.41%** of all adults who own televisions use their televisions to watch nature shows.
- C. Since the sample included adults who own televisions and not just those who use their televisions to watch nature shows, no conclusion can be made.
- D. Since the sample did not include all the people who watch nature shows, no conclusion can be made.

ID: e03f3477 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that based on a sample selected at random, it's estimated that **32%** of all adults who own televisions use their televisions to watch nature shows, with an associated margin of error of **3.41%**. Subtracting the margin of error from the estimate and adding the margin of error to the estimate gives an interval of plausible values for the true percentage of adults who own televisions who use their televisions to watch nature shows. This means it's plausible that between **32% – 3.41%**, or **28.59%**, and **32% + 3.41%**, or **35.41%**, of all adults who own televisions use their televisions to watch nature shows. Therefore, of the given choices, the most plausible conclusion is that between **28.59%** and **35.41%** of all adults who own televisions use their televisions to watch nature shows.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect. To make a plausible conclusion about all adults who own televisions, the sample must be selected at random from all adults who own televisions, not just those who use their televisions to watch nature shows.

Choice D is incorrect. Since the sample was selected at random from all adults who own televisions, a plausible conclusion can be made about all adults who own televisions.

Question Difficulty:

Medium

# Question ID d693f563

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: d693f563

Last year, Cedric had **35** plants in his garden. This year, the number of plants in Cedric's garden is **60%** greater than the number of plants in his garden last year. How many plants does Cedric have in his garden this year?

ID: d693f563 Answer

Correct Answer:

56

Rationale

The correct answer is **56**. It's given that Cedric had **35** plants in his garden last year and that the number of plants in Cedric's garden this year is **60%** greater than the number of plants in his garden last year. It follows that the number of plants in Cedric's garden this year is **35** plus **60%** of **35**, which is equal to  $35 + 35(\frac{60}{100})$ , or  $35 + 35(0.6)$ . This expression is equivalent to  $35 + 21$ , or **56**. Therefore, Cedric has **56** plants in his garden this year.

Question Difficulty:

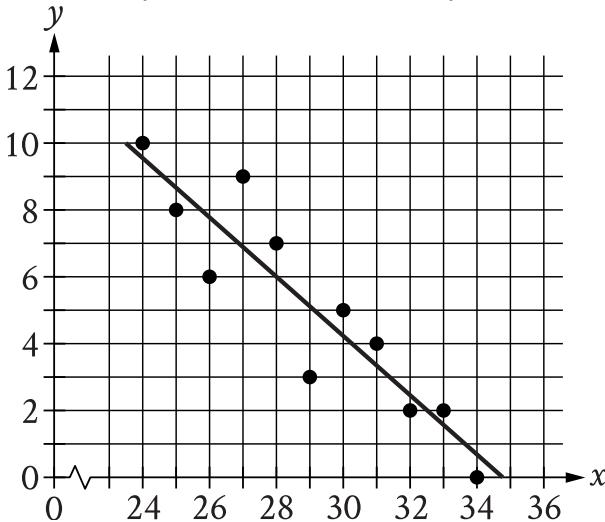
Medium

# Question ID f46139df

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: f46139df

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit for the data is also shown.



At  $x = 25.5$ , which of the following is closest to the  $y$ -value predicted by the line of best fit?

- A. 6.2
- B. 7.3
- C. 8.2
- D. 9.1

ID: f46139df Answer

Correct Answer:

C

Rationale

Choice C is correct. On the line of best fit, an  $x$ -value of 25.5 corresponds to a  $y$ -value between 8 and 8.5. Therefore, at  $x = 25.5$ , 8.2 is closest to the  $y$ -value predicted by the line of best fit.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty:

Medium

# Question ID 07f2829b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: 07f2829b

## International Tourist

Arrivals, in millions

Country	2012	2013
France	83.0	84.7
United States	66.7	69.8
Spain	57.5	60.7
China	57.7	55.7
Italy	46.4	47.7
Turkey	35.7	37.8
Germany	30.4	31.5
United Kingdom	26.3	32.2
Russia	24.7	28.4

The table above shows the number of international tourist arrivals, rounded to the nearest tenth of a million, to the top nine tourist destinations in both 2012 and 2013. Based on the information given in the table, how much greater, in millions, was the median number of international tourist arrivals to the top nine tourist destinations in 2013 than the median number in 2012, to the nearest tenth of a million?

ID: 07f2829b Answer

### Rationale

The correct answer is 1.3. The median number of tourists is found by ordering the number of tourists from least to greatest and determining the middle value from this list. When the number of tourists in 2012 is ordered from least to greatest, the middle value, or the fifth number, is 46.4 million. When the number of tourists in 2013 is ordered from least to greatest, the middle value, or the fifth number, is 47.7 million. The difference between these two medians is  $47.7 \text{ million} - 46.4 \text{ million} = 1.3 \text{ million}$ . Note that 1.3 and 13/10 are examples of ways to enter a correct answer.

### Question Difficulty:

Medium

# Question ID e5b5fbdd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: e5b5fbdd

Of the 8 planets in our solar system, 4 are considered rocky. If a student randomly selects 1 of those 8 planets as a topic for a report, what is the probability that the selected planet will be rocky?

A.  $\frac{1}{8}$

B.  $\frac{1}{4}$

C.  $\frac{1}{2}$

D. 2

ID: e5b5fbdd Answer

Correct Answer:

C

Rationale

Choice C is correct. If one of these planets is selected at random, the probability that the selected planet will be rocky is calculated by dividing the number of planets that are considered rocky by the total number of planets. It's given that 4 of the 8 total planets

are considered rocky. Therefore, the probability that the selected planet will be rocky is  $\frac{4}{8}$ , which is equivalent to  $\frac{1}{2}$ .

Choices A and B are incorrect. These represent the probability if 1 of the 8 planets was considered rocky (choice A) and if 2 of the 8 planets were considered rocky (choice B). Choice D is incorrect and may result from dividing the total number of planets by the number of planets that are considered rocky.

Question Difficulty:

Easy

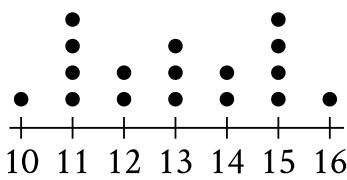
# Question ID d65b9a87

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div>

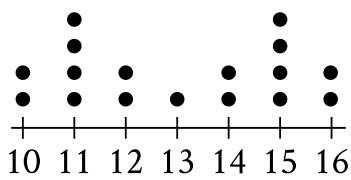
ID: d65b9a87

The dot plots represent the distributions of values in data sets A and B.

Data Set A



Data Set B



Which of the following statements must be true?

- I. The median of data set A is equal to the median of data set B.
  - II. The standard deviation of data set A is equal to the standard deviation of data set B.
- A. I only
- B. II only
- C. I and II
- D. Neither I nor II

ID: d65b9a87 Answer

Correct Answer:

A

Rationale

Choice A is correct. The median of a data set with an odd number of values that are in ascending or descending order is the middle value of the data set. Since the distribution of the values of both data set A and data set B form symmetric dot plots, and each data set has an odd number of values, it follows that the median is given by the middle value in each of the dot plots. Thus, the median of data set A is 13, and the median of data set B is 13. Therefore, statement I is true. Data set A and data set B have the same frequency for each of the values 11, 12, 14, and 15. Data set A has a frequency of 1 for values 10 and 16, whereas data set B has a frequency of 2 for values 10 and 16. Standard deviation is a measure of the spread of a data set; it is larger when there are more values further from the mean, and smaller when there are more values closer to the mean. Since both distributions are symmetric with an odd number of values, the mean of each data set is equal to its median. Thus, each data set has a mean of 13. Since more of the values in data set A are closer to 13 than data set B, it follows that data set A has a smaller standard deviation than data set B. Thus, statement II is false. Therefore, only statement I must be true.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**  
Hard

# Question ID 7ac5d686

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

**ID: 7ac5d686**

An inspector begins a day of work with a large sample of shirts that need to be checked for defects. The inspector works at a constant rate throughout the morning. What type of model is best to model the number of shirts remaining to be checked for defects at any given time throughout the morning?

- A. A linear model with a positive slope
- B. A linear model with a negative slope
- C. An exponential growth model
- D. An exponential decay model

**ID: 7ac5d686 Answer**

## Rationale

Choice B is correct. Since the work is done at a constant rate, a linear model best models the situation. The number of shirts remaining is dependent on the length of time the inspector has worked; therefore, if the relationship were graphed, time would be the variable of the horizontal axis and the number of remaining shirts would be the variable of the vertical axis. Since the number of shirts decreases as the time worked increases, it follows that the slope of this graph is negative.

Choice A is incorrect and may result from incorrectly reasoning about the slope. Choices C and D are incorrect and may result from not identifying the constant rate of work as a characteristic of a linear model.

## Question Difficulty:

Medium

# Question ID 1fc4f47b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

## ID: 1fc4f47b

At a movie theater, there are a total of **350** customers. Each customer is located in either theater A, theater B, or theater C. If one of these customers is selected at random, the probability of selecting a customer who is located in theater A is **0.48**, and the probability of selecting a customer who is located in theater B is **0.24**. How many customers are located in theater C?

- A. **28**
- B. **40**
- C. **84**
- D. **98**

## ID: 1fc4f47b Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. It's given that at a movie theater, there are a total of **350** customers and that each customer is located in either theater A, theater B, or theater C. If the probability of selecting a customer in theater A is **0.48**, then  $(0.48)(350)$ , or **168**, customers are located in theater A. If the probability of selecting a customer in theater B is **0.24**, then  $(0.24)(350)$ , or **84**, customers are located in theater B. It follows that there are **168 + 84**, or **252**, customers in theater A and theater B. Therefore, there are **350 – 252**, or **98**, customers in theater C.

Choice A is incorrect. This is the percent, not the number, of the customers that are located in theater C.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the number of customers that are located in theater B, not theater C.

**Question Difficulty:**

Medium

# Question ID e7133228

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: e7133228

The speed of a vehicle is increasing at a rate of **7.3** meters per second squared. What is this rate, in **miles per minute squared**, rounded to the nearest tenth? (Use **1 mile = 1,609 meters**.)

- A. **0.3**
- B. **16.3**
- C. **195.8**
- D. **220.4**

ID: e7133228 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that the speed of a vehicle is increasing at a rate of **7.3** meters per second squared. It's given to use **1 mile = 1,609 meters**. There are **60** seconds in **1** minute; therefore,  **$60^2$**  or **3,600** seconds squared is equal to **1** minute squared. It follows that the rate of **7.3** meters per second squared is equivalent to

$\left(\frac{7.3 \text{ meters}}{1 \text{ second squared}}\right) \left(\frac{1 \text{ mile}}{1,609 \text{ meters}}\right) \left(\frac{3,600 \text{ seconds squared}}{1 \text{ minute squared}}\right)$ , or approximately **16.33 miles per minute squared**. The rate, in **miles per minute squared**, rounded to the nearest tenth is **16.3**.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Hard

# Question ID 2905ded0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 2905ded0

	Live east of the river	Live west of the river	Total
Less than 40 years old	17	11	28
At least 40 years old	18	89	107
Total	35	100	135

The table summarizes members of a local organization by age and whether they live east or west of the river. If a member of the organization is selected at random, what is the probability that the selected member is at least **40** years old?

- A.  $\frac{28}{135}$
- B.  $\frac{35}{135}$
- C.  $\frac{100}{135}$
- D.  $\frac{107}{135}$

ID: 2905ded0 Answer

Correct Answer:

D

Rationale

Choice D is correct. If a member of the organization is selected at random, the probability that the selected member is at least **40** years old is equal to the number of members who are at least **40** years old divided by the total number of members. According to the table, there are a total of **135** members of the organization, and **107** of these members are at least **40** years old. Therefore, the probability that the selected member is at least **40** years old is  $\frac{107}{135}$ .

Choice A is incorrect. This is the probability that the selected member is less than **40** years old.

Choice B is incorrect. This is the probability that the selected member lives east of the river.

Choice C is incorrect. This is the probability that the selected member lives west of the river.

Question Difficulty:

Easy

# Question ID bb7c8186

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: bb7c8186    ID: bb7c8186 Answer

Correct Answer:

What is 23% of 100?

A. 23

Rationale

B. 46

Choice A is correct. 23% of 100 can be calculated by multiplying  $\frac{23}{100}$  by 100, which yields  $(\frac{23}{100})100$ , or 23.

C. 77

Choice B is incorrect. This is 46%, not 23%, of 100.

D. 123

Choice C is incorrect. This is 23% less than 100, not 23% of 100.

Choice D is incorrect. This is 23% greater than 100, not 23% of 100.

Question Difficulty:

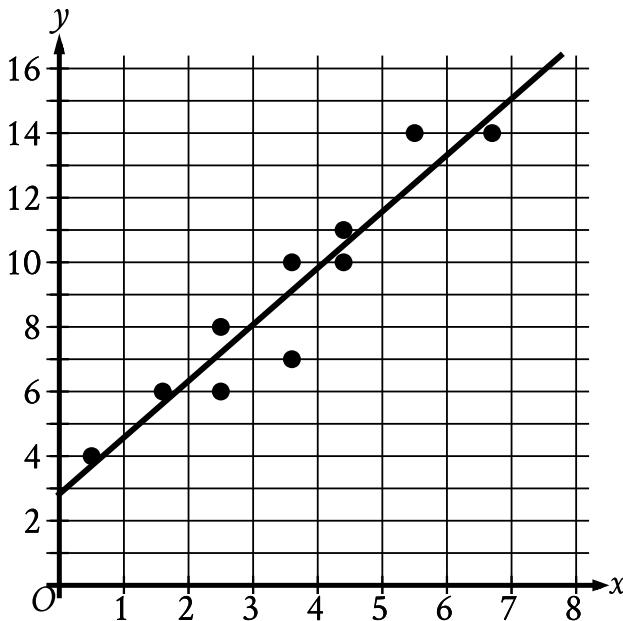
Easy

# Question ID d230e963

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: d230e963

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit is also shown.



Which of the following equations best represents the line of best fit shown?

- A.  $y = 2.8 + 1.7x$
- B.  $y = 2.8 - 1.7x$
- C.  $y = -2.8 + 1.7x$
- D.  $y = -2.8 - 1.7x$

ID: d230e963 Answer

Correct Answer:

A

Rationale

Choice A is correct. The line of best fit shown intersects the  $y$ -axis at a positive  $y$ -value and has a positive slope. The graph of an equation of the form  $y = a + bx$ , where  $a$  and  $b$  are constants, intersects the  $y$ -axis at a  $y$ -value of  $a$  and has a slope of  $b$ . Of the given choices, only choice A represents a line that intersects the  $y$ -axis at a positive  $y$ -value, 2.8, and has a positive slope, 1.7.

Choice B is incorrect. This equation represents a line that has a negative slope, not a positive slope.

Choice C is incorrect. This equation represents a line that intersects the  $y$ -axis at a negative  $y$ -value, not a positive  $y$ -value.

Choice D is incorrect. This equation represents a line that intersects the  $y$ -axis at a negative  $y$ -value, not a positive  $y$ -value, and has a negative slope, not a positive slope.

**Question Difficulty:**

Easy

# Question ID 181cc4d6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 181cc4d6

Rectangle A has length 15 and width  $w$ . Rectangle B has length 20 and the same length-to-width ratio as rectangle A. What is the width of rectangle B in terms of  $w$ ?

A.  $\frac{4}{3}w$

B.  $w + 5$

C.  $\frac{3}{4}w$

D.  $w - 5$

ID: 181cc4d6 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that rectangle A has length 15 and width  $w$ . Therefore, the length-to-width ratio of rectangle A is 15 to  $w$ . It's also given that rectangle B has length 20 and the same length-to-width ratio as rectangle A. Let  $x$  represent the width of

rectangle B. The proportion  $\frac{15}{w} = \frac{20}{x}$  can be used to solve for  $x$  in terms of  $w$ . Multiplying both sides of this equation by  $x$  yields

$\frac{15x}{w} = 20$ , and then multiplying both sides of this equation by  $w$  yields  $15x = 20w$ . Dividing both sides of this equation by 15

yields  $x = \frac{20w}{15}$ . Simplifying this fraction yields  $x = \frac{4}{3}w$ .

Choices B and D are incorrect and may result from interpreting the difference in the lengths of rectangle A and rectangle B as equivalent to the difference in the widths of rectangle A and rectangle B. Choice C is incorrect and may result from using a length-to-width ratio of  $w$  to 15, instead of 15 to  $w$ .

Question Difficulty:

Medium

# Question ID 241f1db7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 241f1db7

Weight (pounds)	Frequency
13	12
14	8
15	5
16	7
17	9
18	10
19	13
20	7

The frequency table summarizes a data set of the weights, rounded to the nearest pound, of 71 tortoises. A weight of 39 pounds is added to the original data set, creating a new data set of the weights, rounded to the nearest pound, of 72 tortoises. Which statement best compares the mean and median of the new data set to the mean and median of the original data set?

- A. The mean of the new data set is greater than the mean of the original data set, and the median of the new data set is greater than the median of the original data set.
- B. The mean of the new data set is greater than the mean of the original data set, and the medians of the two data sets are equal.
- C. The mean of the new data set is less than the mean of the original data set, and the median of the new data set is less than the median of the original data set.
- D. The mean of the new data set is less than the mean of the original data set, and the medians of the two data sets are equal.

ID: 241f1db7 Answer

Correct Answer:

B

Rationale

Choice B is correct. The mean of a data set is the sum of the values in the data set divided by the number of values in the data set. The new data set consists of the weights of the 71 tortoises in the original data set and one additional weight, 39. Since the additional weight, 39, is greater than any of the values in the original data set, the mean of the new data set is greater than the mean of the original data set. If a data set contains an odd number of data values, the median is represented by the middle data value in the list when the data values are listed in ascending or descending order. Since the original data set consists of the weights of 71 tortoises and is in ascending order, the median of the original data set is represented by the middle value, or the 36th value. Based on the frequencies shown in the table, the 36th value in this data set is 17. If a data set contains an even

number of data values, the median is between the two middle data values when the values are listed in ascending or descending order. Since the new data set consists of the weights of **72** tortoises, the median of the new data set is between the **36th** and **37th** data values when the values are arranged in ascending order. To keep the data in ascending order, the additional value of **39** would be placed at the bottom of the frequency table with a frequency of **1**. Therefore, based on the frequencies in the table, the **36th** and **37th** values in the new data set are both **17**. It follows that the median of the new data set is **17**, which is the same as the median of the original data set. Therefore, the mean of the new data set is greater than the mean of the original data set, and the medians of the two data sets are equal.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

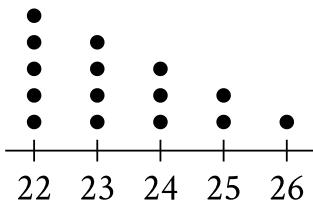
Hard

# Question ID 578e26ae

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a7a; height: 10px;"></div> <div style="width: 25%; background-color: #005a7a; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 578e26ae

Data Set A



Data set A has 15 values and is represented by the dot plot shown. Data set B is created by adding 46 to each of the values in data set A. Which of the following correctly compares the medians and the ranges of data sets A and B?

- A. The median of data set B is greater than the median of data set A, and the range of data set B is equal to the range of data set A.
- B. The median of data set B is greater than the median of data set A, and the range of data set B is greater than the range of data set A.
- C. The median of data set B is equal to the median of data set A, and the range of data set B is greater than the range of data set A.
- D. The median of data set B is equal to the median of data set A, and the range of data set B is equal to the range of data set A.

ID: 578e26ae Answer

Correct Answer:

A

Rationale

Choice A is correct. The median is the middle value in a data set when the data are arranged in order from least to greatest. Since there are 15 values in data set A, the median is the 8th value. The 8th value is 23, so the median of data set A is 23. The range is found by subtracting the minimum value in a data set from the maximum value. The minimum value in data set A is 22 and the maximum value is 26. Therefore, the range of data set A is  $26 - 22$ , or 4. It's given that data set B is created by adding 46 to each of the values in data set A. Therefore, the 8th value in data set B is  $23 + 46$ , or 69, so the median of data set B is 69. The minimum value in data set B is  $22 + 46$ , or 68, and the maximum value is  $26 + 46$ , or 72. Therefore, the range of data set B is  $72 - 68$ , or 4. Since the median of data set A is 23, and the median of data set B is 69, the median of data set B is greater than the median of data set A. Since the ranges of data sets A and B are both 4, the range of data set B is equal to the range of data set A.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Medium

# Question ID e9841407

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: e9841407

Shaquan has 7 red cards and 28 blue cards. What is the ratio of red cards to blue cards that Shaquan has?

- A. 1 to 4
- B. 4 to 1
- C. 1 to 7
- D. 7 to 1

ID: e9841407 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that Shaquan has 7 red cards and 28 blue cards. Therefore, the ratio of red cards to blue cards that Shaquan has is 7 to 28. This ratio can be reduced by dividing both parts of the ratio by 7, which yields the ratio 1 to 4.

Choice B is incorrect. This is the ratio of blue cards to red cards that Shaquan has. Choice C is incorrect and may result from a calculation error when reducing the ratio. Choice D is incorrect. This may result from finding the ratio of blue cards to red cards, or 28 to 7, and then making a calculation error when reducing the ratio.

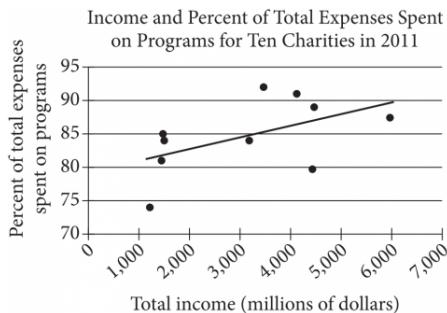
Question Difficulty:

Easy

# Question ID 7fd284ac

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: 7fd284ac



The scatterplot above shows data for ten charities along with the line of best fit. For the charity with the greatest percent of total expenses spent on programs, which of the following is closest to the difference of the actual percent and the percent predicted by the line of best fit?

- A. 10%
- B. 7%
- C. 4%
- D. 1%

ID: 7fd284ac Answer

Correct Answer:

B

Rationale

Choice B is correct. The charity with the greatest percent of total expenses spent on programs is represented by the highest point on the scatterplot; this is the point that has a vertical coordinate slightly less than halfway between 90 and 95 and a horizontal coordinate slightly less than halfway between 3,000 and 4,000. Thus, the charity represented by this point has a total income of about \$3,400 million and spends about 92% of its total expenses on programs. The percent predicted by the line of best fit is the vertical coordinate of the point on the line of best fit with horizontal coordinate \$3,400 million; this vertical coordinate is very slightly more than 85. Thus, the line of best fit predicts that the charity with the greatest percent of total expenses spent on programs will spend slightly more than 85% on programs. Therefore, the difference between the actual percent (92%) and the prediction (slightly more than 85%) is slightly less than 7%.

Choice A is incorrect. There is no charity represented in the scatterplot for which the difference between the actual percent of total expenses spent on programs and the percent predicted by the line of best fit is as much as 10%. Choices C and D are incorrect. These choices may result from misidentifying in the scatterplot the point that represents the charity with the greatest percent of total expenses spent on programs.

**Question Difficulty:**

Medium

# Question ID 1fb3b67

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 1fb3b67

The number  $a$  is 190% greater than the number  $b$ . The number  $b$  is 80% less than 24. What is the value of  $a$ ?

- A. 9.12
- B. 13.92
- C. 26.40
- D. 36.48

ID: 1fb3b67 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that the number  $b$  is 80% less than 24. It follows that  $b$  is equal to 24 minus 80% of 24, which can be written as  $b = 24 - (\frac{80}{100})24$ . This is equivalent to  $b = 24 - 0.8(24)$ , or  $b = 4.8$ . It's also given that the number  $a$  is 190% greater than the number  $b$ . It follows that  $a$  is equal to  $b$  plus 190% of  $b$ . Since  $b = 4.8$ , this can be written as  $a = 4.8 + (\frac{190}{100})4.8$ . This is equivalent to  $a = 4.8 + 1.9(4.8)$ , or  $a = 13.92$ .

Choice A is incorrect. This would be the value of  $a$  if  $a$  were 190% of  $b$ , not 190% greater than  $b$ .

Choice C is incorrect. This is  $(190 - 80)\%$  of 24.

Choice D is incorrect. This would be the value of  $a$  if  $b$  were 80% of 24, not 80% less than 24, and  $a$  were 190% of  $b$ , not 190% greater than  $b$ .

Question Difficulty:

Hard

# Question ID 1b403590

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 1b403590

An object has a mass of **168** grams and a volume of **24** cubic centimeters. What is the density, in grams per cubic centimeter, of the object?

- A. **7**
- B. **144**
- C. **192**
- D. **4,032**

ID: 1b403590 Answer

Correct Answer:

A

## Rationale

Choice A is correct. It's given that the object has a mass of **168** grams and a volume of **24** cubic centimeters. Dividing the mass, in grams, of the object by the volume, in cubic centimeters, of the object gives the density, in grams per cubic centimeter, of the object. It follows that the density of the object is  $\frac{168 \text{ grams}}{24 \text{ cubic centimeters}}$ , which is equivalent to  $\frac{168}{24}$  grams per cubic centimeter, or **7** grams per cubic centimeter.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

## Question Difficulty:

Medium

# Question ID c81499e1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: c81499e1

A giant armadillo has a mass of **39** kilograms. What is the giant armadillo's mass in **grams**? (**1 kilogram = 1,000 grams**)

ID: c81499e1 Answer

**Correct Answer:**

39000

**Rationale**

The correct answer is **39,000**. It's given that the giant armadillo has a mass of **39** kilograms. Since **1** kilogram is equal to **1,000** grams, **39** kilograms is equal to **39 kilograms**  $\left(\frac{1,000 \text{ grams}}{1 \text{ kilogram}}\right)$ , or **39,000** grams. Therefore, the giant armadillo's mass, in grams, is **39,000**.

**Question Difficulty:**

Easy

# Question ID a2162ea1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: a2162ea1

A company fills boxes with approximately **23** pounds of oranges. To test the accuracy of the filling process, **344** boxes of oranges were selected at random and weighed. Based on the sample, it is estimated that the average weight of all boxes of oranges filled by the company in an **8**-hour period is **23.1** pounds, with an associated margin of error of **0.19** pounds. Which of the following is the best interpretation of this estimate?

- A. Plausible values for the average weight of all boxes of oranges filled by the company are between **22.91** pounds and **23.29** pounds.
- B. Plausible values for the average weight of all boxes of oranges filled by the company are less than **22.91** pounds or greater than **23.29** pounds.
- C. The average weight of all boxes of oranges filled by the company is less than **23.01** pounds.
- D. The average weight of all boxes of oranges filled by the company is greater than **23.01** pounds.

ID: a2162ea1 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the estimate for the average weight of all boxes of oranges filled by the company in an **8**-hour period is **23.1** pounds, with an associated margin of error of **0.19** pounds. It follows that plausible values for this average weight are between **23.1 – 0.19** pounds and **23.1 + 0.19** pounds. Therefore, plausible values for the average weight of all boxes of oranges filled by the company are between **22.91** pounds and **23.29** pounds.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Medium

# Question ID ecbdbe84

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: ecbdbe84

The table shown summarizes the number of employees at each of the **17** restaurants in a town.

Number of employees	Number of restaurants
2 to 7	2
8 to 13	4
14 to 19	2
20 to 25	7
26 to 31	2

Which of the following could be the median number of employees for the restaurants in this town?

- A. 2
- B. 9
- C. 15
- D. 21

ID: ecbdbe84 Answer

Correct Answer:

D

Rationale

Choice D is correct. If a data set contains an odd number of data values, the median is represented by the middle data value in the list when the data values are listed in ascending or descending order. Since the numbers of employees are given as ranges of values rather than specific values, it's only possible to determine the range in which the median falls, rather than the exact median. Since there are **17** restaurants included in the data set and the numbers of employees are listed in ascending order, it follows that the median number of employees will be represented by the ninth restaurant in the list. Since the first **2** restaurants each have **2** to **7** employees, numbers of employees in the **2** to **7** range would be represented by the first and second restaurants in the list. The next **4** restaurants each have **8** to **13** employees. Therefore, numbers of employees in the **8** to **13** range will be represented by the third through sixth restaurants in the list. The next **2** restaurants each have **14** to **19** employees. Therefore, numbers of employees in the **14** to **19** range will be represented by the seventh and eighth restaurants in the list. Since the next **7** restaurants each have **20** to **25** employees, numbers of employees in the **20** to **25** range will be represented by the ninth through fifteenth restaurants in the list. This means that the ninth restaurant in the list, which has the median number of employees for the restaurants in this town, has a number of employees in the **20** to **25** range. Of the given choices, the only number of employees in the **20** to **25** range is **21**.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the position of the median in the list, not the value of the median.

Choice C is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

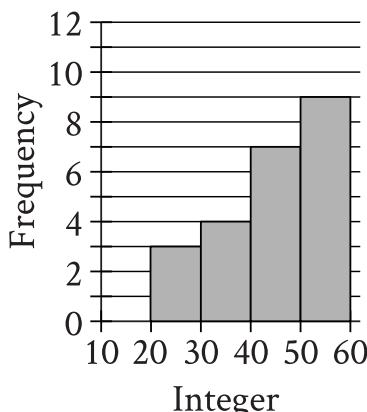
Hard

# Question ID f8a322d9

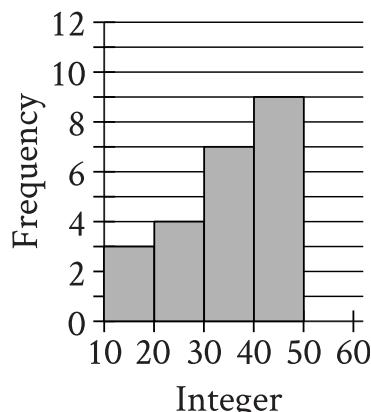
Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: f8a322d9

Data Set A



Data Set B



Two data sets of **23** integers each are summarized in the histograms shown. For each of the histograms, the first interval represents the frequency of integers greater than or equal to **10**, but less than **20**. The second interval represents the frequency of integers greater than or equal to **20**, but less than **30**, and so on. What is the smallest possible difference between the mean of data set A and the mean of data set B?

- A. 0
- B. 1
- C. 10
- D. 23

ID: f8a322d9 Answer

Correct Answer:

B

Rationale

Choice B is correct. The histograms shown have the same shape, but data set A contains values between **20** and **60** and data set B contains values between **10** and **50**. Thus, the mean of data set A is greater than the mean of data set B. Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is the difference between the smallest possible mean of data set A and the greatest possible mean of data set B. In data set A, since there are **3** integers in the interval greater than or equal to **20** but less than **30**, **4** integers greater than or equal to **30** but less than **40**, **7** integers greater than or equal to **40** but less than **50**, and **9** integers greater than or equal to **50** but less than **60**, the smallest possible mean for data set A is  $\frac{(3 \cdot 20) + (4 \cdot 30) + (7 \cdot 40) + (9 \cdot 50)}{23}$ . In data set B, since there are **3** integers greater than or equal to **10** but less than **20**, **4** integers greater than or equal to **20** but less than **30**, **7** integers greater than or equal to **30** but less than **40**, and **9** integers greater than or equal to **40** but less than **50**, the largest possible mean for data set B is  $\frac{(3 \cdot 19) + (4 \cdot 29) + (7 \cdot 39) + (9 \cdot 49)}{23}$ . Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is  $\frac{(3 \cdot 20) + (4 \cdot 30) + (7 \cdot 40) + (9 \cdot 50)}{23} - \frac{(3 \cdot 19) + (4 \cdot 29) + (7 \cdot 39) + (9 \cdot 49)}{23}$ , which is equivalent to  $\frac{(3 \cdot 20) - (3 \cdot 19) + (4 \cdot 30) - (4 \cdot 29) + (7 \cdot 40) - (7 \cdot 39) + (9 \cdot 50) - (9 \cdot 49)}{23}$ . This expression can be rewritten as

$\frac{3(20-19)+4(30-29)+7(40-39)+9(50-49)}{23}$ , or  $\frac{23}{23}$ , which is equal to 1. Therefore, the smallest possible difference between the mean of data set A and the mean of data set B is 1.

Choice A is incorrect. This is the smallest possible difference between the ranges, not the means, of the data sets.

Choice C is incorrect. This is the difference between the greatest possible mean, not the smallest possible mean, of data set A and the greatest possible mean of data set B.

Choice D is incorrect. This is the smallest possible difference between the sum of the values in data set A and the sum of the values in data set B, not the smallest possible difference between the means.

**Question Difficulty:**

Hard

# Question ID e7d9649f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #005a99; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: e7d9649f

A random sample of 50 people from a town with a population of 14,878 were asked to name their favorite flavor of ice cream. If 7 people in the sample named chocolate as their favorite ice-cream flavor, about how many people in the town would be expected to name chocolate?

- A. 350
- B. 2,100
- C. 7,500
- D. 10,500

ID: e7d9649f Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. Let  $x$  be the number of people in the entire town that would be expected to name chocolate. Since the sample of 50 people was selected at random, it is reasonable to expect that the proportion of people who named chocolate as their favorite ice-cream flavor would be the same for both the sample and the town population. Symbolically, this can be expressed as  $\frac{7}{50} = \frac{x}{14,878}$ . Using cross multiplication,  $7 \times 14,878 = x \times 50$ ; solving for  $x$  yields 2,083. The choice closest to the value of 2,083 is choice B, 2,100.

Choices A, C, and D are incorrect and may be the result of errors when setting up the proportion, solving for the unknown, or incorrectly comparing the choices to the number of people expected to name chocolate, 2,083.

**Question Difficulty:**

Easy

# Question ID 2df8f293

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 2df8f293

Each vertex of a **14**-sided polygon is labeled with one of the **14** letters **A** through **N**, with a different letter at each vertex. If one vertex is selected at random, what is the probability that the letter **D** will be at the selected vertex? (Express your answer as a decimal or fraction, not as a percent.)

ID: 2df8f293 Answer

Correct Answer:

.0714, 1/14

Rationale

The correct answer is  $\frac{1}{14}$ . If one vertex of the polygon is selected at random, the probability that the letter **D** will be at the selected vertex is equal to the number of vertices labeled with the letter **D** divided by the total number of vertices. It's given that each vertex is labeled with one of the **14** letters **A** through **N**, with a different letter at each vertex. It follows that there is **1** vertex labeled with the letter **D**. It's also given that the polygon is **14**-sided. It follows that there are a total of **14** vertices. Thus, the probability that the letter **D** will be at the selected vertex is  $\frac{1}{14}$ . Note that 1/14, .0714, and 0.071 are examples of ways to enter a correct answer.

Question Difficulty:

Medium

# Question ID 7cab9fe1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3;"></div> <div style="width: 20%; background-color: #0056b3;"></div> <div style="width: 60%; background-color: #e0e0e0;"></div>

ID: 7cab9fe1

Which expression represents the result of increasing a positive quantity  $w$  by 43%?

- A.  $1.43w$
- B.  $0.57w$
- C.  $43w$
- D.  $0.43w$

ID: 7cab9fe1 Answer

Correct Answer:

A

Rationale

Choice A is correct. The result of increasing a positive quantity  $w$  by  $x\%$  can be represented by the expression  $(1 + \frac{x}{100})w$ . Therefore, the result of increasing a positive quantity  $w$  by 43% can be found by substituting 43 for  $x$  in the expression  $(1 + \frac{x}{100})w$ , which gives  $(1 + \frac{43}{100})w$ , or  $1.43w$ . Thus, the expression  $1.43w$  represents the result of increasing a positive quantity  $w$  by 43%.

Choice B is incorrect. This is the result of decreasing a positive quantity  $w$  by 43%.

Choice C is incorrect. This is the result of increasing a positive quantity  $w$  by 4,200%.

Choice D is incorrect. This is the result of decreasing a positive quantity  $w$  by 57%.

Question Difficulty:

Medium

# Question ID ec7b0eb8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div>

ID: ec7b0eb8

Texting behavior	Talks on cell phone daily	Does not talk on cell phone daily	Total
Light	110	146	256
Medium	139	164	303
Heavy	166	74	240
<b>Total</b>	<b>415</b>	<b>384</b>	<b>799</b>

In a study of cell phone use, 799 randomly selected US teens were asked how often they talked on a cell phone and about their texting behavior. The data are summarized in the table above. If one of the 799 teens surveyed is selected at random, what is the probability that the teen talks on a cell phone daily?

A.  $\frac{1}{799}$

B.  $\frac{415}{799}$

C.  $\frac{384}{415}$

D.  $\frac{384}{799}$

ID: ec7b0eb8 Answer

Correct Answer:

B

Rationale

Choice B is correct. If one of the teens surveyed is selected at random, the probability that the teen talks on a cell phone daily is equal to the quotient of the total number of teens who reported that they talk on a cell phone daily, 415, and the total number of

teens surveyed, 799. Therefore, this probability is equal to  $\frac{415}{799}$ .

Choice A is incorrect. This fraction represents the probability of selecting at random any one of the 799 teens surveyed. Choice C is incorrect and may result from conceptual errors. Choice D is incorrect. This fraction represents the probability of selecting at random one of the 799 teens surveyed who doesn't talk on a cell phone daily.

**Question Difficulty:**  
Easy

# Question ID 0700a2d5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 0700a2d5

How many yards are equivalent to **77** rods? (**5.5 yards = 1 rod**)

ID: 0700a2d5 Answer

Correct Answer:

423.5, 847/2

Rationale

The correct answer is **423.5**. It's given that **5.5 yards = 1 rod**. Therefore, **77** rods is equivalent to  $(77 \text{ rods}) \left( \frac{5.5 \text{ yards}}{1 \text{ rod}} \right)$ , or **423.5** yards. Note that 423.5 and 847/2 are examples of ways to enter a correct answer.

Question Difficulty:

Easy

# Question ID 3638f413

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: 3638f413

Jeremy deposited  $x$  dollars in his investment account on January 1, 2001. The amount of money in the account doubled each year until Jeremy had 480 dollars in his investment account on January 1, 2005. What is the value of  $x$ ?

ID: 3638f413 Answer

## Rationale

The correct answer is 30. The situation can be represented by the equation  $x(2^4) = 480$ , where the 2 represents the fact that the amount of money in the account doubled each year and the 4 represents the fact that there are 4 years between January 1, 2001, and January 1, 2005. Simplifying  $x(2^4) = 480$  gives  $16x = 480$ . Therefore,  $x = 30$ .

## Question Difficulty:

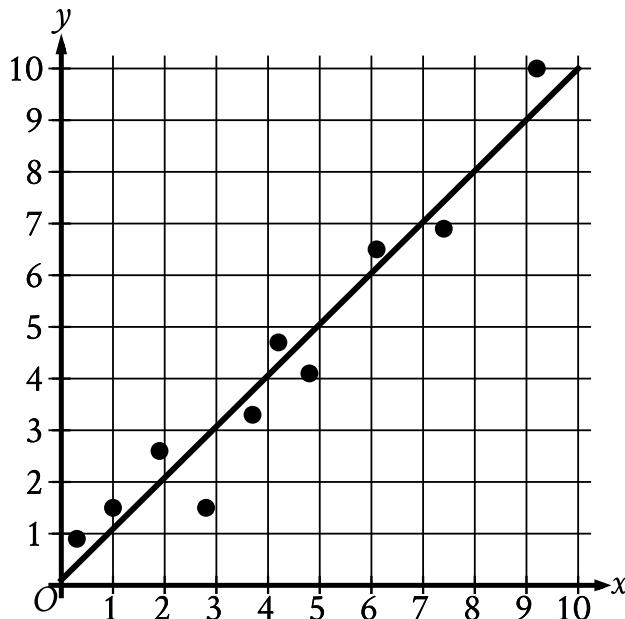
Hard

# Question ID e17babed

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0070C0; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: e17babed

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit for the data is also shown.



For how many of the 10 data points is the actual  $y$ -value greater than the  $y$ -value predicted by the line of best fit?

- A. 3
- B. 4
- C. 6
- D. 7

ID: e17babed Answer

Correct Answer:

C

Rationale

Choice C is correct. Any data point that's located above the line of best fit has a  $y$ -value that's greater than the  $y$ -value predicted by the line of best fit. For the scatterplot shown, 6 of the data points are above the line of best fit. Therefore, 6 of the data points have an actual  $y$ -value that's greater than the  $y$ -value predicted by the line of best fit.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the number of data points that have an actual  $y$ -value that's less than the  $y$ -value predicted by the line of best fit.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Medium

# Question ID 12dae628

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 12dae628

2, 9, 14, 23, 32

What is the mean of the data shown?

- A. 14
- B. 16
- C. 17
- D. 32

ID: 12dae628 Answer

Correct Answer:

B

Rationale

Choice B is correct. The mean of a set of data values is the sum of all the data values divided by the number of data values in the set. The sum of the data values shown is  $2 + 9 + 14 + 23 + 32$ , or 80. Since there are 5 data values in the set, the mean of the data shown is  $\frac{80}{5}$ , or 16.

Choice A is incorrect. This is the median, not the mean, of the data shown.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect. This is the maximum, not the mean, of the data shown.

Question Difficulty:

Easy

# Question ID 1142af44

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 1142af44

Value	Frequency
1	$a$
2	$2a$
3	$3a$
4	$2a$
5	$a$

The frequency distribution above summarizes a set of data, where  $a$  is a positive integer. How much greater is the mean of the set of data than the median?

- A. 0
- B. 1
- C. 2
- D. 3

ID: 1142af44 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. Since the frequencies of values less than the middle value, 3, are the same as the frequencies of the values greater than 3, the set of data has a symmetric distribution. When a set of data has a symmetric distribution, the mean and median values are equal. Therefore, the mean is 0 greater than the median.

Choices B, C, and D are incorrect and may result from misinterpreting the set of data.

**Question Difficulty:**

Hard

# Question ID 79201024

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 79201024

A band with **45** members has **11** members who play saxophone. If one band member is selected at random, what is the probability of selecting a band member who plays saxophone?

- A.  $\frac{1}{45}$
- B.  $\frac{11}{45}$
- C.  $\frac{34}{45}$
- D.  $\frac{45}{45}$

ID: 79201024 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The probability of an event occurring is the ratio of the number of favorable outcomes to the total number of possible outcomes. It's given that there are **45** band members, which is the total number of possible outcomes. It's also given that there are **11** band members who play saxophone. Therefore, the number of favorable outcomes is **11**. Thus, the probability of selecting a band member who plays saxophone is  $\frac{11}{45}$ .

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the probability of selecting a band member who does not play saxophone.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID 445dd032

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 445dd032

Tanya earns \$13.50 per hour at her part-time job. When she works  $z$  hours, she earns  $13.50z$  dollars. Which of the following expressions gives the amount, in dollars, Tanya will earn if she works  $3z$  hours?

- A.  $3(13.50z)$
- B.  $3 + 13.50z$
- C.  $3z + 13.50z$
- D.  $13.50(z + 3)$

ID: 445dd032 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that when Tanya works  $z$  hours, she earns  $13.50z$  dollars. Since her hourly rate is constant, if she works 3 times as many hours, or  $3z$  hours, she will earn 3 times as many dollars, or  $3(13.50z)$ .

Choice B is incorrect. This expression represents adding 3 dollars to the  $13.50z$  dollars Tanya will earn. Choice C is incorrect. This expression can be rewritten as  $16.50z$ , which implies that Tanya earns \$16.50 per hour, not \$13.50. Choice D is incorrect. This expression adds 3 to the number of hours Tanya works, rather than multiplying the hours she works by 3.

Question Difficulty:

Medium

# Question ID 121dc44f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

## ID: 121dc44f

The population of City A increased by 7% from 2015 to 2016. If the 2016 population is  $k$  times the 2015 population, what is the value of  $k$ ?

- A. 0.07
- B. 0.7
- C. 1.07
- D. 1.7

## ID: 121dc44f Answer

**Correct Answer:**

C

### Rationale

Choice C is correct. It's given that the population of City A increased by 7% from 2015 to 2016. Therefore, the population of City A in 2016 includes 100% of the population of City A in 2015 plus an additional 7% of the population of City A in 2015. This means that the population of City A in 2016 is 107% of the population in 2015. Thus, the population of City A in 2016 is  $\frac{107}{100}$ , or 1.07, times the 2015 population. Therefore, the value of  $k$  is 1.07.

Choice A is incorrect. This would be the value of  $k$  if the population in 2016 was 7% of the population in 2015.

Choice B is incorrect. This would be the value of  $k$  if the population in 2016 was 70% of the population in 2015.

Choice D is incorrect. This would be the value of  $k$  if the population increased by 70%, not 7%, from 2015 to 2016.

### Question Difficulty:

Medium

# Question ID 1e8ccffd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%;"><div style="width: 100px; height: 10px; background-color: #0056b3;"></div></div>

## ID: 1e8ccffd

The mean score of 8 players in a basketball game was 14.5 points. If the highest individual score is removed, the mean score of the remaining 7 players becomes 12 points. What was the highest score?

- A. 20
- B. 24
- C. 32
- D. 36

## ID: 1e8ccffd Answer

**Correct Answer:**

C

### Rationale

Choice C is correct. If the mean score of 8 players is 14.5, then the total of all 8 scores is  $14.5 \times 8 = 116$ . If the mean of 7 scores is 12, then the total of all 7 scores is  $12 \times 7 = 84$ . Since the set of 7 scores was made by removing the highest score of the set of 8 scores, then the difference between the total of all 8 scores and the total of all 7 scores is equal to the removed score:  $116 - 84 = 32$ .

Choice A is incorrect because if 20 is removed from the group of 8 scores, then the mean score of the remaining 7 players is  $\frac{(14.5 \times 8) - 20}{7}$

is approximately 13.71, not 12. Choice B is incorrect because if 24 is removed from the group of 8 scores, then

$$\frac{(14.5 \times 8) - 24}{7}$$

the mean score of the remaining 7 players is  $\frac{(14.5 \times 8) - 24}{7}$  is approximately 13.14, not 12. Choice D is incorrect because if 36

$$\frac{(14.5 \times 8) - 36}{7}$$

is removed from the group of 8 scores, then the mean score of the remaining 7 players is  $\frac{(14.5 \times 8) - 36}{7}$  or approximately 11.43, not 12.

### Question Difficulty:

Hard

# Question ID a29e89fc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: a29e89fc

The list gives the mass, in grams, of **5** alpine marmots.

**4,010; 4,010; 3,030; 4,050; 3,050**

What is the mean mass, in grams, of these **5** alpine marmots?

ID: a29e89fc Answer

**Correct Answer:**

3630

**Rationale**

The correct answer is **3,630**. The mean of a data set is the sum of the values in the data set divided by the number of values in the data set. The sum of the masses, in grams, of these alpine marmots is  $4,010 + 4,010 + 3,030 + 4,050 + 3,050$ , or 18,150 grams. The number of alpine marmots in the data set is **5**. Therefore, the mean mass, in grams, of these **5** alpine marmots is  $\frac{18,150}{5}$ , or **3,630**.

**Question Difficulty:**

Medium

# Question ID 9bedc4a0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #005599; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: 9bedc4a0

A company that produces socks wants to estimate the percent of the socks produced in a typical week that are defective. A random sample of **310** socks produced in a certain week were inspected. Based on the sample, it is estimated that **12%** of all socks produced by the company in this week are defective, with an associated margin of error of **3.62%**. Based on the estimate and associated margin of error, which of the following is the most appropriate conclusion about all socks produced by the company during this week?

- A. **3.62%** of the socks are defective.
- B. It is plausible that between **8.38%** and **15.62%** of the socks are defective.
- C. **12%** of the socks are defective.
- D. It is plausible that more than **15.62%** of the socks are defective.

ID: 9bedc4a0 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that, based on the sample, an estimate of **12%** of all socks produced by the company in a certain week are defective, with an associated margin of error of **3.62%**. This estimate, plus or minus the margin of error, gives an interval of plausible values for the actual percent of all socks produced by the company that week that are defective. Subtracting **3.62%** from **12%** yields **8.38%**. Adding **3.62%** to **12%** yields **15.62%**. Therefore, it is plausible that between **8.38%** and **15.62%** of all socks produced by the company are defective.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect. **12%** is the estimated percent of defective socks based on the sample. However, since the margin of error for this estimate is known, the most appropriate conclusion is not that the percent of defective socks is exactly **12%** but instead that it lies in an interval of plausible percents.

Choice D is incorrect and may result from conceptual errors.

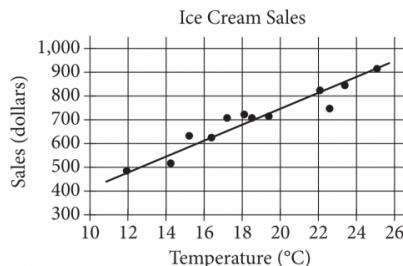
Question Difficulty:

Medium

# Question ID 1e1027a7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 150px; height: 10px; background-color: #0056b3;"></div> <div style="width: 150px; height: 10px; background-color: #0056b3;"></div>

ID: 1e1027a7



The scatterplot above shows a company's ice cream sales  $d$ , in dollars, and the high temperature  $t$ , in degrees Celsius ( $^{\circ}\text{C}$ ), on 12 different days. A line of best fit for the data is also shown. Which of the following could be an equation of the line of best fit?

- A.  $d = 0.03t + 402$
- B.  $d = 10t + 402$
- C.  $d = 33t + 300$
- D.  $d = 33t + 84$

ID: 1e1027a7 Answer

Correct Answer:

D

Rationale

Choice D is correct. On the line of best fit,  $d$  increases from approximately 480 to 880 between  $t = 12$  and  $t = 24$ . The slope of the line of best fit is the difference in  $d$ -values divided by the difference in  $t$ -values, which gives  $\frac{880 - 480}{24 - 12} = \frac{400}{12}$ , or approximately 33. Writing the equation of the line of best fit in slope-intercept form gives  $d = 33t + b$ , where  $b$  is the  $y$ -coordinate of the  $y$ -intercept. This equation is satisfied by all points on the line, so  $d = 480$  when  $t = 12$ . Thus,  $480 = 33(12) + b$ , which is equivalent to  $480 = 396 + b$ . Subtracting 396 from both sides of this equation gives  $b = 84$ . Therefore, an equation for the line of best fit could be  $d = 33t + 84$ .

Choice A is incorrect and may result from an error in calculating the slope and misidentifying the  $y$ -coordinate of the  $y$ -intercept of the graph as the value of  $d$  at  $t = 10$  rather than the value of  $d$  at  $t = 0$ . Choice B is incorrect and may result from using the smallest value of  $t$  on the graph as the slope and misidentifying the  $y$ -coordinate of the  $y$ -intercept of the graph as the value of  $d$  at  $t = 10$  rather than the value of  $d$  at  $t = 0$ . Choice C is incorrect and may result from misidentifying the  $y$ -coordinate of the  $y$ -intercept as the smallest value of  $d$  on the graph.

**Question Difficulty:**

Hard

# Question ID fe1ec415

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

## ID: fe1ec415

A cherry pitting machine pits **12** pounds of cherries in **3** minutes. At this rate, how many minutes does it take the machine to pit **96** pounds of cherries?

- A. **8**
- B. **15**
- C. **24**
- D. **36**

## ID: fe1ec415 Answer

**Correct Answer:**

C

### Rationale

Choice C is correct. It's given that the cherry pitting machine pits **12** pounds of cherries in **3** minutes. This rate can be written as  $\frac{12 \text{ pounds of cherries}}{3 \text{ minutes}}$ . If the number of minutes it takes the machine to pit **96** pounds of cherries is represented by  $x$ , the value of  $x$  can be calculated by solving the equation  $\frac{12 \text{ pounds of cherries}}{3 \text{ minutes}} = \frac{96 \text{ pounds of cherries}}{x \text{ minutes}}$ , which can be rewritten as  $\frac{12}{3} = \frac{96}{x}$ , or  $4 = \frac{96}{x}$ . Multiplying each side of this equation by  $x$  yields  $4x = 96$ . Dividing each side of this equation by  $4$  yields  $x = 24$ . Therefore, it takes the machine **24** minutes to pit **96** pounds of cherries.

Choice A is incorrect. This is the number of minutes it takes the machine to pit **32**, not **96**, pounds of cherries.

Choice B is incorrect. This is the number of minutes it takes the machine to pit **60**, not **96**, pounds of cherries.

Choice D is incorrect. This is the number of minutes it takes the machine to pit **144**, not **96**, pounds of cherries.

### Question Difficulty:

Easy

# Question ID ba62b0b0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: ba62b0b0

A kangaroo has a mass of **28** kilograms. What is the kangaroo's mass, in grams? (**1 kilogram = 1,000 grams**)

- A. **28,000**
- B. **1,028**
- C. **972**
- D. **784**

ID: ba62b0b0 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that a kangaroo has a mass of **28** kilograms and that **1** kilogram is equal to **1,000** grams. Therefore, the kangaroo's mass, in grams, is **28 kilograms**  $\left( \frac{1,000 \text{ grams}}{1 \text{ kilogram}} \right)$ , which is equivalent to **28,000** grams.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

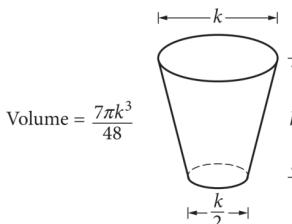
**Question Difficulty:**

Easy

# Question ID 939c46d1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 939c46d1



The glass pictured above can hold a maximum volume of 473 cubic centimeters, which is approximately 16 fluid ounces. Jenny has a pitcher that contains 1 gallon of water. How many times could Jenny completely fill the glass with 1 gallon of water?

(1 gallon = 128 fluid ounces)

- A. 16
- B. 8
- C. 4
- D. 3

ID: 939c46d1 Answer

Correct Answer:

B

Rationale

Choice A is correct. It is given that the volume of the glass is approximately 16 fluid ounces. If Jenny has 1 gallon of water, which is 128 fluid ounces, she could fill the glass  $\frac{128}{16} = 8$  times.

Choice A is incorrect because Jenny would need  $16 \times 16$  fluid ounces = 256 fluid ounces, or 2 gallons, of water to fill the glass 16 times. Choice C is incorrect because Jenny would need only  $4 \times 16$  fluid ounces = 64 fluid ounces of water to fill the glass 4 times. Choice D is incorrect because Jenny would need only  $3 \times 16$  fluid ounces = 48 fluid ounces to fill the glass 3 times.

Question Difficulty:

Medium

# Question ID 29c177e6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 29c177e6

What is 10% of 470?

- A. 37
- B. 47
- C. 423
- D. 460

ID: 29c177e6 Answer

Correct Answer:

B

Rationale

Choice B is correct. 10% of a quantity means  $\frac{10}{100}$  times the quantity. Therefore, 10% of 470 can be represented as  $\frac{10}{100}(470)$ , which is equivalent to 0.10(470), or 47. Therefore, 10% of 470 is 47.

Choice A is incorrect. This is 10% of 370, not 10% of 470.

Choice C is incorrect. This is 90% of 470, not 10% of 470.

Choice D is incorrect. This is 470 – 10, not 10% of 470.

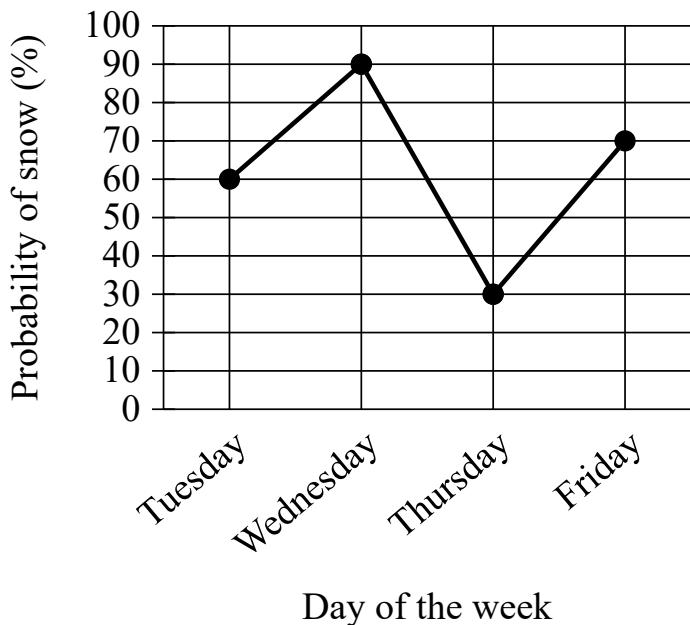
Question Difficulty:

Easy

# Question ID 13f67ddc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 13f67ddc



The line graph shows the probability of snow, as a percent, at a certain location for each day during a four-day period. According to the line graph, for which day during this four-day period is the probability of snow **30%**?

- A. Tuesday
- B. Wednesday
- C. Thursday
- D. Friday

ID: 13f67ddc Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. For the line graph shown, the probability of snow, as a percent, is represented on the vertical axis. According to the line graph, during this four-day period, the probability of snow is **30%** for Thursday.

Choice A is incorrect. The probability of snow on Tuesday is **60%**.

Choice B is incorrect. The probability of snow on Wednesday is **90%**.

Choice D is incorrect. The probability of snow on Friday is **70%**.

**Question Difficulty:**  
Easy

# Question ID ea95087d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: ea95087d

Type of store	Average number of employees
Warehouse store	365
Department store	213
Supermarket	130

For a certain region, the table shows the average number of store employees in **2016** by type of store. Based on the table, how much greater was the average number of store employees in warehouse stores than in supermarkets?

- A. 83
- B. 152
- C. 235
- D. 495

ID: ea95087d Answer

Correct Answer:

C

Rationale

Choice C is correct. The table shows that for a certain region in **2016**, the average number of store employees in warehouse stores was **365** and the average number of store employees in supermarkets was **130**. Subtracting **130** from **365** yields **365 – 130**, or **235**. Therefore, the average number of store employees was **235** greater in warehouse stores than in supermarkets.

Choice A is incorrect. For this region in **2016**, this is how much greater the average number of store employees was in department stores than in supermarkets.

Choice B is incorrect. For this region in **2016**, this is how much greater the average number of store employees was in warehouse stores than in department stores.

Choice D is incorrect. For this region in **2016**, this is the sum of the average number of store employees in warehouse stores and in supermarkets.

Question Difficulty:

Easy

# Question ID fc46af57

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #005599; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: fc46af57

A bag containing 10,000 beads of assorted colors is purchased from a craft store. To estimate the percent of red beads in the bag, a sample of beads is selected at random. The percent of red beads in the bag was estimated to be 15%, with an associated margin of error of 2%. If  $r$  is the actual number of red beads in the bag, which of the following is most plausible?

- A.  $r > 1,700$
- B.  $1,300 < r < 1,700$
- C.  $200 < r < 1,500$
- D.  $r < 1,300$

ID: fc46af57 Answer

Correct Answer:

B

Rationale

Choice B is correct. It was estimated that 15% of the beads in the bag are red. Since the bag contains 10,000 beads, it follows that there are an estimated  $10,000 \times 0.15 = 1,500$  red beads. It's given that the margin of error is 2%, or  $10,000 \times 0.02 = 200$  beads. If the estimate is too high, there could plausibly be  $1,500 - 200 = 1,300$  red beads. If the estimate is too low, there could plausibly be  $1,500 + 200 = 1,700$  red beads. Therefore, the most plausible statement of the actual number of red beads in the bag is  $1,300 < r < 1,700$ .

Choices A and D are incorrect and may result from misinterpreting the margin of error. It's unlikely that more than 1,700 beads or fewer than 1,300 beads in the bag are red. Choice C is incorrect because 200 is the margin of error for the number of red beads, not the lower bound of the range of red beads.

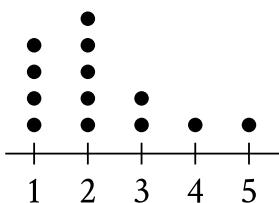
Question Difficulty:

Medium

# Question ID e7d48c8a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div>

ID: e7d48c8a



Number of bursts

The dot plot represents a data set of the number of bursts for 13 eruptions of a steam vent. If an additional eruption with 11 bursts is added to this data set to create a new data set of 14 eruptions, which of the following measures will be greater for the new data set than for the original data set?

- I. The median number of bursts
  - II. The mean number of bursts
- A. I and II
- B. I only
- C. II only
- D. Neither I nor II

ID: e7d48c8a Answer

Correct Answer:

C

Rationale

Choice C is correct. It's given that the dot plot represents a data set of the number of bursts for 13 eruptions of a steam vent. The median of a data set with an odd number of elements is the middle element when the elements are in numerical order. For 13 elements in numerical order, this is the 7th element. For this data set, the first 4 elements have a value of 1, and the next 5 elements have a value of 2. Thus, the 7th element in the ordered data set is 2 and the median number of bursts for the original data set is 2. If an additional eruption with 11 bursts is added to this data set to create a new data set of 14 eruptions, the median of the new data set will be between the 7th and 8th elements in the ordered set, which will also be 2. Therefore, the median number of bursts for the new data set will be the same as the median number of bursts for the original data set. The mean number of bursts for the original data set is found by adding the values of all 13 elements and dividing that sum by the number of elements, 13. Since the data is shown in a dot plot, the sum of the values of the elements can be found by multiplying each element's value by its frequency:  $1(4) + 2(5) + 3(2) + 4(1) + 5(1)$ , or 29. Therefore, the mean number of bursts for the original data set is  $\frac{29}{13}$ . If an additional eruption with 11 bursts is added to this data set to create a new data set of 14 bursts, the mean number of bursts for the new data set is  $\frac{29+11}{14}$ , or  $\frac{40}{14}$ . Since  $\frac{40}{14} > \frac{29}{13}$ , the mean number of bursts for the new data set is greater than the mean number of bursts for the original data set. Therefore, of the median number of bursts and the mean number of bursts, only the mean number of bursts is greater for the new data set than for the original data set.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Hard

# Question ID 7b65bb28

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 7b65bb28

Station 1	Station 2	Station 3	Station 4	Station 5
\$3.699	\$3.609	\$3.729	\$3.679	\$3.729

In the table above, Melissa recorded the price of one gallon of regular gas from five different local gas stations on the same day. What is the median of the gas prices Melissa recorded?

- A. \$3.679
- B. \$3.689
- C. \$3.699
- D. \$3.729

ID: 7b65bb28 Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. The median of a data set is the middle value when the data is in ascending or descending order. In ascending order, the gas prices are \$3.609, \$3.679, \$3.699, \$3.729, and \$3.729. The middle number of this list is 3.699, so it follows that \$3.699 is the median gas price.

Choice A is incorrect. When the gas prices are listed in ascending order, this value isn't the middle number. Choice B is incorrect. This value represents the mean gas price. Choice D is incorrect. This value represents both the mode and the maximum gas price.

**Question Difficulty:**

Medium

# Question ID 8a714fa1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 8a714fa1

Which of the following represents the result of increasing the quantity  $x$  by 9%, where  $x > 0$ ?

- A.  $1.09x$
- B.  $0.09x$
- C.  $x + 9$
- D.  $x + 0.09$

ID: 8a714fa1 Answer

Correct Answer:

A

Rationale

Choice A is correct. Increasing the positive quantity  $x$  by 9% is the result of adding 9% of  $x$  to  $x$ . 9% of  $x$  can be represented algebraically as  $\frac{9}{100}x$ , or  $0.09x$ . Adding this expression to  $x$  yields  $x + 0.09x$ , or  $1.09x$ .

Choice B is incorrect. This represents 9% of  $x$ . Choice C is incorrect. This represents increasing  $x$  by 9, not by 9%. Choice D is incorrect. This represents increasing  $x$  by 0.09, not by 9%.

Question Difficulty:

Medium

# Question ID 7cd1c6db

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

## ID: 7cd1c6db

An object travels at a constant speed of **12** centimeters per second. At this speed, what is the time, in seconds, that it would take for the object to travel **108** centimeters?

- A. **9**
- B. **96**
- C. **120**
- D. **972**

## ID: 7cd1c6db Answer

### Correct Answer:

A

### Rationale

Choice A is correct. If the object travels **108** centimeters at a speed of **12** centimeters per second, the time of travel can be determined by dividing the total distance by the speed. This results in  $\frac{108 \text{ centimeters}}{12 \text{ centimeters/second}}$ , which is **9** seconds.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

### Question Difficulty:

Easy

# Question ID 8784bc84

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 30%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 8784bc84    ID: 8784bc84 Answer

**Correct Answer:**

What is 20% of 440?

- A. 44
- B. 88
- C. 880
- D. 1,760

**Rationale**

Choice B is correct. 20% of 440 can be calculated as  $(\frac{20}{100})(440)$ , which is equivalent to  $\frac{8,800}{100}$ , or 88.

Choice A is incorrect. This is 10%, not 20%, of 440.

Choice C is incorrect. This is 200%, not 20%, of 440.

Choice D is incorrect. This is 400%, not 20%, of 440.

**Question Difficulty:**

Easy

# Question ID 8637294f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 8637294f

If  $\frac{4a}{b} = 6.7$  and  $\frac{a}{bn} = 26.8$ , what is the value of  $n$ ?

ID: 8637294f Answer

Correct Answer:

.0625, 1/16

Rationale

The correct answer is .0625. It's given that  $\frac{4a}{b} = 6.7$  and  $\frac{a}{bn} = 26.8$ . The equation  $\frac{4a}{b} = 6.7$  can be rewritten as  $(4)\left(\frac{a}{b}\right) = 6.7$ . Dividing both sides of this equation by 4 yields  $\frac{a}{b} = 1.675$ . The equation  $\frac{a}{bn} = 26.8$  can be rewritten as  $\left(\frac{a}{b}\right)\left(\frac{1}{n}\right) = 26.8$ . Substituting 1.675 for  $\frac{a}{b}$  in this equation yields  $(1.675)\left(\frac{1}{n}\right) = 26.8$ , or  $\frac{1.675}{n} = 26.8$ . Multiplying both sides of this equation by  $n$  yields  $1.675 = 26.8n$ . Dividing both sides of this equation by 26.8 yields  $n = 0.0625$ . Therefore, the value of  $n$  is 0.0625.

Note that .0625, 0.062, 0.063, and 1/16 are examples of ways to enter a correct answer.

Question Difficulty:

Hard

# Question ID 8e2e424e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: 8e2e424e

The number  $k$  is 36% greater than 50. If  $k$  is the product of 50 and  $r$ , what is the value of  $r$ ?

- A. 36
- B. 3.6
- C. 1.36
- D. 0.36

ID: 8e2e424e Answer

Correct Answer:

C

Rationale

Choice C is correct. It's given that the number  $k$  is 36% greater than 50. Therefore, the value of  $k$  is the number 50 plus 36% of 50.

This can be rewritten as  $k = 50 + \left(\frac{36}{100}\right)(50)$ . Multiplying the terms  $\left(\frac{36}{100}\right)(50)$  yields 18, so  $k = 50 + 18$ , or  $k = 68$ . It's also given that  $k$  is the product of 50 and  $r$ , which can be rewritten as  $k = 50r$ . Substituting 68 for  $k$  yields  $68 = 50r$ . Dividing both sides of this equation by 50 yields  $r = 1.36$ .

Choice A is incorrect. This is the percentage that  $k$  is greater than 50. Choice B is incorrect and may result from a calculation error. Choice D is incorrect. This would be the value of  $r$  if  $k$  were 36% of 50, instead of 36% greater than 50.

Question Difficulty:

Medium

# Question ID 24ad9dcb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 24ad9dcb

The weight of an object on Venus is approximately  $\frac{9}{10}$  of its weight on Earth. The weight of an object on Jupiter is approximately  $\frac{23}{10}$  of its weight on Earth. If an object weighs 100 pounds on Earth, approximately how many more pounds does it weigh on Jupiter than it weighs on Venus?

- A. 90
- B. 111
- C. 140
- D. 230

ID: 24ad9dcb Answer

Correct Answer:

C

Rationale

Choice C is correct. The weight of an object on Venus is approximately  $\frac{9}{10}$  of its weight on Earth. If an object weighs 100 pounds on Earth, then the object's weight on Venus is approximately  $\frac{9}{10} (100) = 90$  pounds. The same object's weight on Jupiter is approximately  $\frac{23}{10}$  of its weight on Earth; therefore, the object weighs approximately  $\frac{23}{10} (100) = 230$  pounds on Jupiter. The difference between the object's weight on Jupiter and the object's weight on Venus is approximately  $230 - 90 = 140$  pounds. Therefore, an object that weighs 100 pounds on Earth weighs 140 more pounds on Jupiter than it weighs on Venus.

Choice A is incorrect because it is the weight, in pounds, of the object on Venus. Choice B is incorrect because it is the weight, in pounds, of an object on Earth if it weighs 100 pounds on Venus. Choice D is incorrect because it is the weight, in pounds, of the object on Jupiter.

Question Difficulty:

Easy

# Question ID be00d896

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: be00d896

For which of the following data sets is the mean greater than the median?

- A. 5, 5, 5, 5, 5, 5, 5, 5, 5
- B. 0, 10, 20, 30, 40, 50, 60, 70, 80
- C. 2, 4, 8, 16, 32, 64, 128, 256, 512
- D. 7, 107, 107, 207, 207, 207, 307, 307, 307

ID: be00d896 Answer

Correct Answer:

C

## Rationale

Choice C is correct. If the values in a data set are ordered from least to greatest, the median of the data set will be the middle value. Since each data set in the choices is ordered and contains exactly 9 data values, the 5th value in each is the median. It follows that the median of the data set in choice C is 32. The sum of the positive differences between 32 and each of the values that are less than 32 is significantly smaller than the sum of the positive differences between 32 and each of the values that are greater than 32. If 32 were the mean, these sums would have been equal to each other. Therefore, the mean of this data set must be greater than 32. This can also be confirmed by calculating the mean as the sum of the values divided by the number of values

$$\frac{2 + 4 + 8 + 16 + 32 + 64 + 128 + 256 + 512}{9} = 113\frac{5}{9}$$

in the data set:

Choices A and B are incorrect. Each of the data sets in these choices is symmetric with respect to its median, so the mean and the median for each of these choices are equivalent. Choice D is incorrect. The median of this data set is 207. Since the sum of the positive differences between 207 and each of the values less than 207 is greater than the sum of the positive differences between 207 and each value greater than 207 in this data set, the mean must be less than the median.

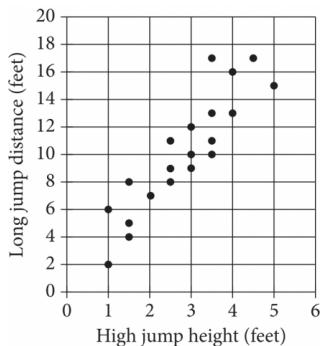
## Question Difficulty:

Medium

# Question ID 3d985614

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: 3d985614



Each dot in the scatterplot above represents the height  $x$ , in feet, in the high jump, and the distance  $y$ , in feet, in the long jump, made by each student in a group of twenty students. The graph of which of the following equations is a line that most closely fits the data?

- A.  $y = 0.82x + 3.30$
- B.  $y = 0.82x - 0.82$
- C.  $y = 3.30x + 0.82$
- D.  $y = 3.30x - 3.30$

ID: 3d985614 Answer

Correct Answer:

C

## Rationale

Choice C is correct. A line that most closely fits the data is a line with an approximately balanced number of data points above and below the line. Fitting a line to the data shown results in a line with an approximate slope of 3 and a y-intercept near the point  $(0, 1)$ . An equation for the line can be written in slope-intercept form,  $y = mx + b$ , where  $m$  is the slope and  $b$  is the y-coordinate of the y-intercept. The equation  $y = 3.30x + 0.82$  in choice C fits the data most closely.

Choices A and B are incorrect because the slope of the lines of these equations is 0.82, which is a value that is too small to be the slope of the line that fits the data shown. Choice D is incorrect. The graph of this equation has a y-intercept at  $(0, -3.30)$ , not  $(0, 0.82)$ . This line would lie below all of the data points, and therefore would not closely fit the data.

Question Difficulty:

Medium

# Question ID 560fab82

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

**ID: 560fab82**

The table shows the frequency of values in a data set.

Value	Frequency
19	7
21	1
23	7
25	4

What is the minimum value of the data set?

**ID: 560fab82 Answer**

**Correct Answer:**

19

**Rationale**

The correct answer is **19**. The minimum value of a data set is the least value in the data set. The frequency refers to the number of times a value occurs. The given table shows that for this data set, the value **19** occurs **7** times, the value **21** occurs **1** time, the value **23** occurs **7** times, and the value **25** occurs **4** times. Therefore, of the values **19, 21, 23**, and **25** given in the data set, the minimum value of the data set is **19**.

**Question Difficulty:**

Medium

# Question ID 308084c5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 308084c5

Sample	Percent in favor	Margin of error
A	52%	4.2%
B	48%	1.6%

The results of two random samples of votes for a proposition are shown above. The samples were selected from the same population, and the margins of error were calculated using the same method. Which of the following is the most appropriate reason that the margin of error for sample A is greater than the margin of error for sample B?

- A. Sample A had a smaller number of votes that could not be recorded.
- B. Sample A had a higher percent of favorable responses.
- C. Sample A had a larger sample size.
- D. Sample A had a smaller sample size.

ID: 308084c5 Answer

Correct Answer:

D

Rationale

Choice D is correct. Sample size is an appropriate reason for the margin of error to change. In general, a smaller sample size increases the margin of error because the sample may be less representative of the whole population.

Choice A is incorrect. The margin of error will depend on the size of the sample of recorded votes, not the number of votes that could not be recorded. In any case, the smaller number of votes that could not be recorded for sample A would tend to decrease, not increase, the comparative size of the margin of error. Choice B is incorrect. Since the percent in favor for sample A is the same distance from 50% as the percent in favor for sample B, the percent of favorable responses doesn't affect the comparative size of the margin of error for the two samples. Choice C is incorrect. If sample A had a larger margin of error than sample B, then sample A would tend to be less representative of the population. Therefore, sample A is not likely to have a larger sample size.

Question Difficulty:

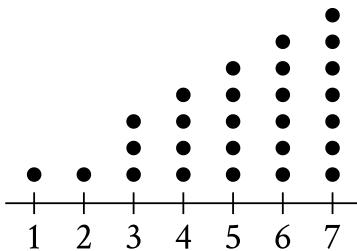
Hard

# Question ID d94018fd

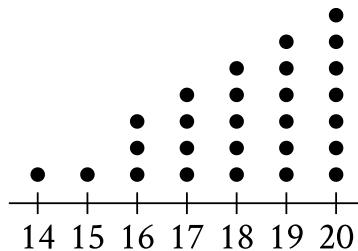
Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a7b; height: 10px;"></div> <div style="width: 25%; background-color: #005a7b; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: d94018fd

Class A



Class B



Each of the dot plots shown represents the number of glue sticks brought in by each student for two classes, class A and class B.

Which statement best compares the standard deviations of the numbers of glue sticks brought in by each student for these two classes?

- A. The standard deviation of the number of glue sticks brought in by each student for class A is less than the standard deviation of the number of glue sticks brought in by each student for class B.
- B. The standard deviation of the number of glue sticks brought in by each student for class A is equal to the standard deviation of the number of glue sticks brought in by each student for class B.
- C. The standard deviation of the number of glue sticks brought in by each student for class A is greater than the standard deviation of the number of glue sticks brought in by each student for class B.
- D. There is not enough information to compare these standard deviations.

ID: d94018fd Answer

Correct Answer:

B

## Rationale

Choice B is correct. Standard deviation is a measure of the spread of a data set from its mean. The dot plot for class A and the dot plot for class B have the same shape. Thus, the frequency distributions for both class A and class B are the same. Since both class A and class B have the same frequency distribution of glue sticks brought in by each student, it follows that both class A and class B have the same spread of the number of glue sticks brought in by each student from their respective means. Therefore, the standard deviation of the number of glue sticks brought in by each student for class A is equal to the standard deviation of the number of glue sticks brought in by each student for class B.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Medium

# Question ID e635aede

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: e635aede

In 2008, Zinah earned 14% more than in 2007, and in 2009 Zinah earned 4% more than in 2008. If Zinah earned  $y$  times as much in 2009 as in 2007, what is the value of  $y$ ?

- A. 0.5600
- B. 1.0056
- C. 1.1800
- D. 1.1856

ID: e635aede Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that in 2008 Zinah earned 14% more than in 2007. Let  $h$  represent the amount Zinah earned in 2007 and let  $j$  represent the amount that Zinah earned in 2008. This situation can be represented by the equation  $j = (1 + \frac{14}{100})h$ , or  $j = 1.14h$ . It's also given that in 2009 Zinah earned 4% more than in 2008. Let  $k$  represent the amount Zinah earned in 2009. This situation can be represented by the equation  $k = (1 + \frac{4}{100})j$ , or  $k = 1.04j$ . Substituting  $1.14h$  for  $j$  in the equation  $k = 1.04j$  yields  $k = (1.04)(1.14h)$ , or  $k = 1.1856h$ . If Zinah earned  $y$  times as much in 2009 as in 2007, then the value of  $y$  is 1.1856.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

# Question ID e21d10a7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: e21d10a7

One of a planet's moons orbits the planet every **252** days. A second moon orbits the planet every **287** days. How many more days does it take the second moon to orbit the planet **29** times than it takes the first moon to orbit the planet **29** times?

ID: e21d10a7 Answer

Correct Answer:

1015

Rationale

The correct answer is **1,015**. It's given that the first moon orbits the planet every **252** days. Therefore, it takes the first moon **252(29)**, or **7,308**, days to orbit the planet **29** times. It's also given that the second moon orbits the planet every **287** days. Therefore, it takes the second moon **287(29)**, or **8,323**, days to orbit the planet **29** times. Since it takes the first moon **7,308** days and the second moon **8,323** days, it takes the second moon  **$8,323 - 7,308$ , or 1,015**, more days than it takes the first moon to orbit the planet **29** times.

Question Difficulty:

Medium

# Question ID 7d721177

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 7d721177

The density of a certain type of wood is **353** kilograms per cubic meter. A sample of this type of wood is in the shape of a cube and has a mass of **345** kilograms. To the nearest hundredth of a meter, what is the length of one edge of this sample?

- A. **0.98**
- B. **0.99**
- C. **1.01**
- D. **1.02**

ID: 7d721177 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that the density of a certain type of wood is **353** kilograms per cubic meter ( $\text{kg}/\text{m}^3$ ), and a sample of this type of wood has a mass of **345 kg**. Let  $x$  represent the volume, in  $\text{m}^3$ , of the sample. It follows that the relationship between the density, mass, and volume of this sample can be written

as  $\frac{353 \text{ kg}}{1 \text{ m}^3} = \frac{345 \text{ kg}}{x \text{ m}^3}$ , or  $353 = \frac{345}{x}$ . Multiplying both sides of this equation by  $x$  yields  $353x = 345$ . Dividing both sides of this equation by **353** yields  $x = \frac{345}{353}$ . Therefore, the volume of this sample is  $\frac{345}{353} \text{ m}^3$ . Since it's given that the sample of this type of wood is a cube, it follows that the length of one edge of this sample can be found using the volume formula for a cube,  $V = s^3$ , where  $V$  represents the volume, in  $\text{m}^3$ , and  $s$  represents the length, in m, of one edge of the cube. Substituting  $\frac{345}{353}$  for  $V$  in this formula yields  $\frac{345}{353} = s^3$ . Taking the cube root of both sides of this equation yields  $\sqrt[3]{\frac{345}{353}} = s$ , or  $s \approx 0.99$ . Therefore, the length of one edge of this sample to the nearest hundredth of a meter is **0.99**.

Choices A, C, and D are incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Hard

# Question ID d0d9ede4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #e0e0e0;"></div> <div style="width: 25%; background-color: #e0e0e0;"></div>

ID: d0d9ede4

How many feet are equivalent to **34** yards? (**1 yard = 3 feet**)

ID: d0d9ede4 Answer

Correct Answer:

102

Rationale

The correct answer is **102**. It's given that **1** yard is equivalent to **3** feet. Therefore, **34** yards is equivalent to  $(34 \text{ yards}) \left( \frac{3 \text{ feet}}{1 \text{ yard}} \right)$ , or **102** feet.

Question Difficulty:

Easy

# Question ID 1d945139

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 1d945139

The total mass, in kilograms, of  $r$  identical objects is  $t$ . Which expression represents the total mass, in kilograms, of  $146r$  of these objects?

- A.  $146 - t$
- B.  $146 + t$
- C.  $\frac{t}{146}$
- D.  $146t$

ID: 1d945139 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that the total mass, in kilograms, of  $r$  identical objects is  $t$ . To obtain the expression  $146r$ ,  $r$  is multiplied by  $146$ . Therefore, to find the total mass, in kilograms, of  $146r$  of these objects,  $t$  must also be multiplied by  $146$ . The result of multiplying  $t$  by  $146$  is the expression  $146t$ . Therefore, the total mass, in kilograms, of  $146r$  of these objects, is  $146t$ .

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Question Difficulty:

Medium

# Question ID 4b09f783

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 4b09f783

A list of **10** data values is shown.

**6, 8, 16, 4, 17, 26, 8, 5, 5, 5**

What is the mean of these data?

ID: 4b09f783 Answer

**Correct Answer:**

10

**Rationale**

The correct answer is **10**. The mean of a data set is calculated by dividing the sum of the data values by the number of data values in the data set. For this data set, the mean can be calculated as  $\frac{6+8+16+4+17+26+8+5+5+5}{10}$ , which is equivalent to  $\frac{100}{10}$ , or **10**.

**Question Difficulty:**

Easy

# Question ID 67c0200a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 67c0200a

The number  $a$  is 70% less than the positive number  $b$ . The number  $c$  is 80% greater than  $a$ . The number  $c$  is how many times  $b$ ?

ID: 67c0200a Answer

Correct Answer:

.54, 27/50

Rationale

The correct answer is .54. It's given that the number  $a$  is 70% less than the positive number  $b$ . Therefore,  $a = (1 - \frac{70}{100})b$ , which is equivalent to  $a = (1 - 0.70)b$ , or  $a = 0.30b$ . It's also given that the number  $c$  is 80% greater than  $a$ . Therefore,  $c = (1 + \frac{80}{100})a$ , which is equivalent to  $c = (1 + 0.80)a$ , or  $c = 1.80a$ . Since  $a = 0.30b$ , substituting  $0.30b$  for  $a$  in the equation  $c = 1.80a$  yields  $c = 1.80(0.30b)$ , or  $c = 0.54b$ . Thus,  $c$  is 0.54 times  $b$ . Note that .54 and 27/50 are examples of ways to enter a correct answer.

Question Difficulty:

Hard

# Question ID f04d40b2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

## ID: f04d40b2

From a population of **50,000** people, **1,000** were chosen at random and surveyed about a proposed piece of legislation. Based on the survey, it is estimated that **35%** of people in the population support the legislation, with an associated margin of error of **3%**. Based on these results, which of the following is a plausible value for the total number of people in the population who support the proposed legislation?

- A. **350**
- B. **650**
- C. **16,750**
- D. **31,750**

## ID: f04d40b2 Answer

### Correct Answer:

C

### Rationale

Choice C is correct. It's given that an estimated **35%** of people in the population support the legislation, with an associated margin of error of **3%**. Subtracting and adding the margin of error from the estimate gives an interval of plausible values for the true percentage of people in the population who support the legislation. Therefore, it's plausible that between **32%** and **38%** of people in this population support the legislation. The corresponding numbers of people represented by these percentages in the population can be calculated by multiplying the total population, **50,000**, by **0.32** and by **0.38**, which gives **50,000(0.32) = 16,000** and **50,000(0.38) = 19,000**, respectively. It follows that any value in the interval **16,000** to **19,000** is a plausible value for the total number of people in the population who support the proposed legislation. Of the choices given, only **16,750** is in this interval.

Choice A is incorrect. This is the number of people in the sample, rather than in the population, who support the legislation.

Choice B is incorrect. This is the number of people in the sample who do not support the legislation.

Choice D is incorrect. This is a plausible value for the total number of people in the population who do not support the proposed legislation.

### Question Difficulty:

Medium

# Question ID bfa8a85c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: bfa8a85c

6, 6, 8, 8, 8, 10, 21

Which of the following lists represents a data set that has the same median as the data set shown?

- A. 4, 6, 6, 6, 8, 8
- B. 6, 6, 8, 8, 10, 10
- C. 6, 8, 10, 10, 10, 12
- D. 8, 8, 10, 10, 21, 21

ID: bfa8a85c Answer

Correct Answer:

B

Rationale

Choice B is correct. If a data set contains an odd number of data values, the median is represented by the middle data value in the list when the data values are listed in ascending or descending order. Since the data set shown has 7 data values and is in ascending order, it follows that the median is the fourth data value in the list, or 8. If a data set contains an even number of data values, the median is between the two middle data values when the values are listed in ascending or descending order. Since each of the choices consists of a data set with 6 data values in ascending order, it follows that the median is between the third and fourth data value. The third and fourth data values in choice B are 8 and 8. Thus, choice B represents a data set with a median of 8. Since the median of the data set shown is 8 and choice B represents a data set with a median of 8, it follows that choice B represents a data set that has the same median as the data set shown.

Choice A is incorrect. This list represents a data set with a median of 6, not 8.

Choice C is incorrect. This list represents a data set with a median of 10, not 8.

Choice D is incorrect. This list represents a data set with a median of 10, not 8.

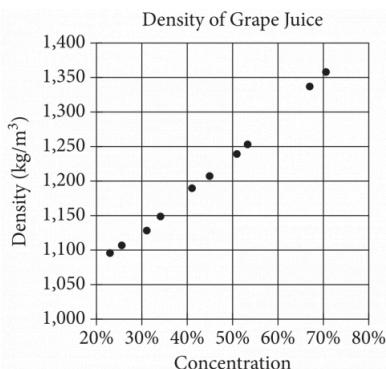
Question Difficulty:

Easy

# Question ID c9dd92b1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: c9dd92b1



The densities of different concentrations of grape juice are shown in the scatterplot above. According to the trend shown by the data, which of the following is closest to the predicted density, in kilograms per cubic meter ( $\text{kg}/\text{m}^3$ ), for grape juice with a concentration of 60%?

- A. 1,200
- B. 1,250
- C. 1,300
- D. 1,350

ID: c9dd92b1 Answer

Correct Answer:

C

Rationale

Choice C is correct. The data in the scatterplot show an increasing linear trend. The density when the juice concentration is 60% will be between the densities shown at about 53% and 67% concentration, or between about 1,255 and 1,340  $\text{kg}/\text{m}^3$ . Of the choices given, only 1,300 falls within this range.

Choices A, B, and D are incorrect. These are the approximate densities of grape juice with a concentration of 45%, 55%, and 70%, respectively.

Question Difficulty:

Easy

# Question ID 9bf4c545

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 9bf4c545

The members of a city council wanted to assess the opinions of all city residents about converting an open field into a dog park. The council surveyed a sample of 500 city residents who own dogs. The survey showed that the majority of those sampled were in favor of the dog park. Which of the following is true about the city council's survey?

- A. It shows that the majority of city residents are in favor of the dog park.
- B. The survey sample should have included more residents who are dog owners.
- C. The survey sample should have consisted entirely of residents who do not own dogs.
- D. The survey sample is biased because it is not representative of all city residents.

ID: 9bf4c545 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The members of the city council wanted to assess opinions of all city residents. To gather an unbiased sample, the council should have used a random sampling design to select subjects from all city residents. The given survey introduced a sampling bias because the 500 city residents surveyed were all dog owners. This sample is not representative of all city residents because not all city residents are dog owners.

Choice A is incorrect because when the sampling method isn't random, there is no guarantee that the survey results will be reliable; hence, they cannot be generalized to the entire population. Choice B is incorrect because a larger sample of residents who are dog owners would not correct the sampling bias. Choice C is incorrect because a survey sample of entirely non-dog owners would likely have a biased opinion, just as a sample of dog owners would likely have a biased opinion.

**Question Difficulty:**

Easy

# Question ID fa7a0164

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: fa7a0164

The table below shows the high and low temperatures in Houston, Texas, during a five-day period.

Temperatures in Houston, Texas  
(degrees Fahrenheit)

	Monday	Tuesday	Wednesday	Thursday	Friday
High temperature	73	56	62	75	81
Low temperature	49	37	41	54	63

What was the mean low temperature, in degrees Fahrenheit, during the five-day period?

- A. 48.8
- B. 49
- C. 59
- D. 59.1

ID: fa7a0164 Answer

Correct Answer:

A

Rationale

Choice A is correct. The mean low temperature can be calculated by finding the sum of the low temperatures for all the days shown in the table,  $49 + 37 + 41 + 54 + 63 = 244$ , and then dividing the sum by the number of days the temperature was recorded,  $244 \div 5 = 48.8$ .

Choice B is incorrect. This may be the result of choosing the median rather than calculating the mean. Choices C and D are incorrect and may be the result of calculation errors.

Question Difficulty:

Easy

## Question ID 40e7a1a9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 30%; background-color: #005a9f; height: 10px;"></div> <div style="width: 30%; background-color: #005a9f; height: 10px;"></div> <div style="width: 30%; background-color: #005a9f; height: 10px;"></div>

ID: 40e7a1a9

210 is  $p\%$  greater than 30. What is the value of  $p$ ?

ID: 40e7a1a9 Answer

Correct Answer:

600

Rationale

The correct answer is 600. It's given that 210 is  $p\%$  greater than 30. It follows that  $210 = (1 + \frac{p}{100})(30)$ . Dividing both sides of this equation by 30 yields  $7 = 1 + \frac{p}{100}$ . Subtracting 1 from both sides of this equation yields  $6 = \frac{p}{100}$ . Multiplying both sides of this equation by 100 yields  $p = 600$ . Therefore, the value of  $p$  is 600.

Question Difficulty:

Hard

# Question ID 708590d7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 708590d7

Data set A: 1, 2, 3, 4, 5, 6, 7

Data set B: 1, 1, 2, 2, 3, 3, 4

Which of the following statements correctly compares the means of data set A and data set B?

- A. The mean of each data set is 2.
- B. The mean of each data set is 4.
- C. The mean of data set A is less than the mean of data set B.
- D. The mean of data set A is greater than the mean of data set B.

ID: 708590d7 Answer

Correct Answer:

D

Rationale

Choice D is correct. The mean of a data set is found by dividing the sum of the values in the data set by the number of values in

the data set. Therefore, the mean of data set A is  $\frac{1+2+3+4+5+6+7}{7} = \frac{28}{7}$ , or 4. The mean of data set B is

$\frac{1+1+2+2+3+3+4}{7} = \frac{16}{7}$ , or approximately 2.2857. Therefore, the mean of data set A is greater than the mean of data set

B.

Alternate approach: Data set A and data set B are both ordered from least to greatest value. Besides the first value in each data set, which is 1, each value in ordered data set B is less than the respective value in ordered data set A. Therefore, conceptually, the mean of data set A must be greater than the mean of data set B.

Choices A, B, and C are incorrect and may result from various misconceptions or miscalculations.

Question Difficulty:

Easy

# Question ID bf47ad54

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: bf47ad54

Each of the following frequency tables represents a data set. Which data set has the greatest mean?

A.

Value	Frequency
70	4
80	5
90	6
100	7

B.

Value	Frequency
70	6
80	6
90	6
100	6

C.

Value	Frequency
70	7
80	6
90	6
100	7

D.

Value	Frequency
70	8
80	5
90	5
100	8

ID: bf47ad54 Answer

Correct Answer:

A

**Rationale**

Choice A is correct. The tables in choices B, C, and D each represent a data set where the values **80** and **90** have the same frequency and the values **70** and **100** have the same frequency. It follows that each of these data sets is symmetric around the value halfway between **80** and **90**, or **85**. When a data set is symmetric around a value, that value is the mean of the data set. Therefore, the data sets represented by the tables in choices B, C, and D each have a mean of **85**. The table in choice A represents a data set where the value **90** has a greater frequency than the value **80** and the value **100** has a greater frequency than the value **70**. It follows that this data set has a mean greater than **85**. Therefore, of the given choices, choice A represents the data set with the greatest mean.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

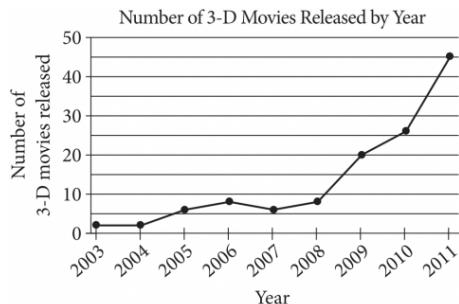
**Question Difficulty:**

Hard

# Question ID a6b2fcce

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: a6b2fcce



According to the line graph above, between which two consecutive years was there the greatest change in the number of 3-D movies released?

- A. 2003–2004
- B. 2008–2009
- C. 2009–2010
- D. 2010–2011

ID: a6b2fcce Answer

Correct Answer:

D

Rationale

Choice D is correct. The change in the number of 3-D movies released between any two consecutive years can be found by first estimating the number of 3-D movies released for each of the two years and then finding the positive difference between these two estimates. Between 2003 and 2004, this change is approximately  $2 - 2 = 0$  movies; between 2008 and 2009, this change is approximately  $20 - 8 = 12$  movies; between 2009 and 2010, this change is approximately  $26 - 20 = 6$  movies; and between 2010 and 2011, this change is approximately  $46 - 26 = 20$  movies. Therefore, of the pairs of consecutive years in the choices, the greatest increase in the number of 3-D movies released occurred during the time period between 2010 and 2011.

Choices A, B, and C are incorrect. Between 2010 and 2011, approximately 20 more 3-D movies were released. The change in the number of 3-D movies released between any of the other pairs of consecutive years is significantly smaller than 20.

Question Difficulty:

Easy

# Question ID f52123e0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: f52123e0

**23, 27, 27, 32, 35, 36, 52**

What is the range of the 7 scores shown?

ID: f52123e0 Answer

**Correct Answer:**

29

**Rationale**

The correct answer is **29**. The range of a data set is the difference between its maximum value and its minimum value. For the data set shown, the maximum score is **52** and the minimum score is **23**. The difference between those scores is **52 – 23**, or **29**. Therefore, the range of the 7 scores shown is **29**.

**Question Difficulty:**

Medium

# Question ID 06a152cd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

**ID: 06a152cd**

To make a bakery's signature chocolate muffins, a baker needs 2.5 ounces of chocolate for each muffin. How many pounds of chocolate are needed to make 48 signature chocolate muffins? (1 pound = 16 ounces)

- A. 7.5
- B. 10
- C. 50.5
- D. 120

**ID: 06a152cd Answer**

**Correct Answer:**

A

**Rationale**

Choice A is correct. If 2.5 ounces of chocolate are needed for each muffin, then the number of ounces of chocolate needed to make 48 muffins is  $48 \times 2.5 = 120$  ounces. Since 1 pound = 16 ounces, the number of pounds that is equivalent to 120 ounces is  $\frac{120}{16} = 7.5$  pounds. Therefore, 7.5 pounds of chocolate are needed to make the 48 muffins.

Choice B is incorrect. If 10 pounds of chocolate were needed to make 48 muffins, then the total number of ounces of chocolate needed would be  $10 \times 16 = 160$  ounces. The number of ounces of chocolate per muffin would then be  $\frac{160}{48} = 3.33$  ounces per muffin, not 2.5 ounces per muffin. Choices C and D are also incorrect. Following the same procedures as used to test choice B gives 16.8 ounces per muffin for choice C and 40 ounces per muffin for choice D, not 2.5 ounces per muffin. Therefore, 50.5 and 120 pounds cannot be the number of pounds needed to make 48 signature chocolate muffins.

**Question Difficulty:**

Easy

# Question ID 7d68096f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: 7d68096f

A trivia tournament organizer wanted to study the relationship between the number of points a team scores in a trivia round and the number of hours that a team practices each week. For the study, the organizer selected **55** teams at random from all trivia teams in a certain tournament. The table displays the information for the **40** teams in the sample that practiced for at least **3** hours per week.

Hours practiced	Number of points per round		
	6 to 13 points	14 or more points	Total
<b>3 to 5 hours</b>	<b>6</b>	<b>4</b>	<b>10</b>
<b>More than 5 hours</b>	<b>4</b>	<b>26</b>	<b>30</b>
<b>Total</b>	<b>10</b>	<b>30</b>	<b>40</b>

Which of the following is the largest population to which the results of the study can be generalized?

- A. All trivia teams in the tournament that scored **14** or more points in the round
- B. The **55** trivia teams in the sample
- C. The **40** trivia teams in the sample that practiced for at least **3** hours per week
- D. All trivia teams in the tournament

ID: 7d68096f Answer

Correct Answer:

D

## Rationale

Choice D is correct. It's given that the organizer selected **55** teams at random from all trivia teams in the tournament. A table is also given displaying the information for the **40** teams in the sample that practiced for at least **3** hours per week. Selecting a sample of a reasonable size at random to use for a survey allows the results from that survey to be applied to the population from which the sample was selected, but not beyond this population. Thus, only the sampling method information is necessary to determine the largest population to which the results of the study can be generalized. Since the organizer selected the sample at random from all trivia teams in the tournament, the largest population to which the results of the study can be generalized is all trivia teams in the tournament.

Choice A is incorrect. The sample was selected at random from all trivia teams in the tournament, not just from the teams that scored an average of **14** or more points per round.

Choice B is incorrect. If a study uses a sample selected at random from a population, the results of the study can be generalized to the population, not just the sample.

Choice C is incorrect. If a study uses a sample selected at random from a population, the results of the study can be generalized to the population, not just a subset of the sample.

**Question Difficulty:**

Hard

# Question ID 7760c516

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 7760c516

Each value in the data set shown represents the height, in centimeters, of a plant.

**6, 10, 13, 2, 15, 22, 10, 4, 4, 4**

What is the mean height, in centimeters, of these plants?

ID: 7760c516 Answer

**Correct Answer:**

9

**Rationale**

The correct answer is **9**. The mean of a data set is the sum of the values in the data set divided by the number of values in the data set. It follows that the mean height, in centimeters, of these plants is the sum of the heights, in centimeters, of each plant,

**6 + 10 + 13 + 2 + 15 + 22 + 10 + 4 + 4 + 4**, or **90**, divided by the number of plants in the data set, **10**. Therefore, the mean height, in centimeters, of these plants is  $\frac{90}{10}$ , or **9**.

**Question Difficulty:**

Easy

# Question ID 8917ce38

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: 8917ce38

Which of the following speeds is equivalent to 90 kilometers per hour? (1 kilometer = 1,000 meters)

- A. 25 meters per second
- B. 32 meters per second
- C. 250 meters per second
- D. 324 meters per second

ID: 8917ce38 Answer

Correct Answer:

A

Rationale

Choice A is correct. Since 1 kilometer is equal to 1,000 meters, it follows that 90 kilometers is equal to  $90(1,000) = 90,000$  meters. Since 1 hour is equal to 60 minutes and 1 minute is equal to 60 seconds, it follows that 1 hour is equal to  $60(60) = 3,600$

seconds. Now  $\frac{90 \text{ kilometers}}{1 \text{ hour}}$  is equal to  $\frac{90,000 \text{ meters}}{3,600 \text{ seconds}}$ , which reduces to  $\frac{25 \text{ meters}}{1 \text{ second}}$  or 25 meters per second.

Choices B, C, and D are incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Medium

# Question ID f4b3672a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: f4b3672a

A certain forest is 253 acres. To estimate the number of trees in the forest, a ranger randomly selects 5 different 1-acre parcels in the forest and determines the number of trees in each parcel. The numbers of trees in the sample acres are 51, 59, 45, 52, and 73. Based on the mean of the sample, which of the following ranges contains the best estimate for the number of trees in the entire forest?

- A. 11,000 to 12,000
- B. 12,500 to 13,500
- C. 13,500 to 14,500
- D. 18,000 to 19,000

ID: f4b3672a Answer

**Correct Answer:**

C

**Rationale**

$$\frac{51 + 59 + 45 + 52 + 73}{5} = 56$$

Choice C is correct. The mean of the 5 samples is  $\frac{51 + 59 + 45 + 52 + 73}{5} = 56$  trees per acre. The best estimate for the total number of trees in the forest is the product of the mean number of trees per acre in the sample and the total number of acres in the forest. This is  $(56)(253) = 14,168$ , which is between 13,500 and 14,500.

Choice A is incorrect and may result from multiplying the minimum number of trees per acre in the sample, 45, by the number of acres, 253. Choice B is incorrect and may result from multiplying the median number of trees per acre in the sample, 52, by the number of acres, 253. Choice D is incorrect and may result from multiplying the maximum number of trees per acre in the sample, 73, by the number of acres, 253.

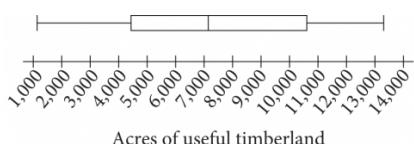
**Question Difficulty:**

Easy

# Question ID 374b18f9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 374b18f9



The number of acres of useful timberland in 13 counties in California is summarized in the box plot above. Which of the following is closest to the median number of acres?

- A. 4,399
- B. 7,067
- C. 8,831
- D. 10,595

ID: 374b18f9 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The median of the data summarized by a box plot is the value associated with the vertical line segment within the box. According to the box plot shown, this value is slightly greater than 7,000. Therefore, the closest value for the median number of acres is 7,067.

Choice A is incorrect. This is the value associated with the vertical line segment forming the left-hand side of the box. Choice C is incorrect. This value is greater than the value associated with the vertical line segment within the box. Choice D is incorrect. This is the value associated with the vertical line segment forming the right-hand side of the box.

**Question Difficulty:**

Easy

# Question ID 585de39a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 585de39a

On May 10, 2015, there were 83 million Internet subscribers in Nigeria. The major Internet providers were MTN, Globacom, Airtel, Etisalat, and Visafone. By September 30, 2015, the number of Internet subscribers in Nigeria had increased to 97 million. If an Internet subscriber in Nigeria on September 30, 2015, is selected at random, the probability that the person selected was an MTN subscriber is 0.43. There were  $p$  million MTN subscribers in Nigeria on September 30, 2015. To the nearest integer, what is the value of  $p$  ?

ID: 585de39a Answer

## Rationale

The correct answer is 42. It's given that in Nigeria on September 30, 2015, the probability of selecting an MTN subscriber from all Internet subscribers is 0.43, that there were  $p$  million, or  $p(1,000,000)$ , MTN subscribers, and that there were 97 million, or 97,000,000, Internet subscribers. The probability of selecting an MTN subscriber from all Internet subscribers can be found by dividing the number of MTN subscribers by the total number of Internet subscribers. Therefore, the equation

$$\frac{p(1,000,000)}{97,000,000} = 0.43$$

can be used to solve for  $p$ . Dividing 1,000,000 from the numerator and denominator of the expression on the left-hand side yields  $\frac{p}{97} = 0.43$ . Multiplying both sides of this equation by 97 yields  $p = (0.43)(97) = 41.71$ , which, to the nearest integer, is 42.

## Question Difficulty:

Hard

# Question ID 4ff597db

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

**ID: 4ff597db**

The mean amount of time that the 20 employees of a construction company have worked for the company is 6.7 years. After one of the employees leaves the company, the mean amount of time that the remaining employees have worked for the company is reduced to 6.25 years. How many years did the employee who left the company work for the company?

- A. 0.45
- B. 2.30
- C. 9.00
- D. 15.25

**ID: 4ff597db Answer**

**Correct Answer:**

D

**Rationale**

Choice D is correct. The mean amount of time that the 20 employees worked for the company is 6.7 years. This means that the total number of years all 20 employees worked for the company is  $(6.7)(20) = 134$  years. After the employee left, the mean amount of time that the remaining 19 employees worked for the company is 6.25 years. Therefore, the total number of years all 19 employees worked for the company is  $(6.25)(19) = 118.75$  years. It follows that the number of years that the employee who left had worked for the company is  $134 - 118.75 = 15.25$  years.

Choice A is incorrect; this is the change in the mean, which isn't the same as the amount of time worked by the employee who left. Choice B is incorrect and likely results from making the assumption that there were still 20 employees, rather than 19, at the company after the employee left and then subtracting the original mean of 6.7 from that result. Choice C is incorrect and likely results from making the assumption that there were still 20 employees, rather than 19, at the company after the employee left.

**Question Difficulty:**

Hard

# Question ID ec787383

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: ec787383

A distance of **61** furlongs is equivalent to how many feet? (**1 furlong = 220 yards and 1 yard = 3 feet**)

ID: ec787383 Answer

Correct Answer:

40260

Rationale

The correct answer is **40,260**. It's given that **1 furlong = 220 yards** and **1 yard = 3 feet**. It follows that a distance of **61** furlongs is equivalent to  $(61 \text{ furlongs}) \left( \frac{220 \text{ yards}}{1 \text{ furlong}} \right) \left( \frac{3 \text{ feet}}{1 \text{ yard}} \right)$ , or **40,260** feet.

Question Difficulty:

Medium

# Question ID 7e6c745f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 7e6c745f

Food	Protein	Cost
1 large egg	6 grams	\$0.36
1 cup of milk	8 grams	\$0.24

The table above shows the amount of protein in two foods and the cost of each food.

Based on the table, what is the ratio of the cost per gram of protein in a large egg to the cost per gram of protein in a cup of milk?

- A. 1 : 2
- B. 2 : 3
- C. 3 : 4
- D. 2 : 1

ID: 7e6c745f Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The cost per gram of protein in 1 large egg is  $\$0.36 \div 6 = \$0.06$ . The cost per gram of protein in 1 cup of milk is  $\$0.24 \div 8 = \$0.03$ . It follows that the ratio of the cost per gram of protein in a large egg to the cost per gram of protein in a cup of milk is 0.06:0.03, which can be rewritten as 2:1.

Choice A is incorrect and may result from finding the ratio of the cost per gram of protein in a cup of milk to the cost per gram of protein in a large egg (the reciprocal of the ratio specified in the question). Choices B and C are incorrect and may result from incorrectly calculating the unit rates or from errors made when simplifying the ratio.

**Question Difficulty:**

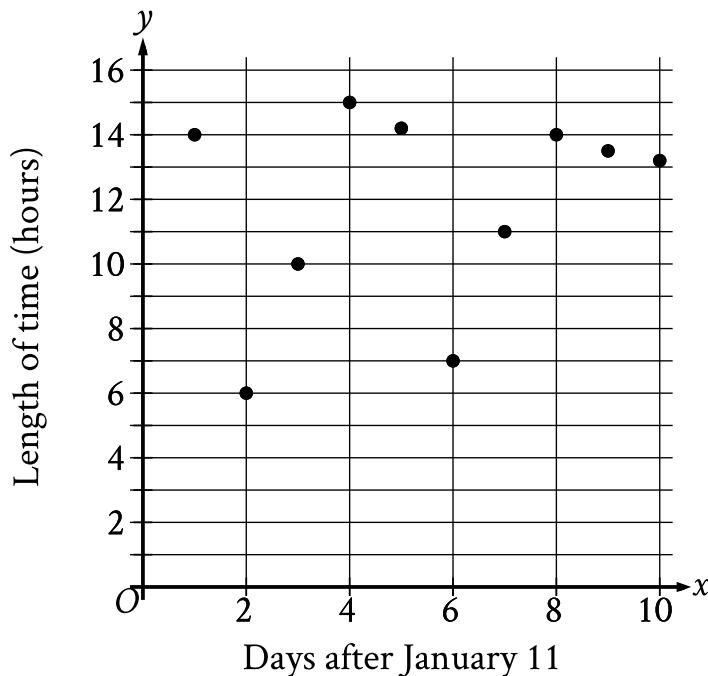
Medium

# Question ID 7b52985c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: 7b52985c

The scatterplot shows the relationship between the length of time  $y$ , in hours, a certain bird spent in flight and the number of days after January 11,  $x$ .



What is the average rate of change, in hours per day, of the length of time the bird spent in flight on January 13 to the length of time the bird spent in flight on January 15?

ID: 7b52985c Answer

Correct Answer:

4.5, 9/2

Rationale

The correct answer is  $\frac{9}{2}$ . It's given that the scatterplot shows the relationship between the length of time  $y$ , in hours, a certain bird spent in flight and the number of days after January 11,  $x$ . Since January 13 is 2 days after January 11, it follows that January 13 corresponds to an  $x$ -value of 2 in the scatterplot. In the scatterplot, when  $x = 2$ , the corresponding value of  $y$  is 6. In other words, on January 13, the bird spent 6 hours in flight. Since January 15 is 4 days after January 11, it follows that January 15 corresponds to an  $x$ -value of 4 in the scatterplot. In the scatterplot, when  $x = 4$ , the corresponding value of  $y$  is 15. In other words, on January 15, the bird spent 15 hours in flight. Therefore, the average rate of change, in hours per day, of the length of time the bird spent in flight on January 13 to the length of time the bird spent in flight on January 15 is the difference in the length of time, in hours, the bird spent in flight divided by the difference in the number of days after January 11, or  $\frac{15-6}{4-2}$ , which is equivalent to  $\frac{9}{2}$ . Note that 9/2 and 4.5 are examples of ways to enter a correct answer.

Question Difficulty:

Hard

# Question ID 7ce2830a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 7ce2830a

A psychologist designed and conducted a study to determine whether playing a certain educational game increases middle school students' accuracy in adding fractions. For the study, the psychologist chose a random sample of 35 students from all of the students at one of the middle schools in a large city. The psychologist found that students who played the game showed significant improvement in accuracy when adding fractions. What is the largest group to which the results of the study can be generalized?

- A. The 35 students in the sample
- B. All students at the school
- C. All middle school students in the city
- D. All students in the city

ID: 7ce2830a Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The largest group to which the results of a study can be generalized is the population from which the random sample was chosen. In this case, the psychologist chose a random sample from all students at one particular middle school. Therefore, the largest group to which the results can be generalized is all the students at the school.

Choice A is incorrect because this isn't the largest group the results can be generalized to. Choices C and D are incorrect because these groups are larger than the population from which the random sample was chosen. Therefore, the sample isn't representative of these groups.

**Question Difficulty:**

Hard

# Question ID 12dbe3de

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

**ID: 12dbe3de**

A store received a shipment of 1,000 MP3 players, 4 of which were defective. If an MP3 player is randomly selected from this shipment, what is the probability that it is defective?

- A. 0.004
- B. 0.04
- C. 0.4
- D. 4

**ID: 12dbe3de Answer**

**Correct Answer:**

A

**Rationale**

Choice A is correct. The probability of randomly selecting a defective MP3 player from the shipment is equal to the number of defective MP3 players divided by the total number of MP3 players in the shipment. Therefore, the probability is  $\frac{4}{1,000}$ , which is equivalent to 0.004.

Choice B is incorrect because 0.04 represents 4 defective MP3 players out of 100 rather than out of 1,000. Choice C is incorrect because 0.4 represents 4 defective MP3 players out of 10 rather than out of 1,000. Choice D is incorrect. This is the number of defective MP3 players in the shipment.

**Question Difficulty:**

Easy

## Question ID 709e04de

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: 709e04de

The value of  $z$  is 1.13 times 100. The value of  $z$  is what percent greater than 100?

- A. 11.3
- B. 13
- C. 130
- D. 213

ID: 709e04de Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that the value of  $z$  is 1.13 times 100. This can be written as  $z = (1.13)(100)$ , which is equivalent to  $z = (1 + 0.13)(100)$ , or  $z = (1 + \frac{13}{100})(100)$ . It follows that the value of  $z$  is 100% of 100 plus 13% of 100. Therefore, the value of  $z$  is 13% greater than 100.

Choice A is incorrect. This gives a value of  $z$  that is 1.113, not 1.13, times 100.

Choice C is incorrect. This gives a value of  $z$  that is 2.30, not 1.13, times 100.

Choice D is incorrect. This gives a value of  $z$  that is 3.13, not 1.13, times 100.

Question Difficulty:

Medium

# Question ID 642519d7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 642519d7

A polling agency recently surveyed 1,000 adults who were selected at random from a large city and asked each of the adults, "Are you satisfied with the quality of air in the city?" Of those surveyed, 78 percent responded that they were satisfied with the quality of air in the city. Based on the results of the survey, which of the following statements must be true?

1. Of all adults in the city, 78 percent are satisfied with the quality of air in the city.
2. If another 1,000 adults selected at random from the city were surveyed, 78 percent of them would report they are satisfied with the quality of air in the city.
3. If 1,000 adults selected at random from a different city were surveyed, 78 percent of them would report they are satisfied with the quality of air in the city.

A. None

B. II only

C. I and II only

D. I and III only

ID: 642519d7 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. Statement I need not be true. The fact that 78% of the 1,000 adults who were surveyed responded that they were satisfied with the air quality in the city does not mean that the exact same percentage of all adults in the city will be satisfied with the air quality in the city. Statement II need not be true because random samples, even when they are of the same size, are not necessarily identical with regard to percentages of people in them who have a certain opinion. Statement III need not be true for the same reason that statement II need not be true: results from different samples can vary. The variation may be even bigger for this sample since it would be selected from a different city. Therefore, none of the statements must be true.

Choices B, C, and D are incorrect because none of the statements must be true.

**Question Difficulty:**

Medium

# Question ID 0108ac2d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

**ID: 0108ac2d**

At a large high school, 300 students were selected at random and were asked in a survey about a menu change in the school cafeteria. All 300 students completed the survey. It was estimated that 38% of the students were in support of a menu change, with a margin of error of 5.5%. Which of the following is the best interpretation of the survey results?

- A. The percent of the students at the school who support a menu change is 38%.
- B. The percent of the students at the school who support a menu change is greater than 38%.
- C. Plausible values of the percent of the students at the school who support a menu change are between 32.5% and 43.5%.
- D. Plausible values of the number of the students at the school who support a menu change are between 295 and 305.

**ID: 0108ac2d Answer**

**Correct Answer:**

C

**Rationale**

Choice C is correct. It's given that an estimated 38% of sampled students at the school were in support of a menu change, with a margin of error of 5.5%. It follows that the percent of the students at the school who support a menu change is 38% plus or minus 5.5%. The lower bound of this estimation is  $38 - 5.5$ , or 32.5%. The upper bound of this estimation is  $38 + 5.5$ , or 43.5%.

Therefore, plausible values of the percent of the students at the school who support a menu change are between 32.5% and 43.5%.

Choice A is incorrect. This is the percent of the sampled students at the school who support a menu change. Choices B and D are incorrect and may result from misinterpreting the margin of error.

**Question Difficulty:**

Easy

# Question ID 949cd96b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 949cd96b

The length of the base of a certain parallelogram is **89%** of the height of the parallelogram. Which expression represents the length of the base of the parallelogram, where  $h$  is the height of the parallelogram?

- A.  $89h$
- B.  $0.089h$
- C.  $8.9h$
- D.  $0.89h$

ID: 949cd96b Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that the length of the base of the parallelogram is **89%** of the height of the parallelogram. Since  $h$  is the height of the parallelogram, it follows that the length of the base of the parallelogram can be represented by the expression  $\frac{89}{100}h$ , or  $0.89h$ .

Choice A is incorrect. This expression represents **8,900%**, not **89%**, of the height of the parallelogram.

Choice B is incorrect. This expression represents **8.9%**, not **89%**, of the height of the parallelogram.

Choice C is incorrect. This expression represents **890%**, not **89%**, of the height of the parallelogram.

Question Difficulty:

Easy

# Question ID 28c6bd8c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div>

## ID: 28c6bd8c

Where Do People Get Most of Their Medical Information?

Source	Percent of those surveyed
Doctor	63%
Internet	13%
Magazines/brochures	9%
Pharmacy	6%
Television	2%
Other/none of the above	7%

The table above shows a summary of 1,200 responses to a survey question. Based on the table, how many of those surveyed get most of their medical information from either a doctor or the Internet?

- A. 865
- B. 887
- C. 912
- D. 926

## ID: 28c6bd8c Answer

**Correct Answer:**

C

### Rationale

Choice C is correct. According to the table, 63% of survey respondents get most of their medical information from a doctor and 13% get most of their medical information from the Internet. Therefore, 76% of the 1,200 survey respondents get their information from either a doctor or the Internet, and 76% of 1,200 is 912.

Choices A, B, and D are incorrect. According to the table, 76% of survey respondents get their information from either a doctor or the Internet. Choice A is incorrect because 865 is about 72% (the percent of survey respondents who get most of their medical information from a doctor or from magazines/brochures), not 76%, of 1,200. Choice B is incorrect because 887 is about 74%, not 76%, of 1,200. Choice D is incorrect because 926 is about 77%, not 76%, of 1,200.

### Question Difficulty:

Easy

# Question ID 912cd125

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 912cd125

For a science project, Anka recorded whether it rained each weekday and weekend day for 12 weeks. Her results are summarized in the table below.

Weekday and Weekend Day Rain for 12 Weeks

	Rain	No rain	Total
Number of weekdays	12	48	60
Number of weekend days	8	16	24
Total	20	64	84

If one of the days on which there was no rain is selected at random, what is the probability the day was a weekend day?

A.  $\frac{4}{21}$

B.  $\frac{1}{4}$

C.  $\frac{2}{3}$

D.  $\frac{3}{4}$

ID: 912cd125 Answer

Correct Answer:

B

Rationale

Choice B is correct. There were 64 days with no rain. It was a weekend day for 16 of those 64 days. So 16 out of 64 of the days with no rain were weekend days. Because the day is selected at random, each day has an equal chance of being selected, so the

probability is  $\frac{16}{64} = \frac{1}{4}$ .

Choice A is incorrect. It is the probability that a day selected at random from any one of the days during the 12 weeks is a weekend day with no rain. Choice C is incorrect. It is the probability that a day selected at random from the weekend days has no rain.

Choice D is incorrect. It is the probability that a day selected at random from the days with no rain is a weekday.

Question Difficulty:

Medium

# Question ID 3a6ed720

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 30%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

**ID: 3a6ed720**

Of **900,000** beads, **828,000** are silver. What percentage of the beads are silver?

- A. **8%**
- B. **36%**
- C. **72%**
- D. **92%**

**ID: 3a6ed720 Answer**

**Correct Answer:**

D

**Rationale**

Choice D is correct. The proportion of the beads that are silver can be written as  $\frac{828,000}{900,000}$ , or **0.92**. Therefore, the percentage of the beads that are silver is **0.92(100)**, or **92%**.

Choice A is incorrect. This is the percentage of the beads that are not silver.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

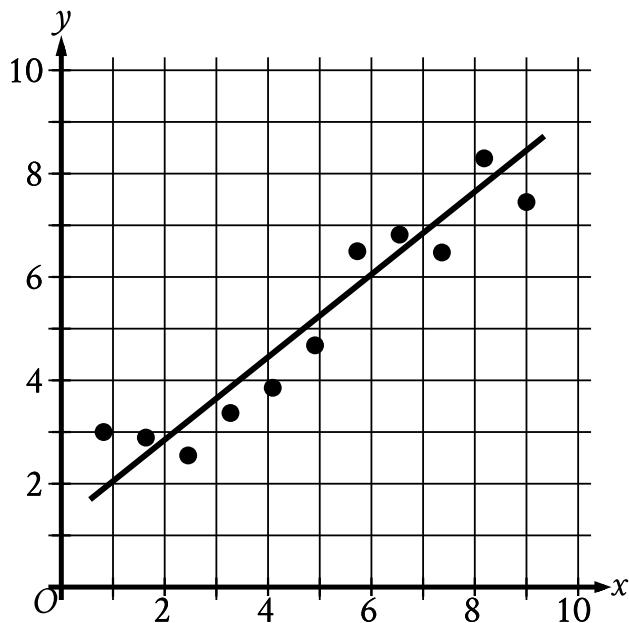
**Question Difficulty:**

Easy

# Question ID ad7dbb22

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: ad7dbb22



The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit is also shown. For how many of the 11 data points does the line of best fit predict a greater  $y$ -value than the actual  $y$ -value?

ID: ad7dbb22 Answer

Correct Answer:

6

Rationale

The correct answer is 6. The line of best fit predicts a greater  $y$ -value than the actual  $y$ -value for any data point that's located below the line of best fit. For the scatterplot shown, 6 of the data points are below the line of best fit. Therefore, the line of best fit predicts a greater  $y$ -value than the actual  $y$ -value for 6 of the data points.

Question Difficulty:

Medium

# Question ID 85b33aa8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 85b33aa8

A fish swam a distance of 5,104 yards. How far did the fish swim, in miles? (1 mile = 1,760 yards)

- A. 0.3
- B. 2.9
- C. 3,344
- D. 6,864

ID: 85b33aa8 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that the fish swam 5,104 yards and that 1 mile is equal to 1,760 yards. Therefore, the fish swam  $5,104 \text{ yards} \left( \frac{1 \text{ mile}}{1,760 \text{ yards}} \right)$ , which is equivalent to  $\frac{5,104}{1,760}$  miles, or 2.9 miles.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Easy

# Question ID 284303f1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 284303f1

There are **250** trees in a park. Of these trees, **6%** are birch trees. How many birch trees are in the park?

- A. **6**
- B. **15**
- C. **75**
- D. **244**

ID: 284303f1 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that there are **250** trees in a park and of these trees, **6%** are birch trees. The number of birch trees in the park can be calculated by multiplying the number of trees in the park by  $\frac{6}{100}$ . Therefore, the number of birch trees in the park is  $250 \left( \frac{6}{100} \right)$ , or **15**.

Choice A is incorrect. This is the percentage of trees in the park that are birch trees, not the number of birch trees in the park.

Choice C is incorrect. This is **30%**, not **6%**, of **250**.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID ba61d95f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

## ID: ba61d95f

The population of Greenville increased by 7% from 2015 to 2016. If the 2016 population is  $k$  times the 2015 population, what is the value of  $k$ ?

- A. 0.07
- B. 0.7
- C. 1.07
- D. 1.7

## ID: ba61d95f Answer

**Correct Answer:**

C

### Rationale

Choice C is correct. Let  $x$  be the 2015 population of Greenville. It's given that the population increased by 7% from 2015 to 2016. The increase in population can be written as  $(0.07)x$ . The 2016 population of Greenville is given as the sum of the 2015 population of Greenville and the increase in population from 2015 to 2016. This can be rewritten as  $x + (0.07)x$ , or  $1.07x$ . Therefore, the value of  $k$  is 1.07.

Choice A is incorrect. This is the percent, represented as a decimal, that the population increased from 2015 to 2016, not the value of  $k$ .

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect. This is the value of  $k$  if the population increased by 70%, not 7%, from 2015 to 2016.

### Question Difficulty:

Medium

# Question ID 873d2838

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 873d2838

The population density of Cedar County is **230** people per square mile. The county has a population of **85,100** people. What is the area, in square miles, of Cedar County?

ID: 873d2838 Answer

**Correct Answer:**

370

**Rationale**

The correct answer is **370**. It's given that the population density of Cedar County is **230** people per square mile and the county has a population of **85,100** people. Based on the population density, it follows that the area of Cedar County is  $(85,100 \text{ people}) \left( \frac{1 \text{ square mile}}{230 \text{ people}} \right)$ , or **370** square miles.

**Question Difficulty:**

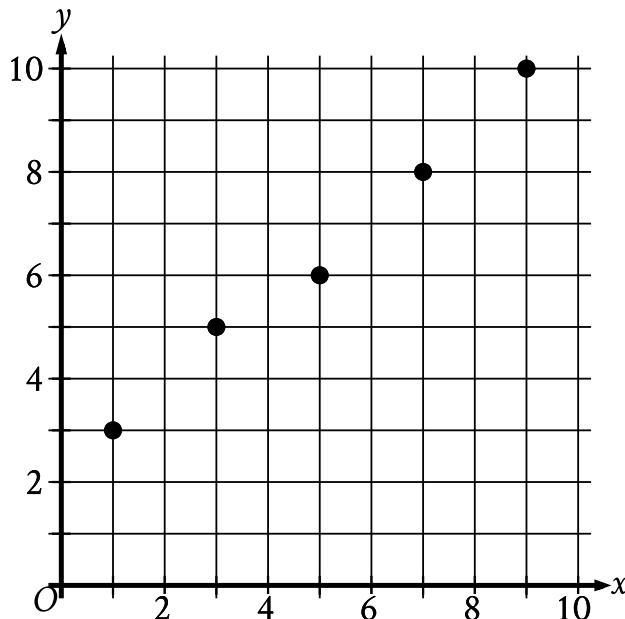
Medium

# Question ID 16988f9c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 16988f9c

The scatterplot shows the relationship between two variables,  $x$  and  $y$ .



Which equation is the most appropriate linear model for this relationship?

- A.  $y = -0.9x - 2.2$
- B.  $y = -0.9x + 2.2$
- C.  $y = -0.9x$
- D.  $y = 0.9x + 2.2$

ID: 16988f9c Answer

Correct Answer:

D

Rationale

Choice D is correct. A linear model can be written in the form  $y = mx + b$ , where  $m$  is the slope of the graph of the model in the  $xy$ -plane and  $(0, b)$  is the  $y$ -intercept. The graph of an appropriate linear model for this relationship passes near the points  $(1, 3)$  and  $(9, 10)$  in the  $xy$ -plane. Two points on a line,  $(x_1, y_1)$  and  $(x_2, y_2)$ , can be used to find the slope of the line using the slope formula,  $m = \frac{y_2 - y_1}{x_2 - x_1}$ . Substituting the points  $(1, 3)$  and  $(9, 10)$  for  $(x_1, y_1)$  and  $(x_2, y_2)$ , respectively, in the slope formula yields  $m = \frac{10 - 3}{9 - 1}$ , or  $m = 0.875$ . Therefore, the value of  $m$  for an appropriate linear model is approximately  $0.875$ . Substituting  $0.875$  for  $m$  in  $y = mx + b$  yields  $y = 0.875x + b$ . Since an appropriate linear model passes near the point  $(1, 3)$ , the approximate value of  $b$  can be found by substituting  $1$  for  $x$  and  $3$  for  $y$  in the equation  $y = 0.875x + b$ , which yields  $3 = (0.875)(1) + b$ , or  $3 = 0.875 + b$ . Subtracting  $0.875$  from both sides of this equation yields  $2.125 = b$ . Therefore, the value of  $b$  for an appropriate

linear model is approximately **2.125**. Thus, of the given choices,  $y = 0.9x + 2.2$  is the most appropriate linear model for this relationship.

Alternate approach: A linear model can be written in the form  $y = mx + b$ , where  $m$  is the slope of the graph of the model in the  $xy$ -plane and  $(0, b)$  is the  $y$ -intercept. The scatterplot shows that as the  $x$ -values of the data points increase, the  $y$ -values of the data points increase, which means the graph of an appropriate linear model has a positive slope. Of the given choices,  $y = 0.9x + 2.2$  is the only linear model whose graph has a positive slope.

Choice A is incorrect. The graph of this model has a negative slope, not a positive slope.

Choice B is incorrect. The graph of this model has a negative slope, not a positive slope.

Choice C is incorrect. The graph of this model has a negative slope, not a positive slope.

**Question Difficulty:**

Easy

# Question ID 2cdefcb1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

## ID: 2cdefcb1

What length, in centimeters, is equivalent to a length of **51** meters? (**1 meter = 100 centimeters**)

- A. **0.051**
- B. **0.51**
- C. **5,100**
- D. **51,000**

## ID: 2cdefcb1 Answer

**Correct Answer:**

C

### Rationale

Choice C is correct. Since **1** meter is equal to **100** centimeters, **51** meters is equal to **51 meters** ( $\frac{100 \text{ centimeters}}{1 \text{ meter}}$ ), or **5,100** centimeters.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from dividing, rather than multiplying, **51** by **100**.

Choice D is incorrect. This is the length, in millimeters rather than centimeters, that is equivalent to a length of **51** meters.

### Question Difficulty:

Easy

# Question ID 6a715bed

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 6a715bed

The table summarizes the distribution of age and assigned group for **90** participants in a study.

	0–9 years	10–19 years	20+ years	Total
Group A	7	14	9	30
Group B	6	4	20	30
Group C	17	12	1	30
Total	30	30	30	90

One of these participants will be selected at random. What is the probability of selecting a participant from group A, given that the participant is at least **10** years of age? (Express your answer as a decimal or fraction, not as a percent.)

ID: 6a715bed Answer

**Correct Answer:**

.3833, 23/60

**Rationale**

The correct answer is  $\frac{23}{60}$ . It's given that one of the participants will be selected at random. The probability of selecting a participant from group A given that the participant is at least **10** years of age is the number of participants in group A who are at least **10** years of age divided by the total number of participants who are at least **10** years of age. The table shows that in group A, there are **14** participants who are **10–19** years of age and **9** participants who are **20+** years of age. Therefore, there are **14 + 9**, or **23**, participants in group A who are at least **10** years of age. The table also shows that there are a total of **30** participants who are **10–19** years of age and **30** participants who are **20+** years of age. Therefore, there are a total of **30 + 30**, or **60**, participants who are at least **10** years of age. It follows that the probability of selecting a participant from group A given that the participant is at least **10** years of age is  $\frac{23}{60}$ . Note that  $23/60$ , .3833, and 0.383 are examples of ways to enter a correct answer.

**Question Difficulty:**

Hard

# Question ID 8cbf1415

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: 8cbf1415

In a group, **40%** of the items are red. Of all the red items in the group, **30%** also have stripes. What percentage of the items in the group are red with stripes?

- A. **10%**
- B. **12%**
- C. **70%**
- D. **75%**

ID: 8cbf1415 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that in a group, **40%** of the items are red. It follows that the number of red items in the group can be represented by  **$0.4x$** , where  **$x$**  represents the total number of items in the group. It's also given that of all the red items in the group, **30%** also have stripes. It follows that the number of items in the group that are red and have stripes can be represented by  **$0.3(0.4x)$** , or  **$0.12x$** . The expression  **$0.12x$**  represents **12%** of  **$x$** . Since  **$x$**  represents the total number of items in the group, it follows that **12%** of the items in the group are red and have stripes.

Choice A is incorrect and may result from subtracting **30%** from **40%** rather than calculating **30%** of **40%**.

Choice C is incorrect and may result from adding **30%** and **40%** rather than calculating **30%** of **40%**.

Choice D is incorrect and may result from calculating the percentage that **30%** is of **40%** rather than calculating **30%** of **40%**.

**Question Difficulty:**

Medium

# Question ID c7c6445f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: c7c6445f

A certain town has an area of **4.36** square miles. What is the area, in square yards, of this town? (**1 mile = 1,760 yards**)

- A. **404**
- B. **7,674**
- C. **710,459**
- D. **13,505,536**

ID: c7c6445f Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. Since the number of yards in 1 mile is **1,760**, the number of square yards in 1 square mile is  $(1,760)(1,760) = 3,097,600$ . Therefore, if the area of the town is **4.36** square miles, it is  $4.36(3,097,600) = 13,505,536$ , in square yards.

Choice A is incorrect and may result from dividing the number of yards in a mile by the square mileage of the town.

Choice B is incorrect and may result from multiplying the number of yards in a mile by the square mileage of the town.

Choice C is incorrect and may result from dividing the number of square yards in a square mile by the square mileage of the town.

**Question Difficulty:**

Hard

# Question ID c54b92a2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: c54b92a2

A study was conducted on the production rates for a company that produces tractor wheels. The table below shows the number of wheels made during 11 consecutive one-hour production periods.

One-hour period	Number of wheels made
A	24
B	24
C	21
D	21
E	21
F	19
G	24
H	24
I	19
J	22
K	23

What is the range of the number of wheels made for the 11 one-hour periods?

- A. 5.5
- B. 5.0
- C. 4.5
- D. 4.0

ID: c54b92a2 Answer

Correct Answer:

B

Rationale

Choice B is correct. Range is defined as the difference between the greatest and least values from a set of data. The greatest number of wheels made during a one-hour period was 24 wheels. The least number of wheels was 19. Hence, the range is  $24 - 19 = 5$ , or 5.0.

Choices A, C, and D are incorrect and may be the result of arithmetic errors or incorrectly identifying the greatest or least number of wheels made during a one-hour period.

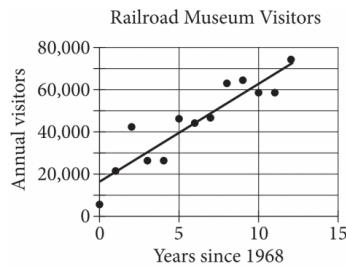
**Question Difficulty:**

Easy

# Question ID 3c5b19ef

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 3c5b19ef



The scatterplot above shows the number of visitors to a railroad museum in Pennsylvania each year from 1968 to 1980, where  $t$  is the number of years since 1968 and  $n$  is the number of visitors. A line of best fit is also shown. Which of the following could be an equation of the line of best fit shown?

- A.  $n = 16,090 + 4,680t$
- B.  $n = 4,690 + 16,090t$
- C.  $n = 16,090 + 9,060t$
- D.  $n = 9,060 + 16,090t$

ID: 3c5b19ef Answer

Correct Answer:

A

Rationale

Choice A is correct. An equation of a line of best fit can be written in the form  $y = a + bx$ , where  $a$  is the  $y$ -intercept of the line and  $b$  is the slope. In the scatterplot shown, the line of best fit intersects the  $y$ -axis just over halfway between 10,000 and 20,000, or approximately 16,000. The line of best fit also intersects the graph at  $(5, 40,000)$ . Using the slope formula  $b = \frac{y_2 - y_1}{x_2 - x_1}$  and two points that lie on the graph such as  $(5, 40,000)$  and  $(0, 16,000)$ , the slope can be approximated as  $\frac{40,000 - 16,000}{5 - 0}$ , or 4,800. Only choice A has a  $y$ -intercept near the estimate of 16,000 and a slope near the estimate of 4,800. Therefore, an equation of the line of best fit could be  $n = 16,090 + 4,680t$ .

Choice B is incorrect because the values for the slope and the  $y$ -coordinate of the  $y$ -intercept are switched. Choice C is incorrect because the value for the slope is approximately double the actual slope. Choice D is incorrect because the values for the slope and the  $y$ -intercept are switched and because the slope is approximately double the actual slope.

**Question Difficulty:**

Medium

# Question ID 73ddfdac

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 73ddfdac

A distance of **112** furlongs is equivalent to how many feet? (**1 furlong = 220 yards and 1 yard = 3 feet**)

ID: 73ddfdac Answer

Correct Answer:

73920

Rationale

The correct answer is **73,920**. It's given that **1 furlong = 220 yards** and **1 yard = 3 feet**. It follows that a distance of **112** furlongs is equivalent to  $(112 \text{ furlongs}) \left( \frac{220 \text{ yards}}{1 \text{ furlong}} \right) \left( \frac{3 \text{ feet}}{1 \text{ yard}} \right)$ , or **73,920** feet.

Question Difficulty:

Medium

# Question ID 96a45430

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: 96a45430

A number  $n$  is increased 6%. If the result is 318, what is the value of  $n$ ?

- A. 199
- B. 299
- C. 300
- D. 337

ID: 96a45430 Answer

Correct Answer:

C

Rationale

Choice C is correct. The decimal equivalent of 6% is 0.06. Since increasing the number  $n$  by 6% yields the number 318, this situation can be represented by the equation  $n(1 + 0.06) = 318$ , or  $n(1.06) = 318$ . Dividing both sides of this equation by 1.06 yields  $n = 300$ .

Choice A is incorrect. This is the result when  $n$  is increased by 60%, not by 6%. Choice B is incorrect. This is the approximate result of decreasing 318 by 6%. Choice D is incorrect. This is the approximate result of increasing 318 by 6%.

Question Difficulty:

Medium

# Question ID 5267c3c7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 5267c3c7

The result of increasing the quantity  $x$  by 400% is 60. What is the value of  $x$ ?

- A. 12
- B. 15
- C. 240
- D. 340

ID: 5267c3c7 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the result of increasing the quantity  $x$  by 400% is 60. This can be written as  $x + (\frac{400}{100})x = 60$ , which is equivalent to  $x + 4x = 60$ , or  $5x = 60$ . Dividing each side of this equation by 5 yields  $x = 12$ . Therefore, the value of  $x$  is 12.

Choice B is incorrect. The result of increasing the quantity 15 by 400% is 75, not 60.

Choice C is incorrect. The result of increasing the quantity 240 by 400% is 1,200, not 60.

Choice D is incorrect. The result of increasing the quantity 340 by 400% is 1,700, not 60.

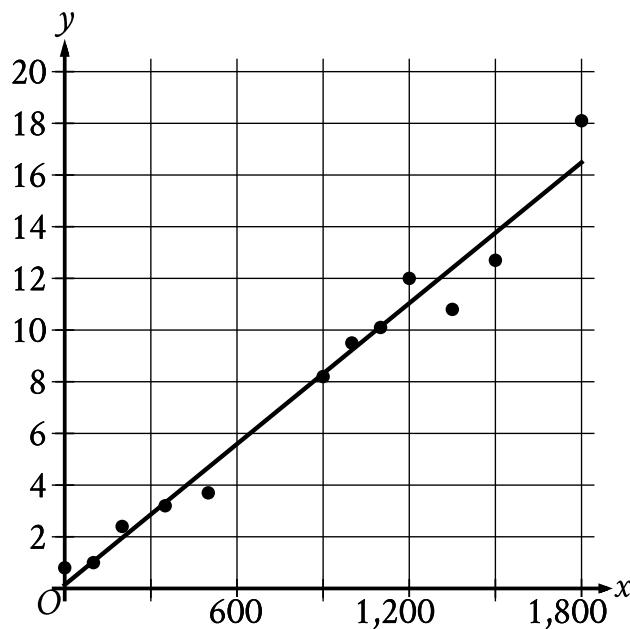
Question Difficulty:

Hard

# Question ID ae32cc3c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: ae32cc3c



Twelve data points are shown in the scatterplot. A line of best fit for the data is also shown. At  $x = 1,200$ , which of the following is closest to the  $y$ -value predicted by the line of best fit?

- A. 16
- B. 14
- C. 11
- D. 6

ID: ae32cc3c Answer

Correct Answer:

C

## Rationale

Choice C is correct. On the line of best fit, an  $x$ -value of 1,200 corresponds to a  $y$ -value between 10 and 12. Therefore, of the given choices, 11 is closest to the  $y$ -value predicted by the line of best fit at  $x = 1,200$ .

Choice A is incorrect. This is the integer value closest to the  $y$ -value predicted by the line of best fit at  $x = 1,800$ .

Choice B is incorrect. This is the integer value closest to the  $y$ -value predicted by the line of best fit at  $x = 1,500$ .

Choice D is incorrect. This is the integer value closest to the  $y$ -value predicted by the line of best fit at  $x = 600$ .

**Question Difficulty:**  
Easy

# Question ID 82dfb646

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 82dfb646

A market researcher selected 200 people at random from a group of people who indicated that they liked a certain book. The 200 people were shown a movie based on the book and then asked whether they liked or disliked the movie. Of those surveyed, 95% said they disliked the movie. Which of the following inferences can appropriately be drawn from this survey result?

- A. At least 95% of people who go see movies will dislike this movie.
- B. At least 95% of people who read books will dislike this movie.
- C. Most people who dislike this book will like this movie.
- D. Most people who like this book will dislike this movie.

ID: 82dfb646 Answer

Correct Answer:

D

Rationale

Choice D is correct. The sample was selected from a group of people who indicated that they liked the book. It is inappropriate to generalize the result of the survey beyond the population from which the participants were selected. Choice D is the most appropriate inference from the survey results because it describes a conclusion about people who liked the book, and the results of the survey indicate that most people who like the book disliked the movie.

Choices A, B, and C are incorrect because none of these inferences can be drawn from the survey results. Choices A and B need not be true. The people surveyed all liked the book on which the movie was based, which is not necessarily true of all people who go see movies or all people who read books. Thus, the people surveyed are not representative of all people who go see movies or all people who read books. Therefore, the results of this survey cannot appropriately be extended to at least 95% of people who go see movies or to at least 95% of people who read books. Choice C need not be true because the sample includes only people who liked the book, and so the results do not extend to people who dislike the book.

Question Difficulty:

Easy

# Question ID 5c3c2e3c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

**ID: 5c3c2e3c**

The weights, in pounds, for 15 horses in a stable were reported, and the mean, median, range, and standard deviation for the data were found. The horse with the lowest reported weight was found to actually weigh 10 pounds less than its reported weight. What value remains unchanged if the four values are reported using the corrected weight?

- A. Mean
- B. Median
- C. Range
- D. Standard deviation

**ID: 5c3c2e3c Answer**

**Correct Answer:**

B

**Rationale**

Choice B is correct. The median weight is found by ordering the horses' weights from least to greatest and then determining the middle value from this list of weights. Decreasing the value for the horse with the lowest weight doesn't affect the median since it's still the lowest value.

Choice A is incorrect. The mean is calculated by finding the sum of all the weights of the horses and then dividing by the number of horses. Decreasing one of the weights would decrease the sum and therefore decrease the mean. Choice C is incorrect. Range is the difference between the highest and lowest weights, so decreasing the lowest weight would increase the range. Choice D is incorrect. Standard deviation is calculated based on the mean weight of the horses. Decreasing one of the weights decreases the mean and therefore would affect the standard deviation.

**Question Difficulty:**

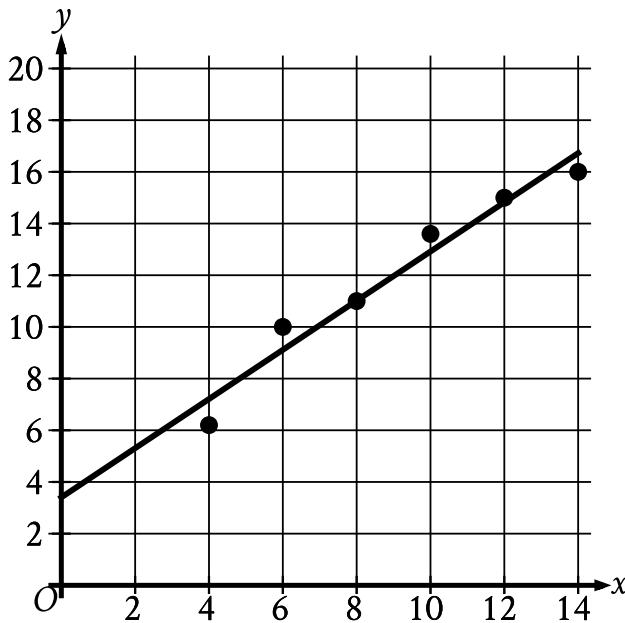
Medium

# Question ID c5ee6ac0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: c5ee6ac0

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit is also shown.



Which of the following equations best represents the line of best fit shown?

- A.  $y = x + 3.4$
- B.  $y = x - 3.4$
- C.  $y = -x + 3.4$
- D.  $y = -x - 3.4$

ID: c5ee6ac0 Answer

Correct Answer:

A

## Rationale

Choice A is correct. The line of best fit shown has a positive slope and intersects the  $y$ -axis at a positive  $y$ -value. The graph of an equation of the form  $y = mx + b$ , where  $m$  and  $b$  are constants, has a slope of  $m$  and intersects the  $y$ -axis at a  $y$ -value of  $b$ . Of the given choices, only  $y = x + 3.4$  represents a line that has a positive slope, 1, and intersects the  $y$ -axis at a positive  $y$ -value, 3.4.

Choice B is incorrect. This equation represents a line that intersects the  $y$ -axis at a negative  $y$ -value, not a positive  $y$ -value.

Choice C is incorrect. This equation represents a line that has a negative slope, not a positive slope.

Choice D is incorrect. This equation represents a line that has a negative slope, not a positive slope, and intersects the  $y$ -axis at a negative  $y$ -value, not a positive  $y$ -value.

**Question Difficulty:**

Easy

# Question ID 61b87506

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 61b87506

For the values  $j$  and  $k$ , the ratio of  $j$  to  $k$  is 11 to 12. If  $j$  is multiplied by 17, what is  $k$  multiplied by in order to maintain the same ratio?

ID: 61b87506 Answer

Correct Answer:

17

Rationale

The correct answer is 17. If one value is multiplied by a number, then the other value must be multiplied by the same number in order to maintain the same ratio. It's given that  $j$  is multiplied by 17. Therefore, in order to maintain the same ratio,  $k$  must also be multiplied by 17.

Question Difficulty:

Medium

# Question ID 30db8f77

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 30db8f77

At a conference, there are a total of **275** attendees. Each attendee is assigned to either group A, group B, or group C. If one of these attendees is selected at random, the probability of selecting an attendee who is assigned to group A is **0.44** and the probability of selecting an attendee who is assigned to group B is **0.24**. How many attendees are assigned to group C?

ID: 30db8f77 Answer

Correct Answer:

88

Rationale

The correct answer is **88**. It's given that there are a total of **275** attendees and each attendee is assigned to either group A, group B, or group C. It's also given that if one of these attendees is selected at random, the probability of selecting an attendee who is assigned to group A is **0.44** and the probability of selecting an attendee who is assigned to group B is **0.24**. It follows that there are **0.44(275)**, or **121**, attendees who are assigned to group A and **0.24(275)**, or **66**, attendees who are assigned to group B. The number of attendees who are assigned to group C is the number of attendees who are not assigned to group A or group B. In other words, the number of attendees who are assigned to group C is the total number of attendees minus the number of attendees who are assigned to group A and group B. Therefore, the number of attendees who are assigned to group C is **275 – 121 – 66**, or **88**.

Question Difficulty:

Medium

# Question ID 43744269

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 43744269

An airplane descends from an altitude of **9,500** feet to **5,000** feet at a constant rate of **400** feet per minute. What type of function best models the relationship between the descending airplane's altitude and time?

- A. Decreasing exponential
- B. Decreasing linear
- C. Increasing exponential
- D. Increasing linear

ID: 43744269 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that the airplane descends at a constant rate of **400 feet per minute**. Since the altitude decreases by a constant amount during each fixed time period, the relationship between the airplane's altitude and time is linear. Since the airplane descends from an altitude of **9,500 feet** to **5,000 feet**, the airplane's altitude is decreasing with time. Thus, the relationship is best modeled by a decreasing linear function.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID 3ac09984

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 3ac09984

Marta has 7,500 pesos she will convert to US dollars using a currency exchange service. At this time, the currency exchange rate is 1 peso = 0.075 US dollars. The exchange service will charge Marta a 2% fee on the converted US dollar amount. How many US dollars will Marta receive from the currency exchange after the 2% fee is applied?

- A. \$551.25
- B. \$562.50
- C. \$5,625.00
- D. \$98,000.00

ID: 3ac09984 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. At the exchange rate of 1 peso = 0.075 US dollars, 7,500 pesos would be converted to  $7,500 \times 0.075 = \$562.50$ . However, since Maria pays a 2% fee on the converted US dollar amount, she receives only  $(100 - 2)\%$ , or 98%, of the converted US dollars, and  $562.50 \times 0.98 = \$551.25$ .

Choice B is incorrect. This is the number of US dollars Maria would receive if the exchange service did not charge a 2% fee. Choice C is incorrect and may result from a decimal point error made when calculating the conversion to US dollars and from not assessing the 2% fee. Choice D is incorrect and may result from reversing the units of the exchange rate.

**Question Difficulty:**

Easy

# Question ID 66f03086

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 66f03086

71, 72, 73, 76, 77, 79, 83, 87, 93

What is the median of the data shown?

- A. 71
- B. 77
- C. 78
- D. 79

ID: 66f03086 Answer

Correct Answer:

B

Rationale

Choice B is correct. The median of a data set with an odd number of data values is defined as the middle value of the ordered list of values. The data set shown has nine values, so the median is the fifth value in the ordered list, which is 77.

Choice A is incorrect. This is the minimum value of the data set, not the median.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect. This is the mean of the data set, not the median.

Question Difficulty:

Easy

# Question ID 61f61789

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 61f61789

To study the moisture content in a group of trees, samples from the trunk of each tree were taken from **25** trees and cut in the shape of a cube. The length of the edge of one of these cubes is **2.00** centimeters. If this cube has a mass of **2.56** grams, what is the density of this cube, in grams per cubic centimeter?

ID: 61f61789 Answer

Correct Answer:

0.32, 8/25

Rationale

The correct answer is **.32**. The volume of a cube is given by the formula  $V = s^3$ , where  $s$  is the length of an edge of the cube. It's given that each edge of the cube has a length of **2.00** centimeters. Substituting **2.00** centimeters for  $s$  in the formula  $V = s^3$  yields  $V = (2.00 \text{ centimeters})^3$ , or  $V = 8.00$  cubic centimeters. It's given that the cube has a mass of **2.56** grams. Dividing the mass, in grams, of the cube by the volume, in cubic centimeters, of the cube gives its density, in grams per cubic centimeters. Therefore, the density of the cube is  $\frac{2.56 \text{ grams}}{8.00 \text{ cubic centimeters}}$ , or **.32** grams per cubic centimeter. Note that **.32** and **8/25** are examples of ways to enter a correct answer.

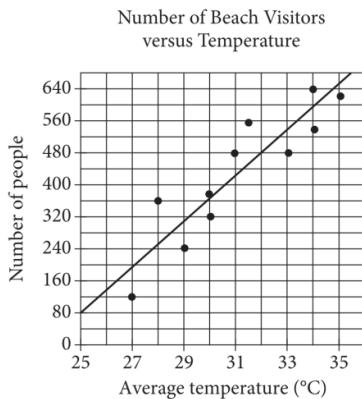
Question Difficulty:

Hard

# Question ID d0430601

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: d0430601



Each dot in the scatterplot above represents the temperature and the number of people who visited a beach in Lagos, Nigeria, on one of eleven different days. The line of best fit for the data is also shown. The line of best fit for the data has a slope of approximately 57. According to this estimate, how many additional people per day are predicted to visit the beach for each 5°C increase in average temperature?

ID: d0430601 Answer

## Rationale

The correct answer is 285. The number of people predicted to visit the beach each day is represented by the y-values of the line of best fit, and the average temperature, in degrees Celsius ( $^{\circ}\text{C}$ ), is represented by the x-values. Since the slope of the line of best fit is approximately 57, the y-value, or the number of people predicted to visit the beach each day, increases by 57 for every x-value increase of 1, or every  $1^{\circ}\text{C}$  increase in average temperature. Therefore, an increase of  $5^{\circ}\text{C}$  in average temperature corresponds to a y-value increase of  $57(5) = 285$  additional people per day predicted to visit the beach.

## Question Difficulty:

Hard

# Question ID 9110c120

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a7a; height: 10px;"></div> <div style="width: 25%; background-color: #005a7a; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 9110c120

Data set A: 5, 5, 5, 5, 5, 5, 5, 5, 5, 5

Data set B: 5, 5, 5, 5, 5, 5, 5, 5, 5, 100

Which of the following statements about the means and medians of data set A and data set B is true?

- A. Only the means are different.
- B. Only the medians are different.
- C. Both the means and the medians are different.
- D. Neither the means nor the medians are different.

ID: 9110c120 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. The mean of a data set is the sum of the values divided by the number of values. The mean of data set A is  $\frac{45}{9}$ , or 5. The mean of data set B is  $\frac{145}{10}$ , or 14.5. Thus, the means are different. The median of a data set is the middle value when the values are ordered from least to greatest. The medians of data sets A and B are both 5. Therefore, the medians are the same, so only the means are different.

Choices B, C, and D are incorrect and may result from conceptual or calculation errors.

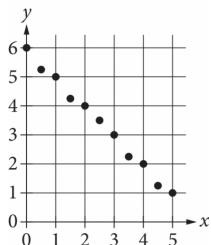
**Question Difficulty:**

Medium

# Question ID 9296553d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 9296553d



Which of the following could be an equation for a line of best fit for the data in the scatterplot?

- A.  $y = -x + 6$
- B.  $y = -x - 6$
- C.  $y = 6x + 1$
- D.  $y = 6x - 1$

ID: 9296553d Answer

Correct Answer:

A

## Rationale

Choice A is correct. A line of best fit for the data in a scatterplot is a line that follows the trend of the data with approximately half the data points above and half the data points below the line. Based on the given data, a line of best fit will have a positive y-intercept on or near the point  $(0, 6)$  and a negative slope. All of the choices are in slope-intercept form  $y = mx + b$ , where  $m$  is the slope and  $b$  is the y-coordinate of the y-intercept. Only choice A is an equation of a line with a positive y-intercept at  $(0, 6)$  and a negative slope,  $-1$ .

Choice B is incorrect. This equation is for a line that has a negative y-intercept, not a positive y-intercept. Choices C and D are incorrect and may result from one or more sign errors and from switching the values of the y-intercept and the slope in the equation.

## Question Difficulty:

Easy

# Question ID d1db8def

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: d1db8def

Response	Frequency
Once a week or more	3
Two or three times a month	16
About once a month	26
A few times a year	73
Almost never	53
Never	29
Total	200

The table gives the results of a survey of **200** people who were asked how often they see a movie in a theater. How many people responded either “never” or “almost never”?

- A. **24**
- B. **53**
- C. **82**
- D. **118**

ID: d1db8def Answer

Correct Answer:

C

## Rationale

Choice C is correct. The table gives the results of **200** people who were asked how often they see a movie in a theater. The table shows that **29** people responded “never” and **53** people responded “almost never.” Therefore, **29 + 53**, or **82**, people responded either “never” or “almost never.”

Choice A is incorrect. This is the difference between the number of people who responded “almost never” and the number of people who responded “never.”

Choice B is incorrect. This is the number of people who responded “almost never” but doesn’t include those who responded “never.”

Choice D is incorrect. This is the number of people who responded something other than “never” or “almost never,” rather than the number of people who responded either “never” or “almost never.”

**Question Difficulty:**  
Easy

# Question ID b2f6f17d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #006699; height: 10px;"></div> <div style="width: 60%; background-color: #CCCCCC; height: 10px;"></div>

ID: b2f6f17d

A customer's monthly water bill was \$75.74. Due to a rate increase, her monthly bill is now \$79.86. To the nearest tenth of a percent, by what percent did the amount of the customer's water bill increase?

- A. 4.1%
- B. 5.1%
- C. 5.2%
- D. 5.4%

ID: b2f6f17d Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. To find the percent increase of the customer's water bill, the absolute increase of the bill, in dollars, is divided by the original amount of the bill, and the result is multiplied by 100%, as follows:  $\frac{79.86 - 75.74}{75.74} \approx 0.054$ ;  $0.054 \times 100\% = 5.4\%$ .

Choice A is incorrect. This choice is the difference  $79.86 - 75.74$  rounded to the nearest tenth, which is the (absolute) increase of the bill's amount, not its percent increase. Choice B is incorrect and may be the result of some calculation errors. Choice C is incorrect and is the result of dividing the difference between the two bill amounts by the new bill amount instead of the original bill amount.

**Question Difficulty:**

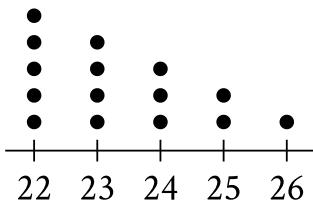
Medium

# Question ID 4626102e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; height: 10px; background-color: #005a9f;"></div>

ID: 4626102e

Data Set A



The dot plot represents the 15 values in data set A. Data set B is created by adding 56 to each of the values in data set A. Which of the following correctly compares the medians and the ranges of data sets A and B?

- A. The median of data set B is equal to the median of data set A, and the range of data set B is equal to the range of data set A.
- B. The median of data set B is equal to the median of data set A, and the range of data set B is greater than the range of data set A.
- C. The median of data set B is greater than the median of data set A, and the range of data set B is equal to the range of data set A.
- D. The median of data set B is greater than the median of data set A, and the range of data set B is greater than the range of data set A.

ID: 4626102e Answer

Correct Answer:

C

Rationale

Choice C is correct. The median of a data set with an odd number of values, in ascending or descending order, is the middle value of the data set, and the range of a data set is the positive difference between the maximum and minimum values in the data set. Since the dot plot shown gives the values in data set A in ascending order and there are 15 values in the data set, the eighth value in data set A, 23, is the median. The maximum value in data set A is 26 and the minimum value is 22, so the range of data set A is  $26 - 22$ , or 4. It's given that data set B is created by adding 56 to each of the values in data set A. Increasing each of the 15 values in data set A by 56 will also increase its median value by 56 making the median of data set B 79. Increasing each value of data set A by 56 does not change the range, since the maximum value of data set B is  $26 + 56$ , or 82, and the minimum value is  $22 + 56$ , or 78, making the range of data set B  $82 - 78$ , or 4. Therefore, the median of data set B is greater than the median of data set A, and the range of data set B is equal to the range of data set A.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

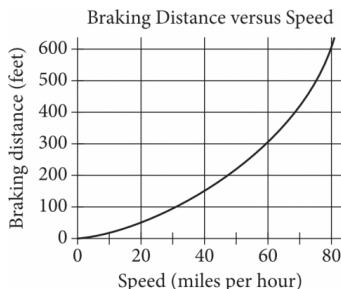
Question Difficulty:

Hard

# Question ID d6121490

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: d6121490



The graph above shows the relationship between the speed of a particular car, in miles per hour, and its corresponding braking distance, in feet. Approximately how many feet greater will the car's braking distance be when the car is traveling at 50 miles per hour than when the car is traveling at 30 miles per hour?

- A. 75
- B. 125
- C. 175
- D. 250

ID: d6121490 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. According to the graph, when the car is traveling at 50 miles per hour, the braking distance is approximately 225 feet, and when the car is traveling at 30 miles per hour, the braking distance is approximately 100 feet. The difference between these braking distances is  $225 - 100$ , or 125 feet.

Choice A is incorrect and may result from finding the braking distance for 20 miles per hour, the difference between the given speeds. Choice C is incorrect and may result from subtracting the speed from the braking distance at 50 miles per hour. Choice D is incorrect and may result from finding the difference in the braking distances at 60 and 20 miles per hour.

**Question Difficulty:**

Easy

# Question ID 55cfaf22

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 55cfaf22

Data set X: **5, 9, 9, 13**

Data set Y: **5, 9, 9, 13, 27**

The lists give the values in data sets X and Y. Which statement correctly compares the mean of data set X and the mean of data set Y?

- A. The mean of data set X is greater than the mean of data set Y.
- B. The mean of data set X is less than the mean of data set Y.
- C. The means of data set X and data set Y are equal.
- D. There is not enough information to compare the means.

ID: 55cfaf22 Answer

Correct Answer:

B

Rationale

Choice B is correct. The mean of a data set is the sum of the values in the data set divided by the number of values in the data set. It follows that the mean of data set X is  $\frac{5+9+9+13}{4}$ , or 9, and the mean of data set Y is  $\frac{5+9+9+13+27}{5}$ , or 12.6. Since 9 is less than 12.6, the mean of data set X is less than the mean of data set Y.

Alternate approach: Data set Y consists of the 4 values in data set X and one additional value, 27. Since the additional value, 27, is larger than any value in data set X, the mean of data set X is less than the mean of data set Y.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

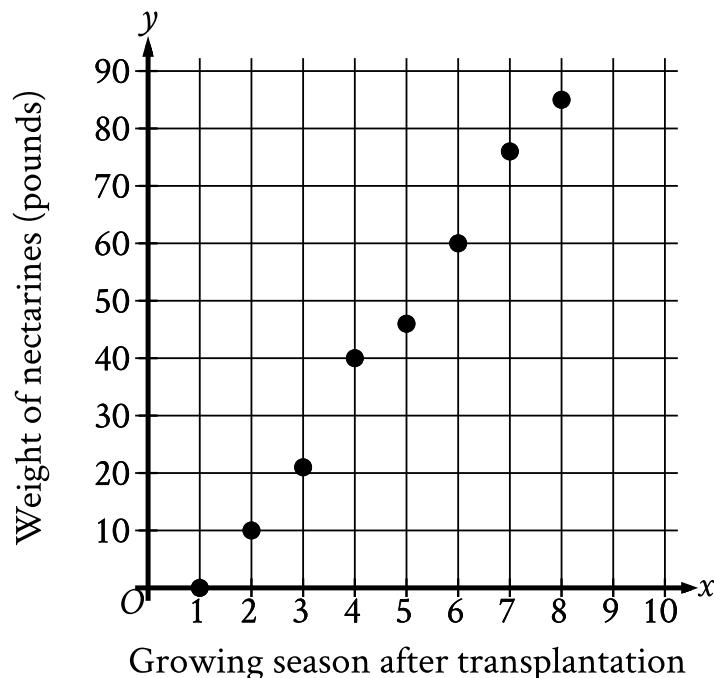
Easy

# Question ID b58dbf88

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: b58dbf88

An orchard owner recorded the weight, in pounds, of all nectarines that grew on a dwarf nectarine tree during each growing season after the tree's transplantation. The scatterplot shows this weight, in pounds, for each growing season after the tree's transplantation.



What was the weight, to the nearest pound, of all nectarines that grew on the tree during the **4th** growing season after the tree's transplantation?

ID: b58dbf88 Answer

Correct Answer:

40

Rationale

The correct answer is **40**. For each data point on the scatterplot, the  $x$ -value represents the growing season after transplantation and the  $y$ -value represents the weight, in pounds, of all nectarines that grew on the tree during the season. The scatterplot shows a data point at  $(4, 40)$ . It follows that during the **4th** growing season after the tree's transplantation, **40** pounds of nectarines grew on the tree.

Question Difficulty:

Easy

# Question ID 5154615f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: 5154615f

To study fluctuations in composition, samples of pumice were taken from **29** locations and cut in the shape of a cube. The length of the edge of one of these cubes is **3.000** centimeters. This cube has a density of **0.230** grams per cubic centimeter. What is the mass of this cube, in grams?

ID: 5154615f Answer

Correct Answer:

6.21

Rationale

The correct answer is **6.21**. It's given that the samples of pumice were cut in the shape of a cube. It's also given that the length of the edge of one of these cubes is **3.000** centimeters. Therefore, the volume of this cube is  $(3.000 \text{ centimeters})^3$ , or **27** cubic centimeters. Since the density of this cube is **0.230** grams per cubic centimeter, it follows that the mass of this cube is  $\left(\frac{0.230 \text{ grams}}{1 \text{ cubic centimeter}}\right)(27 \text{ cubic centimeters})$ , or **6.21** grams.

Question Difficulty:

Hard

# Question ID ab7740a8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: ab7740a8

In which of the following tables is the relationship between the values of  $x$  and their corresponding  $y$ -values nonlinear?

A.

$x$	1	2	3	4
$y$	8	11	14	17

B.

$x$	1	2	3	4
$y$	4	8	12	16

C.

$x$	1	2	3	4
$y$	8	13	18	23

D.

$x$	1	2	3	4
$y$	6	12	24	48

ID: ab7740a8 Answer

Correct Answer:

D

## Rationale

Choice D is correct. The relationship between the values of  $x$  and their corresponding  $y$ -values is nonlinear if the rate of change between these pairs of values isn't constant. The table for choice D gives four pairs of values:  $(1,6)$ ,  $(2,12)$ ,  $(3,24)$ , and  $(4,48)$ .

Finding the rate of change, or slope, between  $(1,6)$  and  $(2,12)$  by using the slope formula,  $\frac{y_2 - y_1}{x_2 - x_1}$ , yields  $\frac{12 - 6}{2 - 1}$ , or 6. Finding

the rate of change between  $(2,12)$  and  $(3,24)$  yields  $\frac{24 - 12}{3 - 2}$ , or 12. Finding the rate of change between  $(3,24)$  and  $(4,48)$  yields

$\frac{48 - 24}{4 - 3}$ , or 24. Since the rate of change isn't constant for these pairs of values, this table shows a nonlinear relationship.

Choices A, B, and C are incorrect. The rate of change between the values of  $x$  and their corresponding  $y$ -values in each of these tables is constant, being 3, 4, and 5, respectively. Therefore, each of these tables shows a linear relationship.

## Question Difficulty:

Medium

# Question ID 2a08d878

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 2a08d878

There are  $n$  nonfiction books and 12 fiction books on a bookshelf. If one of these books is selected at random, what is the probability of selecting a nonfiction book, in terms of  $n$ ?

- A.  $\frac{n}{12}$
- B.  $\frac{n}{n+12}$
- C.  $\frac{12}{n}$
- D.  $\frac{12}{n+12}$

ID: 2a08d878 Answer

Correct Answer:

B

Rationale

Choice B is correct. Since there are  $n$  nonfiction and 12 fiction books on the bookshelf,  $n + 12$  represents the total number of books. If one of these books is selected at random, the probability of selecting a nonfiction book is equivalent to the number of nonfiction books divided by the total number of books. Therefore, the probability of selecting a nonfiction book, in terms of  $n$ , is  $\frac{n}{n+12}$ .

Choice A is incorrect. This expression represents the number of nonfiction books divided by the number of fiction books. Choice C is incorrect. This expression represents the number of fiction books divided by the number of nonfiction books. Choice D is incorrect. This expression represents the probability of selecting a fiction book.

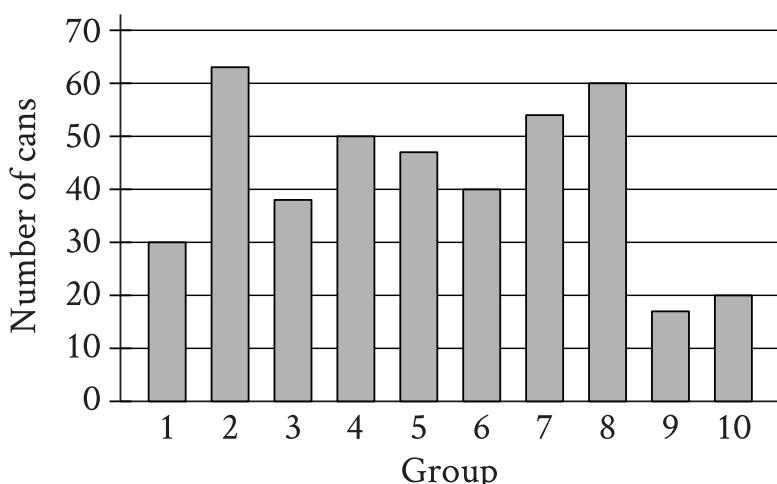
Question Difficulty:

Easy

# Question ID 820d7a73

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 25%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 25%; background-color: #D9D9D9; height: 10px;"></div>

ID: 820d7a73



The bar graph shows the distribution of 419 cans collected by 10 different groups for a food drive. How many cans were collected by group 6?

ID: 820d7a73 Answer

Correct Answer:

40

Rationale

The correct answer is 40. The height of each bar in the bar graph shown represents the number of cans collected by the group specified at the bottom of the bar. The bar for group 6 reaches a height of 40. Therefore, group 6 collected 40 cans.

Question Difficulty:

Easy

# Question ID 38a9ac45

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: 38a9ac45

If 1,200 customers register for new accounts at a social media website every day, what fraction of the first 60,000 new accounts are registered in the first 5 days?

A.  $\frac{1}{5}$

B.  $\frac{1}{10}$

C.  $\frac{1}{12}$

D.  $\frac{1}{50}$

ID: 38a9ac45 Answer

Correct Answer:

B

Rationale

Choice B is correct. If 1,200 customers register for new accounts every day, then  $(1,200)(5) = 6,000$  customers registered for new accounts in the first 5 days. Therefore, of the first 60,000 new accounts that were registered,  $\frac{6,000}{60,000}$ , or  $\frac{1}{10}$ , were registered in the first 5 days.

Choice A is incorrect. The fraction  $\frac{1}{5}$  represents the fraction of accounts registered in 1 of the first 5 days. Choice C is incorrect

and may result from conceptual or computation errors. Choice D is incorrect. The fraction  $\frac{1}{50}$  represents the fraction of the first 60,000 accounts that were registered in 1 day.

Question Difficulty:

Medium

# Question ID 9c44f828

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 9c44f828

There are a total of **840** seats in a school auditorium. During an assembly, students occupied **50%** of the seats in the auditorium. How many seats did the students occupy during this assembly?

- A. **25**
- B. **50**
- C. **420**
- D. **790**

ID: 9c44f828 Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. It's given that during an assembly, students occupied **50%** of the **840** seats in the school auditorium. Therefore, the number of seats that the students occupied during this assembly can be calculated by multiplying the number of seats in the school auditorium by  $\frac{50}{100}$ . Thus, the students occupied  $840 \left( \frac{50}{100} \right)$ , or **420**, seats during this assembly.

Choice A is incorrect. This is approximately **3%**, not **50%**, of **840**.

Choice B is incorrect. This is approximately **6%**, not **50%**, of **840**.

Choice D is incorrect. This is approximately **94%**, not **50%**, of **840**.

**Question Difficulty:**

Easy

# Question ID eb672707

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: eb672707

How many tablespoons are equivalent to **14** teaspoons? (**3** teaspoons = **1** tablespoon)

ID: eb672707 Answer

**Correct Answer:**

14/3, 4.666, 4.667

**Rationale**

The correct answer is  $\frac{14}{3}$ . It's given that **3** teaspoons is equivalent to **1** tablespoon. Therefore, **14** teaspoons is equivalent to  $(14 \text{ teaspoons}) \left( \frac{1 \text{ tablespoon}}{3 \text{ teaspoons}} \right)$ , or  $\frac{14}{3}$  tablespoons. Note that 14/3, 4.666, and 4.667 are examples of ways to enter a correct answer.

**Question Difficulty:**

Medium

# Question ID 7270d642

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 7270d642

A certain bird species can fly at an average speed of **16** meters per second when in continuous flight. At this rate, how many meters would this bird species fly in **4** seconds?

- A. **64**
- B. **20**
- C. **16**
- D. **12**

ID: 7270d642 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that a certain bird species can fly at an average speed of **16** meters per second when in continuous flight. At this rate, in **4** seconds this bird species would fly  $(\frac{16 \text{ meters}}{\text{second}})(4 \text{ seconds})$ , or **64** meters.

Choice B is incorrect. This is the value of  $16 + 4$ , not  $16(4)$ .

Choice C is incorrect. This is the distance the bird would fly in **1** second, not **4** seconds.

Choice D is incorrect. This is the value of  $16 - 4$ , not  $16(4)$ .

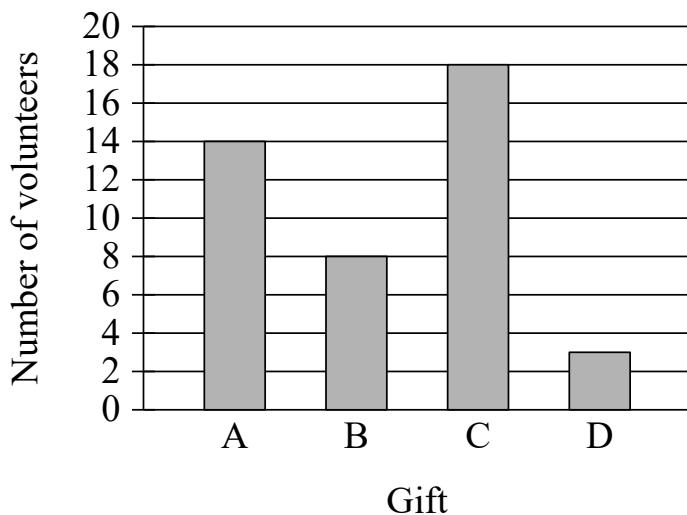
**Question Difficulty:**

Easy

## Question ID 6e3ab4bf

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #CCCCCC; height: 10px;"></div> <div style="width: 25%; background-color: #CCCCCC; height: 10px;"></div>

ID: 6e3ab4bf



In April, there were **43** volunteers in a cleanup project. Each volunteer was asked to choose a small gift labeled A, B, C, or D. The bar graph shows the number of volunteers who chose each gift. How many volunteers chose gift C?

- A. 3
- B. 8
- C. 14
- D. 18

ID: 6e3ab4bf Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The height of each bar in the graph shown represents the number of volunteers who chose the gift labeled with the letter specified at the bottom of the bar. The bar for gift C has a height of **18**. Therefore, **18** volunteers chose gift C.

Choice A is incorrect. This is the number of volunteers who chose gift D, not gift C.

Choice B is incorrect. This is the number of volunteers who chose gift B, not gift C.

Choice C is incorrect. This is the number of volunteers who chose gift A, not gift C.

**Question Difficulty:**

Easy

# Question ID c256b723

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: c256b723

The amount of Hanna's bill for a food order was \$50. Hanna gave a tip of 20% of the amount of the bill. What is the amount, in dollars, of the tip Hanna gave?

ID: c256b723 Answer

Correct Answer:

10

Rationale

The correct answer is 10. It's given that the amount of Hanna's food order was \$50 and that Hanna gave a tip of 20% of the amount of the bill. 20% of 50 can be calculated as  $(\frac{20}{100})(50)$ , which yields  $\frac{1000}{100}$ , or 10. Therefore, the amount, in dollars, of the tip Hanna gave is 10.

Question Difficulty:

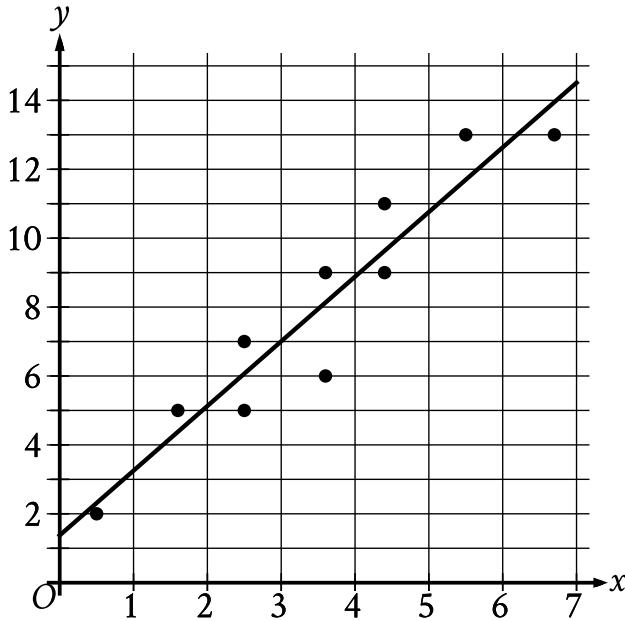
Medium

# Question ID 90ba8f98

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #005599; height: 10px;"></div> <div style="width: 60%; background-color: #CCCCCC; height: 10px;"></div>

ID: 90ba8f98

In the given scatterplot, a line of best fit for the data is shown.



Which of the following is closest to the slope of the line of best fit shown?

- A. 0
- B.  $\frac{1}{2}$
- C. 1
- D. 2

ID: 90ba8f98 Answer

Correct Answer:

D

Rationale

Choice D is correct. A line in the  $xy$ -plane that passes through the points  $(x_1, y_1)$  and  $(x_2, y_2)$  has a slope of  $\frac{y_2 - y_1}{x_2 - x_1}$ . The line of best fit shown passes approximately through the points  $(1, 3.3)$  and  $(7, 14.5)$ . It follows that the slope of this best fit line is approximately  $\frac{14.5 - 3.3}{7 - 1}$ , which is equivalent to  $\frac{11.2}{6}$ , or approximately  $1.87$ . Therefore, of the given choices, 2 is closest to the slope of the line of best fit shown.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Medium

# Question ID 881ef5f5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 881ef5f5

If  $a$  is the mean and  $b$  is the median of nine consecutive integers, what is the value of  $|a - b|$ ?

ID: 881ef5f5 Answer

## Rationale

The correct answer is 0. Any nine consecutive integers can be written as  $k, k+1, k+2, k+3, k+4, k+5, k+6, k+7, k+8$ . The

$$\frac{(k+k+1+k+2+\dots+k+8)}{9} = \frac{(9k+36)}{9}$$

mean of the integers is their sum divided by 9:  $\frac{(9k+36)}{9}$ , which simplifies to  $k+4$ . So  $a = k+4$ . Since there is an odd number of integers (nine), the median is the integer in the middle when all the integers are ordered from least to greatest:  $k+4$ . So  $b = k+4$ . Therefore,  $|a - b| = |(k+4) - (k+4)|$ , which is 0.

## Question Difficulty:

Medium

# Question ID 273b7f37

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 273b7f37

Isabel grows potatoes in her garden. This year, she harvested **760** potatoes and saved **10%** of them to plant next year. How many of the harvested potatoes did Isabel save to plant next year?

- A. **66**
- B. **76**
- C. **84**
- D. **86**

ID: 273b7f37 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The number of harvested potatoes Isabel saved to plant next year can be calculated by multiplying the total number of potatoes Isabel harvested, **760**, by the proportion of potatoes she saved. Since she saved **10%** of the potatoes she harvested, the proportion of potatoes she saved is  $\frac{10}{100}$ , or **0.1**. Multiplying **760** by this proportion gives  $760(0.1)$ , or **76**, potatoes that she saved to plant next year.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

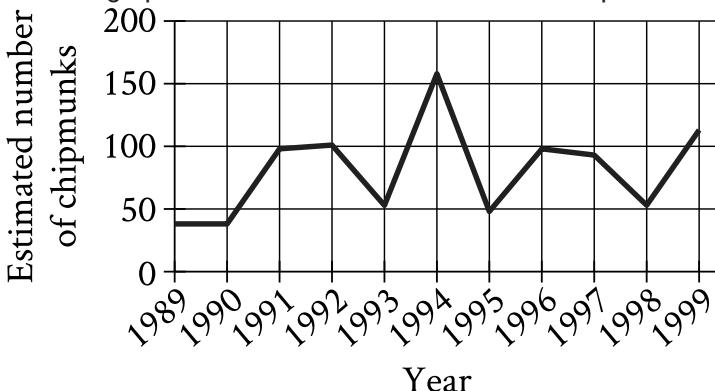
Easy

# Question ID 2e511919

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 2e511919

The line graph shows the estimated number of chipmunks in a state park on April 1 of each year from 1989 to 1999.



Based on the line graph, in which year was the estimated number of chipmunks in the state park the greatest?

- A. 1989
- B. 1994
- C. 1995
- D. 1998

ID: 2e511919 Answer

Correct Answer:

B

Rationale

Choice B is correct. For the given line graph, the estimated number of chipmunks is represented on the vertical axis. The greatest estimated number of chipmunks in the state park is indicated by the greatest height in the line graph. This height is achieved when the year is 1994.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty:

Easy

# Question ID 7ed0d098

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 7ed0d098

Lani spent 15% of her 8-hour workday in meetings. How many minutes of her workday did she spend in meetings?

- A. 1.2
- B. 15
- C. 48
- D. 72

ID: 7ed0d098 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. There are 60 minutes in one hour, so an 8-hour workday has  $(60)(8) = 480$  minutes. To calculate 15% of 480, multiply 0.15 by 480:  $(0.15)(480) = 72$ . Therefore, Lani spent 72 minutes of her workday in meetings.

Choice A is incorrect because 1.2 is 15% of 8, which gives the time Lani spent of her workday in meetings in hours, not minutes. Choices B and C are incorrect and may be the result of computation errors.

**Question Difficulty:**

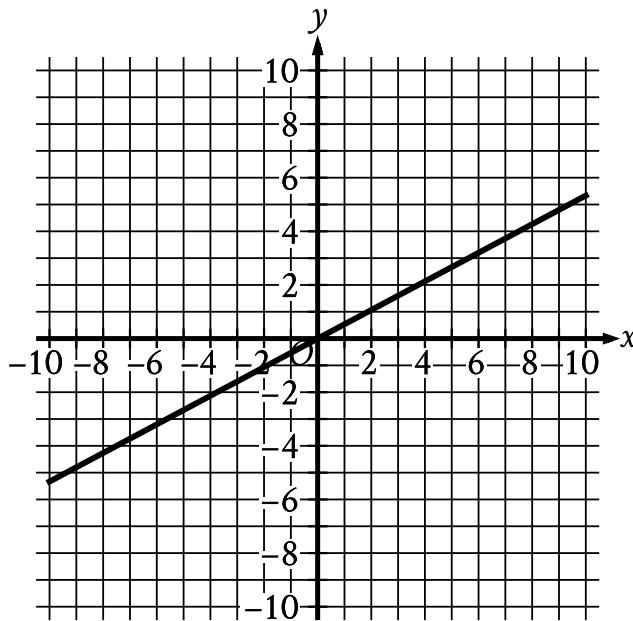
Easy

# Question ID c141366d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: c141366d

The graph of function  $f$  is shown, where  $y = f(x)$ .



Which of the following describes function  $f$ ?

- A. Increasing linear
- B. Decreasing linear
- C. Increasing exponential
- D. Decreasing exponential

ID: c141366d Answer

Correct Answer:

A

## Rationale

Choice A is correct. The graph of function  $f$  shows that as  $x$  increases,  $f(x)$  also increases, which means  $f(x)$  is an increasing function. The graph of  $f$  is a line, which indicates a constant rate of change. A function that has a constant rate of change is a linear function. Therefore, function  $f$  can be described as increasing linear.

Choice B is incorrect. For a decreasing function, as  $x$  increases,  $f(x)$  decreases, rather than increases.

Choice C is incorrect. The graph of an exponential function isn't a line.

Choice D is incorrect. For a decreasing function, as  $x$  increases,  $f(x)$  decreases, rather than increases, and the graph of an exponential function isn't a line.

**Question Difficulty:**

Easy

# Question ID 20845d36

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 20845d36

The number  $a$  is 70% less than the positive number  $b$ . The number  $c$  is 60% greater than  $a$ . The number  $c$  is how many times  $b$ ?

ID: 20845d36 Answer

Correct Answer:

.48, 12/25

Rationale

The correct answer is .48. It's given that the number  $a$  is 70% less than the positive number  $b$ . Therefore,  $a = (1 - \frac{70}{100})b$ , which is equivalent to  $a = (1 - 0.70)b$ , or  $a = 0.30b$ . It's also given that the number  $c$  is 60% greater than  $a$ . Therefore,  $c = (1 + \frac{60}{100})a$ , which is equivalent to  $c = (1 + 0.60)a$ , or  $c = 1.60a$ . Since  $a = 0.30b$ , substituting  $0.30b$  for  $a$  in the equation  $c = 1.60a$  yields  $c = 1.60(0.30b)$ , or  $c = 0.48b$ . Thus,  $c$  is 0.48 times  $b$ . Note that .48 and 12/25 are examples of ways to enter a correct answer.

Question Difficulty:

Hard

# Question ID 8bf3f67a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 8bf3f67a

A special camera is used for underwater ocean research. The camera is at a depth of **39** fathoms. What is the camera's depth in feet? (**1 fathom = 6 feet**)

- A. **234**
- B. **117**
- C. **45**
- D. **7**

ID: 8bf3f67a Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that a special camera is used for underwater ocean research, and this camera is at a depth of **39** fathoms. It's also given that **1 fathom** is equal to **6 feet**. Thus, **39 fathoms** is equivalent to  $(39 \text{ fathoms})\left(\frac{6 \text{ feet}}{1 \text{ fathom}}\right)$ , or **234** feet. Therefore, the camera's depth, in feet, is **234**.

Choice B is incorrect. This is the camera's depth, in feet, if the camera is at a depth of **19.5** fathoms.

Choice C is incorrect. This is the camera's depth, in feet, if the camera is at a depth of **7.5** fathoms.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID a478f9f5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: a478f9f5

Each of 157 gemstones can be classified as one of three classifications, as shown in the frequency table.

Classification	Frequency
color X	119
color Y	3
color Z	35

If one of the gemstones is selected at random, what is the probability of selecting a gemstone of color Y?

- A.  $\frac{3}{157}$
- B.  $\frac{35}{157}$
- C.  $\frac{119}{157}$
- D.  $\frac{154}{157}$

ID: a478f9f5 Answer

Correct Answer:

A

Rationale

Choice A is correct. If one of the gemstones is selected at random, the probability of selecting a gemstone of color Y is equal to the number of gemstones of color Y divided by the total number of gemstones. According to the table, there are 3 gemstones of color Y, and it's given that the total number of gemstones is 157. Therefore, if one of the gemstones is selected at random, the probability of selecting a gemstone of color Y is  $\frac{3}{157}$ .

Choice B is incorrect. This is the probability of selecting a gemstone of color Z.

Choice C is incorrect. This is the probability of selecting a gemstone of color X.

Choice D is incorrect. This is the probability of selecting a gemstone that's not of color Y.

Question Difficulty:

Easy

# Question ID dae79de4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: dae79de4

	1 visit	2 or more visits	Total
Less than 40 years old	15	15	30
At least 40 years old	20	85	105
<b>Total</b>	<b>35</b>	<b>100</b>	<b>135</b>

The table summarizes customers who visited a car dealership in the last month by age and number of visits they made to the dealership. If a customer from the last month is selected at random, what is the probability that the selected customer is at least 40 years old?

- A.  $\frac{30}{135}$
- B.  $\frac{35}{135}$
- C.  $\frac{100}{135}$
- D.  $\frac{105}{135}$

ID: dae79de4 Answer

Correct Answer:

D

## Rationale

Choice D is correct. Based on the table, there are a total of 135 customers who visited the car dealership in the last month, and 105 of these customers are at least 40 years old. If a customer from the last month is selected at random, the probability that the selected customer is at least 40 years old is equal to the number of customers who are at least 40 years old divided by the total number of customers. Therefore, the probability that the selected customer is at least 40 years old is  $\frac{105}{135}$ .

Choice A is incorrect. This is the probability that the selected customer is less than 40 years old.

Choice B is incorrect. This is the probability that the selected customer visited the dealership 1 time in the last month.

Choice C is incorrect. This is the probability that the selected customer visited the dealership 2 or more times in the last month.

## Question Difficulty:

Easy

# Question ID 4bb25495

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 4bb25495

Five Smallest Countries in 2016

Country	Land area (square kilometers)
Monaco	2.0
Nauru	21
San Marino	61
Tuvalu	26
Vatican City	0.44

The table above shows the land area, in square kilometers, of the five smallest countries of the world in 2016. Based on the table, what is the mean land area of the 5 smallest countries in 2016, to the nearest square kilometer?

- A. 20
- B. 22
- C. 61
- D. 110

ID: 4bb25495 Answer

Correct Answer:

B

Rationale

Choice B is correct. The mean land area of these 5 countries is equal to the sum of the land areas of these countries, or

$$\frac{2.0 + 21 + 61 + 26 + 0.44}{5} \text{. Combining like terms in the numerator yields } \frac{110.44}{5}$$

terms in the numerator yields  $\frac{110.44}{5}$ , which simplifies to 22.088 square kilometers. This value, when rounded to the nearest square kilometer, is 22.

Choice A is incorrect and may result from a calculation error. Choice C is incorrect. This is the greatest land area of the 5 countries in the table. Choice D is incorrect. This is the sum of the land areas of the 5 countries in the table, rounded to the nearest square kilometer.

**Question Difficulty:**

Easy

# Question ID aa43b41f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

**ID: aa43b41f**

Near the end of a US cable news show, the host invited viewers to respond to a poll on the show's website that asked, "Do you support the new federal policy discussed during the show?" At the end of the show, the host reported that 28% responded "Yes," and 70% responded "No." Which of the following best explains why the results are unlikely to represent the sentiments of the population of the United States?

- A. The percentages do not add up to 100%, so any possible conclusions from the poll are invalid.
- B. Those who responded to the poll were not a random sample of the population of the United States.
- C. There were not 50% "Yes" responses and 50% "No" responses.
- D. The show did not allow viewers enough time to respond to the poll.

**ID: aa43b41f Answer**

**Correct Answer:**

B

**Rationale**

Choice B is correct. In order for the poll results from a sample of a population to represent the entire population, the sample must be representative of the population. A sample that is randomly selected from a population is more likely than a sample of the type described to represent the population. In this case, the people who responded were people with access to cable television and websites, which aren't accessible to the entire population. Moreover, the people who responded also chose to watch the show and respond to the poll. The people who made these choices aren't representative of the entire population of the United States because they were not a random sample of the population of the United States.

Choices A, C, and D are incorrect because they present reasons unrelated to whether the sample is representative of the population of the United States.

**Question Difficulty:**

Hard

# Question ID cb4894f9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: cb4894f9

A triathlon is a multisport race consisting of three different legs. A triathlon participant completed the cycling leg with an average speed of **19.700** miles per hour. What was the average speed, in yards per hour, of the participant during the cycling leg? (**1 mile = 1,760 yards**)

ID: cb4894f9 Answer

**Correct Answer:**

34672

**Rationale**

The correct answer is **34,672**. It's given that **1 mile = 1,760 yards**. It follows that an average speed of **19.700** miles per hour is equivalent to  $\left(\frac{19.700 \text{ miles}}{1 \text{ hour}}\right) \left(\frac{1,760 \text{ yards}}{1 \text{ mile}}\right)$ , or **34,672** yards per hour.

**Question Difficulty:**

Medium

# Question ID b6569d0e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: b6569d0e

United States  
Presidents  
from 1789 to  
2015

Ages	Number
40–44	2
45–49	7
50–54	13
55–59	11
60–64	7
65–69	3

The table above gives the number of United States presidents from 1789 to 2015 whose age at the time they first took office is within the interval listed. Of those presidents who were at least 50 years old when they first took office, what fraction were at least 60 years old?

A.  $\frac{10}{43}$

B.  $\frac{10}{34}$

C.  $\frac{10}{24}$

D.  $\frac{25}{34}$

ID: b6569d0e Answer

Correct Answer:

B

Rationale

Choice B is correct. The sample space is restricted to the presidents who were at least 50 years old when they first took office. Therefore, the sum of the values in the final four rows of the table,  $13 + 11 + 7 + 3 = 34$ , is the total number of presidents in the

sample space. The number of presidents who were at least 60 years old is the sum of the values in the final two rows of the table:  $7 + 3 = 10$ . Thus, the fraction of the 34 presidents who were at least 50 years old when they first took office who were at least 60 years old is  $\frac{10}{34}$ .

Choice A is incorrect. This is the fraction of all presidents in the table who were at least 60 years old when they first took office. Choice C is incorrect and may result from treating the number of presidents who were between 50 and 59 years old when they first took office, instead of the number of presidents who were at least 50 years old, as the sample space. Choice D is incorrect and may result from a calculation error.

**Question Difficulty:**

Medium

# Question ID 50b99b2d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 50b99b2d

Objects R and S each travel at a constant speed. The speed of object R is half the speed of object S. Object R travels a distance of  $4x$  inches in  $y$  seconds. Which expression represents the time, in seconds, it takes object S to travel a distance of  $24x$  inches?

- A.  $12y$
- B.  $3y$
- C.  $16y$
- D.  $6y$

ID: 50b99b2d Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that object R travels a distance of  $4x$  inches in  $y$  seconds. This speed can be written as  $\frac{4x \text{ inches}}{y \text{ seconds}}$ . It's given that the speed of object R is half the speed of object S. It follows that the speed of object S is twice the speed of object R, which is  $2\left(\frac{4x \text{ inches}}{y \text{ seconds}}\right)$ , or  $\frac{8x \text{ inches}}{y \text{ seconds}}$ . Let  $n$  represent the time, in seconds, it takes object S to travel a distance of  $24x$  inches. The value of  $n$  can be found by solving the equation  $\frac{8x \text{ inches}}{y \text{ seconds}} = \frac{24x \text{ inches}}{n \text{ seconds}}$ , which can be written as  $\frac{8x}{y} = \frac{24x}{n}$ . Multiplying each side of this equation by  $ny$  yields  $8xn = 24xy$ . Dividing each side of this equation by  $8x$  yields  $n = 3y$ . Therefore, the expression  $3y$  represents the time, in seconds, it takes object S to travel a distance of  $24x$  inches.

Choice A is incorrect. This expression represents the time, in seconds, it would take object S to travel a distance of  $24x$  inches if the speed of object R were twice, not half, the speed of object S.

Choice C is incorrect. This expression represents the time, in seconds, it takes object S to travel a distance of  $128x$  inches, not  $24x$  inches.

Choice D is incorrect. This expression represents the time, in seconds, it takes object R, not object S, to travel a distance of  $24x$  inches.

Question Difficulty:

Hard

# Question ID 5dc386fb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 5dc386fb

The table below shows the distribution of US states according to whether they have a state-level sales tax and a state-level income tax.

2013 State-Level Taxes

	State sales tax	No state sales tax
State income tax	39	4
No state income tax	6	1

To the nearest tenth of a percent, what percent of states with a state-level sales tax do not have a state-level income tax?

- A. 6.0%
- B. 12.0%
- C. 13.3%
- D. 14.0%

ID: 5dc386fb Answer

Correct Answer:

C

Rationale

Choice C is correct. The sum of the number of states with a state-level sales tax is  $39 + 6 = 45$ . Of these states, 6 don't have a state-level income tax. Therefore,  $\frac{6}{45} = 0.1333\dots$ , or about 13.3%, of states with a state-level sales tax don't have a state-level income tax.

Choice A is incorrect. This is the number of states that have a state-level sales tax and no state-level income tax. Choice B is incorrect. This is the percent of states that have a state-level sales tax and no state-level income tax. Choice D is incorrect. This is the percent of states that have no state-level income tax.

Question Difficulty:

Hard

# Question ID c47256ca

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: c47256ca

An object's speed is **64 yards** per second. What is the object's speed, in feet per second? (**1 yard = 3 feet**)

- A. **61**
- B. **67**
- C. **94**
- D. **192**

ID: c47256ca Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. Since 1 yard is equal to 3 feet, 64 yards is equal to  $64 \text{ yards} \left( \frac{3 \text{ feet}}{1 \text{ yard}} \right)$ , or 192 feet. It follows that 64 yards per second is equivalent to 192 feet per second. Therefore, the object's speed is 192 feet per second.

Choice A is incorrect. A speed of 61 feet per second is equivalent to  $\frac{61}{3}$ , not 64, yards per second.

Choice B is incorrect. A speed of 67 feet per second is equivalent to  $\frac{67}{3}$ , not 64, yards per second.

Choice C is incorrect. A speed of 94 feet per second is equivalent to  $\frac{94}{3}$ , not 64, yards per second.

**Question Difficulty:**

Easy

# Question ID 86684ce9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 86684ce9

The result of increasing the quantity  $x$  by 1,800% is 684. What is the value of  $x$ ?

- A. 12,996
- B. 12,312
- C. 38
- D. 36

ID: 86684ce9 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that the result of increasing the quantity  $x$  by 1,800% is 684. It follows that  $x + \left(\frac{1,800}{100}\right)x = 684$ , which is equivalent to  $x + 18x = 684$ , or  $19x = 684$ . Dividing each side of this equation by 19 yields  $x = 36$ . Therefore, the value of  $x$  is 36.

Choice A is incorrect. The result of increasing the quantity 12,996 by 1,800% is 246,924, not 684.

Choice B is incorrect. The result of increasing the quantity 12,312 by 1,800% is 233,928, not 684.

Choice C is incorrect. The result of increasing the quantity 38 by 1,800% is 722, not 684.

Question Difficulty:

Hard

## Question ID 551c52b9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 25%; background-color: #e0e0e0; height: 10px;"></div>

ID: 551c52b9

Tilly earns  $p$  dollars for every  $w$  hours of work. Which expression represents the amount of money, in dollars, Tilly earns for  $39w$  hours of work?

- A.  $39p$
- B.  $\frac{p}{39}$
- C.  $p + 39$
- D.  $p - 39$

ID: 551c52b9 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that Tilly earns  $p$  dollars for every  $w$  hours of work. This can be represented by the proportion  $\frac{p}{w}$ . The amount of money,  $x$ , Tilly earns for  $39w$  hours of work can be found by setting up the proportion  $\frac{p}{w} = \frac{x}{39w}$ . This can be rewritten as  $39pw = xw$ . Dividing both sides by  $w$  results in  $x = 39p$ .

Choice B is incorrect. This is the amount of money Tilly earns in dollars per hour, not the amount of money Tilly earns for  $39w$  hours of work.

Choice C is incorrect. This is the amount of money Tilly earns for  $w$  hours of work plus  $39$ , not the amount of money Tilly earns for  $39w$  hours of work.

Choice D is incorrect. This is the amount of money Tilly earns for  $w$  hours of work minus  $39$ , not the amount of money Tilly earns for  $39w$  hours of work.

Question Difficulty:

Easy

# Question ID 014c47ab

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 014c47ab

	Site A	Site B	Total
Tulip	35	15	50
Daffodil	31	21	52
<b>Total</b>	<b>66</b>	<b>36</b>	<b>102</b>

The table shows the distribution of two types of flowers at two different sites. If a flower represented in the table is selected at random, what is the probability of selecting a flower from site A, given that the flower is a tulip? (Express your answer as a decimal or fraction, not as a percent.)

ID: 014c47ab Answer

**Correct Answer:**

0.7, 7/10

**Rationale**

The correct answer is  $\frac{35}{50}$ . Based on the table, there are a total of 50 tulips, and 35 of these tulips are from site A. The probability of selecting at random a flower from site A, given that the flower is a tulip, is equal to the number of tulips from site A divided by the total number of tulips, which can be written as  $\frac{35}{50}$ , or  $\frac{7}{10}$ . Note that 35/50, 7/10, and .7 are examples of ways to enter a correct answer.

**Question Difficulty:**

Hard

# Question ID 1180401d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 1180401d

The total area of a coastal city is 92.1 square miles, of which 11.3 square miles is water. If the city had a population of 621,000 people in the year 2010, which of the following is closest to the population density, in people per square mile of land area, of the city at that time?

- A. 6,740
- B. 7,690
- C. 55,000
- D. 76,000

ID: 1180401d Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The land area of the coastal city can be found by subtracting the area of the water from the total area of the coastal city; that is,  $92.1 - 11.3 = 80.8$  square miles. The population density is the population divided by the land area, or  $\frac{621,000}{80.8} = 7,686$ , which is closest to 7,690 people per square mile.

Choice A is incorrect and may be the result of dividing the population by the total area, instead of the land area. Choice C is incorrect and may be the result of dividing the population by the area of water. Choice D is incorrect and may be the result of making a computational error with the decimal place.

**Question Difficulty:**

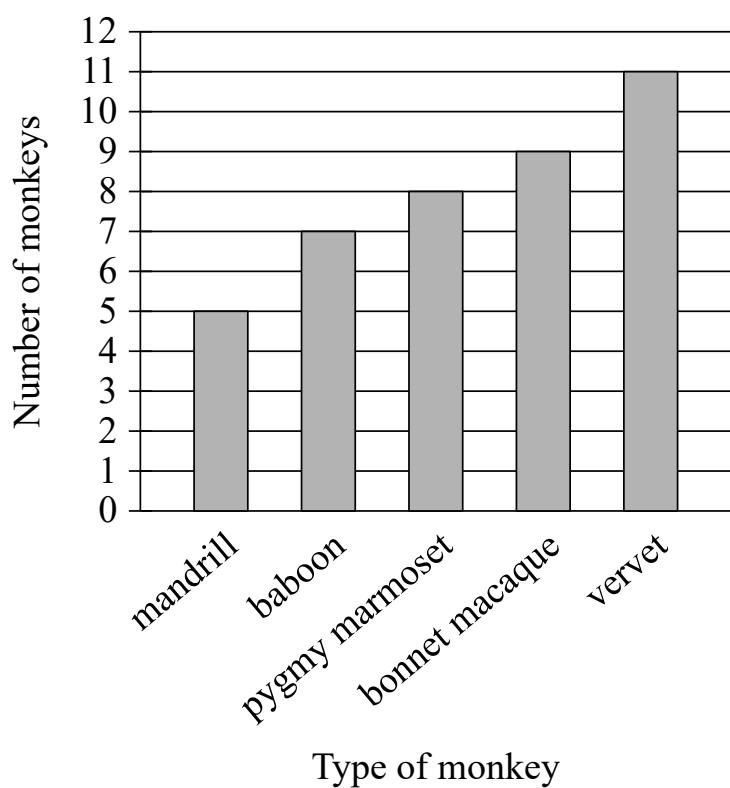
Medium

# Question ID 57481175

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 57481175

The bar graph shows the number of each type of monkey in a sanctuary.



How many more vervets are in this sanctuary than mandrills?

- A. 11
- B. 6
- C. 5
- D. 3

ID: 57481175 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that the bar graph shows the number of each type of monkey in a sanctuary. The bar representing the number of mandrills has a height of 5; therefore, there are 5 mandrills in the sanctuary. The bar representing vervets has a height

of 11; therefore, there are 11 vervets in the sanctuary. Therefore, there are  $11 - 5$ , or 6, more vervets in this sanctuary than mandrills.

Choice A is incorrect. This is the number of vervets in the sanctuary.

Choice C is incorrect. This is the number of mandrills in the sanctuary.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID 1b8e412e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 1b8e412e

$-11, -9, 26$

A data set of three numbers is shown. If a number from this data set is selected at random, what is the probability of selecting a positive number?

- A. 0
- B.  $\frac{1}{3}$
- C.  $\frac{2}{3}$
- D. 1

ID: 1b8e412e Answer

Correct Answer:

B

Rationale

Choice B is correct. The probability of selecting a positive number is the number of positive numbers in the data set divided by the total number of numbers in the data set. There is 1 positive number in this data set. There are 3 total numbers in this data set. Thus, if a number from this data set is selected at random, the probability of selecting a positive number is  $\frac{1}{3}$ .

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the probability of selecting a negative number from this data set.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Easy

# Question ID f6cbb04a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: f6cbb04a

$$d = 55t$$

The equation above can be used to calculate the distance  $d$ , in miles, traveled by a car moving at a speed of 55 miles per hour over a period of  $t$  hours. For any positive constant  $k$ , the distance the car would have traveled after  $9k$  hours is how many times the distance the car would have traveled after  $3k$  hours?

- A. 3
- B. 6
- C.  $3k$
- D.  $6k$

ID: f6cbb04a Answer

Correct Answer:

A

Rationale

Choice A is correct. Since the distance is equal to the amount of time multiplied by a constant, the given equation  $d = 55t$  represents a proportional relationship between distance and time in this situation. Since  $9k = 3 \cdot 3k$ , the time when  $t = 9k$  hours is 3 times the time when  $t = 3k$  hours. Therefore, the distance traveled after  $9k$  hours is 3 times the distance after  $3k$  hours.

Choices B and D are incorrect and may result from interpreting the proportional relationship between time and distance as additive rather than multiplicative. Choice C is incorrect and may result from an arithmetic error.

Question Difficulty:

Medium

# Question ID 568bc2a4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 568bc2a4

A distance of **354** furlongs is equivalent to how many feet? (**1 furlong = 220 yards and 1 yard = 3 feet**)

- A. **306**
- B. **402**
- C. **25,960**
- D. **233,640**

ID: 568bc2a4 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. It's given that **1 furlong = 220 yards** and **1 yard = 3 feet**. It follows that a distance of **354** furlongs is equivalent to  $(354 \text{ furlongs}) \left( \frac{220 \text{ yards}}{1 \text{ furlong}} \right) \left( \frac{3 \text{ feet}}{1 \text{ yard}} \right)$ , or **233,640** feet.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Medium

## Question ID 96c3e32d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 96c3e32d

One side of a flat board has an area of **874** square inches. If a pressure of **19** pounds per square inch of area is exerted on this side of the board, what is the total force, in pounds, exerted on this side of the board?

ID: 96c3e32d Answer

Correct Answer:

16606

Rationale

The correct answer is **16,606**. It's given that one side of a flat board has an area of **874** square inches. If a pressure of **19** pounds per square inch of area is exerted on this side of the board, the total force exerted on this side of the board is  $(874 \text{ square inches}) \left( \frac{19 \text{ pounds}}{1 \text{ square inch}} \right)$ , or **16,606** pounds.

Question Difficulty:

Medium

# Question ID 98958ae8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 98958ae8

Data set A consists of the heights of **75** objects and has a mean of **25** meters. Data set B consists of the heights of **50** objects and has a mean of **65** meters. Data set C consists of the heights of the **125** objects from data sets A and B. What is the mean, in meters, of data set C?

ID: 98958ae8 Answer

Correct Answer:

41

Rationale

The correct answer is **41**. The mean of a data set is computed by dividing the sum of the values in the data set by the number of values in the data set. It's given that data set A consists of the heights of **75** objects and has a mean of **25** meters. This can be represented by the equation  $\frac{x}{75} = 25$ , where  $x$  represents the sum of the heights of the objects, in meters, in data set A. Multiplying both sides of this equation by **75** yields  $x = 75(25)$ , or  $x = 1,875$  meters. Therefore, the sum of the heights of the objects in data set A is **1,875** meters. It's also given that data set B consists of the heights of **50** objects and has a mean of **65** meters. This can be represented by the equation  $\frac{y}{50} = 65$ , where  $y$  represents the sum of the heights of the objects, in meters, in data set B. Multiplying both sides of this equation by **50** yields  $y = 50(65)$ , or  $y = 3,250$  meters. Therefore, the sum of the heights of the objects in data set B is **3,250** meters. Since it's given that data set C consists of the heights of the **125** objects from data sets A and B, it follows that the mean of data set C is the sum of the heights of the objects, in meters, in data sets A and B divided by the number of objects represented in data sets A and B, or  $\frac{1,875+3,250}{125}$ , which is equivalent to **41** meters. Therefore, the mean, in meters, of data set C is **41**.

Question Difficulty:

Hard

## Question ID 391ae4b2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%;"><div style="width: 100px; height: 10px; background-color: #005a9f;"></div><div style="width: 100px; height: 10px; background-color: #005a9f;"></div><div style="width: 100px; height: 10px; background-color: #005a9f;"></div></div>

ID: 391ae4b2

Data set F consists of **55** integers between **170** and **290**. Data set G consists of all the integers in data set F as well as the integer **10**. Which of the following must be less for data set F than for data set G?

- I. The mean
  - II. The median
- A. I only
- B. II only
- C. I and II
- D. Neither I nor II

ID: 391ae4b2 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that data set F consists of **55** integers between **170** and **290** and data set G consists of all the integers in data set F as well as the integer **10**. Since the integer **10** is less than all the integers in data set F, the mean of data set G must be less than the mean of data set F. Thus, the mean of data set F isn't less than the mean of data set G. When a data set is in ascending order, the median is between the two middle values when there is an even number of values and the median is the middle value when there is an odd number of values. It follows that the median of data set F is either greater than or equal to the median of data set G. Therefore, the median of data set F isn't less than the median of data set G. Thus, neither the mean nor the median must be less for data set F than for data set G.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

# Question ID 4096a482

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 4096a482

Based on a random sample from a population, a researcher estimated that the mean value of a certain variable for the population is **20.5**, with an associated margin of error of **1**. Which of the following is the most appropriate conclusion?

- A. It is plausible that the actual mean value of the variable for the population is between **19.5** and **21.5**.
- B. It is not possible that the mean value of the variable for the population is less than **19.5** or greater than **21.5**.
- C. Every value of the variable in the population is between **19.5** and **21.5**.
- D. The mean value of the variable for the population is **20.5**.

ID: 4096a482 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that based on a random sample from a population, the estimated mean value for a certain variable for the population is **20.5**, with an associated margin of error of **1**. This means that it is plausible that the actual mean value of the variable for the population is between **20.5 – 1** and **20.5 + 1**. Therefore, the most appropriate conclusion is that it is plausible that the actual mean value of the variable for the population is between **19.5** and **21.5**.

Choice B is incorrect. The estimated mean value and associated margin of error describe only plausible values, not all the possible values, for the actual mean value of the variable, so this is not an appropriate conclusion.

Choice C is incorrect. The estimated mean value and associated margin of error describe only plausible values for the actual mean value of the variable, not all the possible values of the variable, so this is not an appropriate conclusion.

Choice D is incorrect. Since **20.5** is the estimated mean value of the variable based on a random sample, the actual mean value of the variable may not be exactly **20.5**. Therefore, this is not an appropriate conclusion.

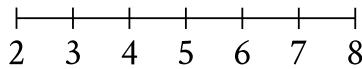
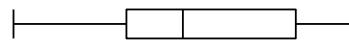
Question Difficulty:

Medium

# Question ID 57f45509

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 57f45509



The box plot summarizes 15 data values. What is the median of this data set?

- A. 2
- B. 3
- C. 5
- D. 8

ID: 57f45509 Answer

Correct Answer:

C

Rationale

Choice C is correct. The median of a data set represented in a box plot is given by the vertical line within the box. In the given box plot, the vertical line within the box occurs at 5. Therefore, the median of this data set is 5.

Choice A is incorrect. This is the minimum value of the data set.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect. This is the maximum value of the data set.

Question Difficulty:

Easy

# Question ID 2a59eb45

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 2a59eb45

Data set A consists of the heights of **75** buildings and has a mean of **32** meters. Data set B consists of the heights of **50** buildings and has a mean of **62** meters. Data set C consists of the heights of the **125** buildings from data sets A and B. What is the mean, in meters, of data set C?

ID: 2a59eb45 Answer

Correct Answer:

44

Rationale

The correct answer is **44**. The mean of a data set is computed by dividing the sum of the values in the data set by the number of values in the data set. It's given that data set A consists of the heights of **75** buildings and has a mean of **32** meters. This can be represented by the equation  $\frac{x}{75} = 32$ , where  $x$  represents the sum of the heights of the buildings, in meters, in data set A.

Multiplying both sides of this equation by **75** yields  $x = 75(32)$ , or  $x = 2,400$  meters. Therefore, the sum of the heights of the buildings in data set A is **2,400** meters. It's also given that data set B consists of the heights of **50** buildings and has a mean of **62** meters. This can be represented by the equation  $\frac{y}{50} = 62$ , where  $y$  represents the sum of the heights of the buildings, in meters, in data set B. Multiplying both sides of this equation by **50** yields  $y = 50(62)$ , or  $y = 3,100$  meters. Therefore, the sum of the heights of the buildings in data set B is **3,100** meters. Since it's given that data set C consists of the heights of the **125** buildings from data sets A and B, it follows that the mean of data set C is the sum of the heights of the buildings, in meters, in data sets A and B divided by the number of buildings represented in data sets A and B, or  $\frac{2,400+3,100}{125}$ , which is equivalent to **44** meters.

Therefore, the mean, in meters, of data set C is **44**.

Question Difficulty:

Hard

# Question ID 623dbebb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 623dbebb

A reseller buys certain books for a purchase price of **5.00** dollars each and then marks them each for sale at a consumer price that is **270%** of the purchase price. After **4** months, any remaining books not yet sold are marked at a discounted price that is **70%** off the consumer price. What is the discounted price of each of the remaining books, in dollars?

ID: 623dbebb Answer

**Correct Answer:**

4.05, 81/20

**Rationale**

The correct answer is **4.05**. It's given that the purchase price for certain books is **5.00** dollars each. It's also given that each book is marked for sale at a consumer price that is **270%** of the purchase price. Since the consumer price is **270%** of the purchase price of **5.00** dollars, it follows that the consumer price is  $(2.7)(5.00)$ , or **13.50**, dollars. It's given that after **4** months, any remaining books are discounted at **70%** off the consumer price. Thus, the discount amount is  $(0.7)(13.50)$ , or **9.45**, dollars. Subtracting the discount amount from the consumer price gives the discounted price of each of the remaining books:

$13.50 - 9.45 = 4.05$ . Note that 4.05 and 81/20 are examples of ways to enter a correct answer.

**Question Difficulty:**

Hard

# Question ID 2afd3cec

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 2afd3cec

After **20%** of the original number of marbles in a group were removed from the group, **360** marbles remained in the group. How many marbles were removed from the group?

- A. **72**
- B. **90**
- C. **450**
- D. **1,800**

ID: 2afd3cec Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that **20%** of the original number of marbles were removed from the group. Let  $x$  represent the original number of marbles in the group. It follows that  $\frac{20}{100}x$ , or **0.20x**, marbles were removed from the group. Therefore,  $x - 0.20x$  marbles remained in the group. It's also given that **360** marbles remained in the group. Thus,  $x - 0.20x = 360$ , or  $0.80x = 360$ . Dividing both sides of this equation by **0.80** yields  $x = 450$ . Substituting **450** for  $x$  in the expression  $0.20x$  yields **0.20(450)**, or **90**. Therefore, **90** marbles were removed from the group.

Choice A is incorrect. This is **20%** of the remaining number of marbles.

Choice C is incorrect. This is the original number of marbles, not the number of marbles that were removed.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Hard

# Question ID 2e92cc21

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 2e92cc21

The number  $a$  is 110% greater than the number  $b$ . The number  $b$  is 90% less than 47. What is the value of  $a$ ?

ID: 2e92cc21 Answer

Correct Answer:

9.87, 987/100

Rationale

The correct answer is 9.87. It's given that the number  $a$  is 110% greater than the number  $b$ . It follows that  $a = (1 + \frac{110}{100})b$ , or  $a = 2.1b$ . It's also given that the number  $b$  is 90% less than 47. It follows that  $b = (1 - \frac{90}{100})(47)$ , or  $b = 0.1(47)$ , which yields  $b = 4.7$ . Substituting 4.7 for  $b$  in the equation  $a = 2.1b$  yields  $a = 2.1(4.7)$ , which is equivalent to  $a = 9.87$ . Therefore, the value of  $a$  is 9.87.

Question Difficulty:

Hard

# Question ID 7f84b136

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 7f84b136

The table summarizes the number of objects in each group.

Group	Number of objects
A	375
B	54
C	690
D	81
Total	1,200

The number of objects in group C is  $p\%$  of the number of objects in group A. What is the value of  $p$ ?

ID: 7f84b136 Answer

Correct Answer:

184

Rationale

The correct answer is 184. It's given in the table that there are 375 objects in group A and 690 objects in group C. It's also given that the number of objects in group C is  $p\%$  of the number of objects in group A. Therefore, 690 is  $p\%$  of 375, which can be represented by  $690 = \left(\frac{p}{100}\right)(375)$ , or  $690 = 3.75p$ . Dividing both sides of this equation by 3.75 yields  $184 = p$ . Therefore, the value of  $p$  is 184.

Question Difficulty:

Medium

# Question ID 77cf4fa6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 77cf4fa6

There are **170** blocks in a container. Of these blocks, **10%** are green. How many blocks in the container are green?

ID: 77cf4fa6 Answer

**Correct Answer:**

17

**Rationale**

The correct answer is **17**. It's given that there are **170** blocks in a container, and of these blocks, **10%** are green. Since **10%** can be rewritten as  $\frac{10}{100}$ , or **0.1**, the number of green blocks in the container is **0.1(170)**, or **17**.

**Question Difficulty:**

Easy

# Question ID 2d31caae

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3;"></div> <div style="width: 30%; background-color: #e0e0e0;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 2d31caae

Call Ratings

	1 Star	2 Stars	3 Stars	4 Stars	Total
Employee A	16	49	72	8	145
Employee B	4	10	22	34	70
Employee C	8	56	45	16	125
Employee D	22	42	84	12	160
Total	50	157	223	70	500

A supervisor at a call center reviewed 500 calls taken by four employees and rated the employees' performance on each call on a scale from 1 star to 4 stars. The ratings for each employee are shown in the table above. According to the table, to the nearest whole percent, what percent of Employee A's calls received a rating of 1 star?

- A. 3%
- B. 11%
- C. 16%
- D. 32%

ID: 2d31caae Answer

Correct Answer:

B

Rationale

Choice B is correct. The percent of Employee A's calls that received a rating of 1 star is the number of Employee A's 1-star calls divided by the total number of Employee A's calls. This quotient,  $\frac{16}{145}$ , is approximately equal to 0.1103, or 11.03%. To the nearest whole percent, this is 11%.

Choice A is incorrect. This is the percent of all calls taken by Employee A that received a rating of 1 star. Choice C is incorrect and may result from a conceptual error. For example, 16 is the number, not the percent, of calls taken by Employee A that received a rating of 1 star. Choice D is incorrect. This is the percent of all calls that received a rating of 1 star that were taken by Employee A.

Question Difficulty:

Easy

## Question ID 4a422e3e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 4a422e3e

To determine the mean number of children per household in a community, Tabitha surveyed 20 families at a playground. For the 20 families surveyed, the mean number of children per household was 2.4. Which of the following statements must be true?

- A. The mean number of children per household in the community is 2.4.
- B. A determination about the mean number of children per household in the community should not be made because the sample size is too small.
- C. The sampling method is flawed and may produce a biased estimate of the mean number of children per household in the community.
- D. The sampling method is not flawed and is likely to produce an unbiased estimate of the mean number of children per household in the community.

ID: 4a422e3e Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. In order to use a sample mean to estimate the mean for a population, the sample must be representative of the population (for example, a simple random sample). In this case, Tabitha surveyed 20 families in a playground. Families in the playground are more likely to have children than other households in the community. Therefore, the sample isn't representative of the population. Hence, the sampling method is flawed and may produce a biased estimate.

Choices A and D are incorrect because they incorrectly assume the sampling method is unbiased. Choice B is incorrect because a sample of size 20 could be large enough to make an estimate if the sample had been representative of all the families in the community.

**Question Difficulty:**

Hard

# Question ID 94660ba8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 94660ba8

A participant in a bicycle race completes the race with an average speed of **24,816** yards per hour. What is this average speed, in miles per hour? (**1 mile = 1,760 yards**)

ID: 94660ba8 Answer

Correct Answer:

14.1

Rationale

The correct answer is **14.1**. It's given that a participant completes the bicycle race with an average speed of **24,816** yards per hour and **1 mile = 1,760 yards**. It follows that this average speed is equivalent to  $\left(\frac{24,816 \text{ yards}}{1 \text{ hour}}\right) \left(\frac{1 \text{ mile}}{1,760 \text{ yards}}\right)$ , which yields  $\frac{14.1 \text{ miles}}{1 \text{ hour}}$ , or **14.1** miles per hour.

Question Difficulty:

Easy

# Question ID ba0e23b0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: ba0e23b0

140 is  $p\%$  greater than 10. What is the value of  $p$ ?

- A. 1,400
- B. 1,300
- C. 140
- D. 130

ID: ba0e23b0 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that 140 is  $p\%$  greater than 10. It follows that  $140 = 10 + \left(\frac{p}{100}\right)10$ , which is equivalent to  $140 = 10 + \frac{10}{100}p$ , or  $140 = 10 + 0.1p$ . Subtracting 10 from each side of this equation yields  $130 = 0.1p$ . Dividing each side of this equation by 0.1 yields  $1,300 = p$ , or  $p = 1,300$ .

Choice A is incorrect. This would be the value of  $p$  if 140 were  $p\%$  of 10, not  $p\%$  greater than 10.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

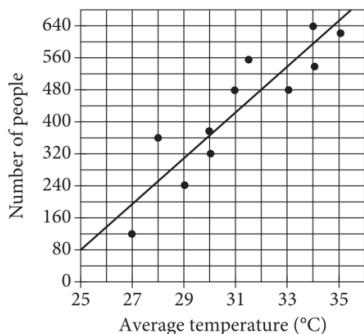
Hard

# Question ID 8156d446

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #002060; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 8156d446

Number of Beach Visitors versus Temperature



Each dot in the scatterplot above represents the temperature and the number of people who visited a beach in Lagos, Nigeria, on one of eleven different days. The line of best fit for the data is also shown. According to the line of best fit, what is the number of people, rounded to the nearest 10, predicted to visit this beach on a day with an average temperature of 32°C?

ID: 8156d446 Answer

## Rationale

The correct answer is 480. An average temperature of  $32^{\circ}\text{C}$  corresponds to the value 32 on the x-axis. On the line of best fit, an x-value of 32 corresponds to a y-value of 480. The values on the y-axis correspond to the number of people predicted to visit this beach. Therefore, 480 people are predicted to visit this beach on a day with an average temperature of  $32^{\circ}\text{C}$ .

## Question Difficulty:

Easy

# Question ID c2e7fa6d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div>

ID: c2e7fa6d

For an electric field passing through a flat surface perpendicular to it, the electric flux of the electric field through the surface is the product of the electric field's strength and the area of the surface. A certain flat surface consists of two adjacent squares, where the side length, in meters, of the larger square is 3 times the side length, in meters, of the smaller square. An electric field with strength **29.00** volts per meter passes uniformly through this surface, which is perpendicular to the electric field. If the total electric flux of the electric field through this surface is **4,640 volts · meters**, what is the electric flux, in **volts · meters**, of the electric field through the larger square?

ID: c2e7fa6d Answer

Correct Answer:

4176

Rationale

The correct answer is **4,176**. It's given that the side length of the larger square is 3 times the side length of the smaller square. This means that the area of the larger square is  $3^2$ , or 9, times the area of the smaller square. If the area of the smaller square is represented by  $x$ , then the area of the larger square can be represented by  $9x$ . Therefore, the flat surface of the two adjacent squares has a total area of  $x + 9x$ , or  $10x$ . It's given that an electric field with strength **29.00** volts per meter passes uniformly through this surface and the total electric flux of the electric field through this surface is **4,640 volts · meters**. Since it's given that the electric flux is the product of the electric field's strength and the area of the surface, the equation  $29.00(10x) = 4,640$ , or  $290x = 4,640$ , can be used to represent this situation. Dividing each side of this equation by **290** yields  $x = 16$ . Substituting **16** for  $x$  in the expression for the area of the larger square,  $9x$ , yields  $9(16)$ , or **144**, square meters. Since the area of the larger square is **144** square meters, the electric flux, in **volts · meters**, of the electric field through the larger square can be determined by multiplying the area of the larger square by the strength of the electric field. Thus, the electric flux is  $(144 \text{ square meters}) \left( \frac{29.00 \text{ volts}}{\text{meter}} \right)$ , or **4,176 volts · meters**.

Question Difficulty:

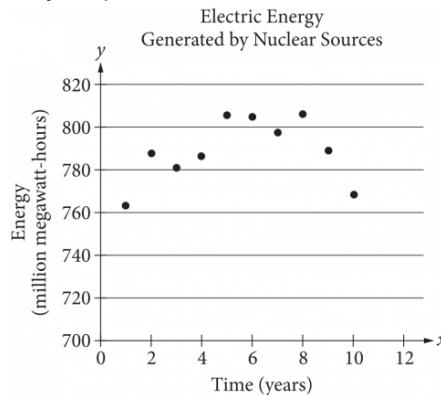
Hard

# Question ID e821a26d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div>

ID: e821a26d

The scatterplot below shows the amount of electric energy generated, in millions of megawatt-hours, by nuclear sources over a 10-year period.



Of the following equations, which best models the data in the scatterplot?

- A.  $y = 1.674x^2 + 19.76x - 745.73$
- B.  $y = -1.674x^2 - 19.76x - 745.73$
- C.  $y = 1.674x^2 + 19.76x + 745.73$
- D.  $y = -1.674x^2 + 19.76x + 745.73$

ID: e821a26d Answer

Correct Answer:

D

Rationale

Choice D is correct. The data in the scatterplot roughly fall in the shape of a downward-opening parabola; therefore, the coefficient for the  $x^2$  term must be negative. Based on the location of the data points, the y-intercept of the parabola should be somewhere between 740 and 760. Therefore, of the equations given, the best model is  $y = -1.674x^2 + 19.76x + 745.73$ .

Choices A and C are incorrect. The positive coefficient of the  $x^2$  term means that these equations each define upward-opening parabolas, whereas a parabola that fits the data in the scatterplot must open downward. Choice B is incorrect because it defines a parabola with a y-intercept that has a negative y-coordinate, whereas a parabola that fits the data in the scatterplot must have a y-intercept with a positive y-coordinate.

**Question Difficulty:**  
Hard

# Question ID 21e539a0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 21e539a0

A landscaper uses a hose that puts  $88x$  ounces of water in a bucket in  $5y$  minutes. Which expression represents the number of ounces of water the hose puts in the bucket in  $9y$  minutes at this rate?

- A.  $\frac{9x}{440}$
- B.  $\frac{440x}{9}$
- C.  $\frac{5x}{792}$
- D.  $\frac{792x}{5}$

ID: 21e539a0 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that a hose puts  $88x$  ounces of water in a bucket in  $5y$  minutes. Therefore, the rate at which the hose puts water in the bucket, in ounces per minute, can be represented by the expression  $\frac{88x}{5y}$ . Let  $w$  represent the number of ounces of water the hose puts in the bucket in  $9y$  minutes at this rate. It follows that the rate at which the hose puts water in the bucket, in ounces per minute, can be represented by the expression  $\frac{w}{9y}$ . The expressions  $\frac{88x}{5y}$  and  $\frac{w}{9y}$  represent the same rate, so it follows that  $\frac{88x}{5y} = \frac{w}{9y}$ . Multiplying both sides of this equation by  $9y$  yields  $\frac{792xy}{5y} = w$ , or  $\frac{792x}{5} = w$ . Therefore, the number of ounces of water the hose puts in the bucket in  $9y$  minutes can be represented by the expression  $\frac{792x}{5}$ .

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

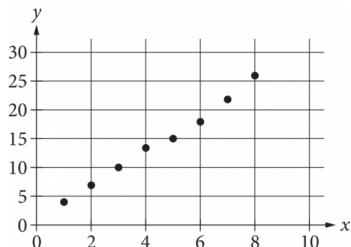
Question Difficulty:

Hard

# Question ID 9eb896c5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 9eb896c5



Which of the following could be the equation for a line of best fit for the data shown in the scatterplot above?

- A.  $y = 3x + 0.8$
- B.  $y = 0.8x + 3$
- C.  $y = -0.8x + 3$
- D.  $y = -3x + 0.8$

ID: 9eb896c5 Answer

Correct Answer:

A

## Rationale

Choice A is correct. The data show a strong linear relationship between  $x$  and  $y$ . The line of best fit for a set of data is a linear equation that minimizes the distances from the data points to the line. An equation for the line of best fit can be written in slope-intercept form,  $y = mx + b$ , where  $m$  is the slope of the graph of the line and  $b$  is the  $y$ -coordinate of the  $y$ -intercept of the graph.

Since, for the data shown, the  $y$ -values increase as the  $x$ -values increase, the slope of a line of best fit must be positive. The data

shown lie almost in a line, so the slope can be roughly estimated using the formula for slope,  $m = \frac{y_2 - y_1}{x_2 - x_1}$ . The leftmost and

rightmost data points have coordinates of about  $(1, 4)$  and  $(8, 26)$ , so the slope is approximately  $\frac{26 - 4}{8 - 1} = \frac{22}{7}$ , which is a little greater than 3. Extension of the line to the left would intersect the  $y$ -axis at about  $(0, 1)$ . Only choice A represents a line with a slope close to 3 and a  $y$ -intercept close to  $(0, 1)$ .

Choice B is incorrect and may result from switching the slope and  $y$ -intercept. The line with a  $y$ -intercept of  $(0, 3)$  and a slope of 0.8 is farther from the data points than the line with a slope of 3 and a  $y$ -intercept of  $(0, 0.8)$ . Choices C and D are incorrect. They represent lines with negative slopes, not positive slopes.

**Question Difficulty:**

Medium

## Question ID 194ae3b1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #e0e0e0;"></div> <div style="width: 25%; background-color: #e0e0e0;"></div>

### ID: 194ae3b1

There were approximately 113,000 occupational therapy jobs in the United States in 2012. The Bureau of Labor Statistics has projected that this number will increase by 29% from 2012 to 2022. Of the following, which is closest to the number of occupational therapy jobs the bureau has projected for the United States in 2022?

- A. 115,900
- B. 116,300
- C. 142,000
- D. 145,800

### ID: 194ae3b1 Answer

Correct Answer:

D

### Rationale

Choice D is correct. The decimal equivalent of 29% is 0.29. It's given that the 113,000 occupational therapy jobs in the United States in 2012 are projected to increase by 29% by 2022. Increasing 113,000 by 29% can be expressed as  $(113,000)(1 + 0.29)$ , or  $(113,000)(1.29)$ . Evaluating this expression yields 145,770. The closest number is 145,800 in choice D.

Choice A is incorrect and may result from increasing 113,000 by 2,900 instead of by 29%. Choice B is incorrect and may result from increasing 113,000 by 2.9% instead of by 29%. Choice C is incorrect and may result from increasing 113,000 by 29,000 instead of by 29%.

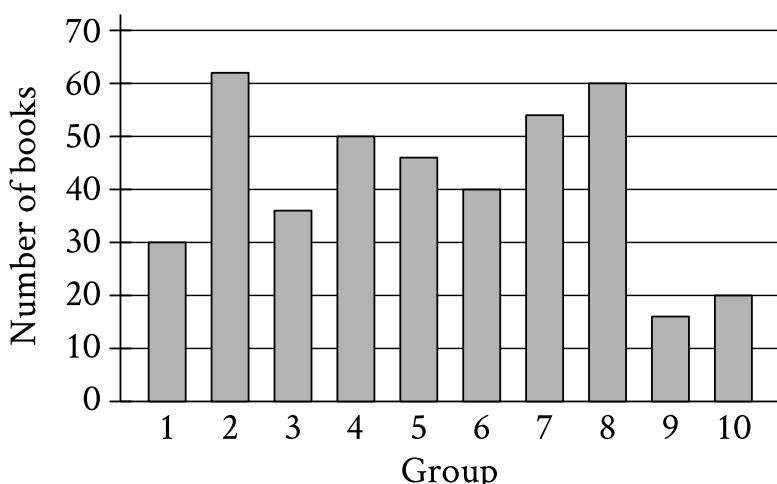
### Question Difficulty:

Easy

# Question ID 79340403

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 79340403



The bar graph shows the distribution of 414 books collected by 10 different groups for a book drive. How many books were collected by group 1?

ID: 79340403 Answer

Correct Answer:

30

Rationale

The correct answer is 30. The height of each bar in the bar graph shown represents the number of books collected by the group specified at the bottom of the bar. The bar for group 1 reaches a height of 30. Therefore, group 1 collected 30 books.

Question Difficulty:

Easy

# Question ID a8fabad0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

## ID: a8fabad0

A waiter receives tips from each customer. On average, the tip is 15% of the customer's bill. At this rate, which of the following is closest to the tip the waiter can expect when a customer has a bill that is \$78.20?

- A. \$8.00
- B. \$10.00
- C. \$12.00
- D. \$14.00

## ID: a8fabad0 Answer

### Correct Answer:

C

### Rationale

Choice C is correct. If the bill is \$78.20, 15% of the bill can be found by multiplying 78.20 by the decimal conversion of 15%,  $78.20 \times 0.15 = \$11.73$ . The exact amount \$11.73 is closest in value to \$12.00.

Choices A, B, and D are incorrect and may be the result of errors when calculating 15% of the total \$78.20.

### Question Difficulty:

Easy

# Question ID 4837406c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 4837406c

An object travels at a constant speed of **6** centimeters per second. At this speed, what is the time, in seconds, that it would take for the object to travel **24** centimeters?

ID: 4837406c Answer

Correct Answer:

4

Rationale

The correct answer is **4**. It's given that the object travels at a constant speed of **6** centimeters per second. The speed of the object can be written as  $\frac{6 \text{ centimeters}}{1 \text{ second}}$ . Let  $x$  represent the time, in seconds, it would take for the object to travel **24** centimeters. The value of  $x$  can be calculated by solving the equation  $\frac{6 \text{ centimeters}}{1 \text{ second}} = \frac{24 \text{ centimeters}}{x \text{ seconds}}$ , which can be written as  $\frac{6}{1} = \frac{24}{x}$ , or  $6 = \frac{24}{x}$ .

Multiplying each side of this equation by  $x$  yields  $6x = 24$ . Dividing each side of this equation by **6** yields  $x = 4$ . Therefore, it would take the object **4** seconds to travel **24** centimeters.

Question Difficulty:

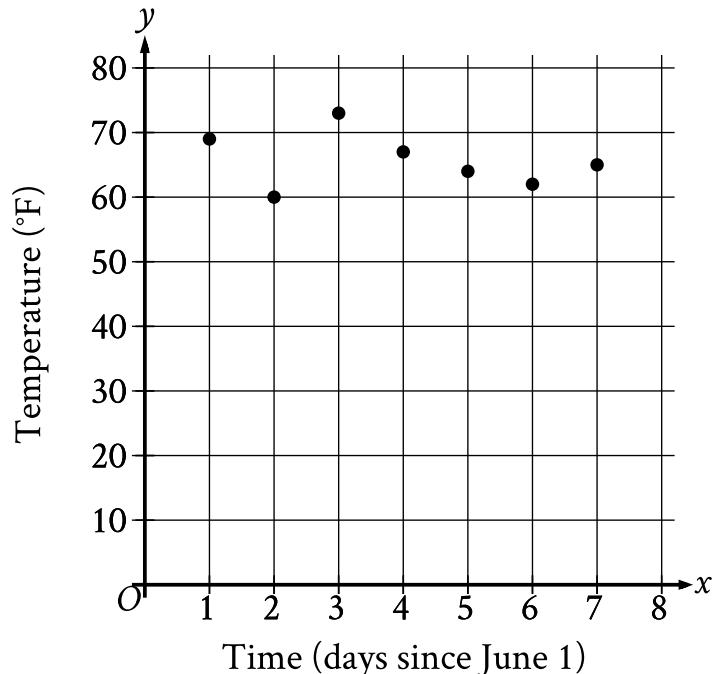
Easy

# Question ID d112bc9d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div>

ID: d112bc9d

The scatterplot shows the temperature  $y$ , in  $^{\circ}\text{F}$ , recorded by a meteorologist at various times  $x$ , in days since June 1.



During which of the following time periods did the greatest increase in recorded temperature take place?

- A. From  $x = 6$  to  $x = 7$
- B. From  $x = 5$  to  $x = 6$
- C. From  $x = 2$  to  $x = 3$
- D. From  $x = 1$  to  $x = 2$

ID: d112bc9d Answer

Correct Answer:

C

## Rationale

Choice C is correct. The scatterplot shows that there was an increase in recorded temperature from  $x = 2$  to  $x = 3$  and from  $x = 6$  to  $x = 7$ . When  $x = 2$ , the recorded temperature was approximately  $60^{\circ}\text{F}$  and when  $x = 3$ , the recorded temperature was greater than  $70^{\circ}\text{F}$ . This means that the increase in recorded temperature from  $x = 2$  to  $x = 3$  was greater than  $(70 - 60)^{\circ}\text{F}$ , or  $10^{\circ}\text{F}$ . When  $x = 6$ , the recorded temperature was greater than  $60^{\circ}\text{F}$  and when  $x = 7$ , the recorded temperature was less than  $70^{\circ}\text{F}$ . This means that the increase in recorded temperature from  $x = 6$  to  $x = 7$  was less than  $(70 - 60)^{\circ}\text{F}$ , or  $10^{\circ}\text{F}$ . It follows that the greatest increase in recorded temperature took place from  $x = 2$  to  $x = 3$ .

Choice A is incorrect. The increase in recorded temperature from  $x = 6$  to  $x = 7$  was less than the increase in recorded temperature from  $x = 2$  to  $x = 3$ .

Choice B is incorrect. From  $x = 5$  to  $x = 6$ , a decrease, not an increase, in recorded temperature took place.

Choice D is incorrect. From  $x = 1$  to  $x = 2$ , a decrease, not an increase, in recorded temperature took place.

**Question Difficulty:**

Easy

# Question ID 99550621

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

**ID: 99550621**

Makayla is planning an event in a 5,400-square-foot room. If there should be at least 8 square feet per person, what is the maximum number of people that could attend this event?

- A. 588
- B. 675
- C. 15,274
- D. 43,200

**ID: 99550621 Answer**

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that the event will be in a 5,400-square-foot room and that there should be at least 8 square feet per person. The maximum number of people that could attend the event can be found by dividing the total square feet in the room by

$$\frac{5,400}{8} = 675$$

the minimum number of square feet needed per person, which gives  $\frac{5,400}{8} = 675$ .

Choices A and C are incorrect and may result from conceptual or computational errors. Choice D is incorrect and may result from multiplying, rather than dividing, 5,400 by 8.

**Question Difficulty:**

Easy

## Question ID 3318d37b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 3318d37b

A product costs **11.00** dollars per pound. What is the cost, in dollars, for **6** pounds of the product?

ID: 3318d37b Answer

Correct Answer:

66

Rationale

The correct answer is **66**. It's given that a product costs **11.00** dollars per pound. Therefore, the cost for **6** pounds of the product is  $\left(\frac{11.00 \text{ dollars}}{1 \text{ pound}}\right)(6 \text{ pounds})$ , which is equivalent to **66.00**, or **66**, dollars.

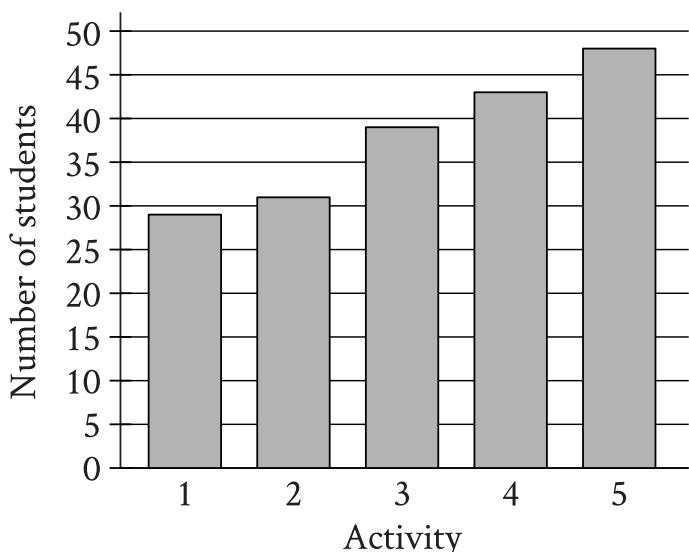
Question Difficulty:

Easy

# Question ID 93779b53

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 93779b53



A group of students voted on five after-school activities. The bar graph shows the number of students who voted for each of the five activities. How many students chose activity 3?

- A. 25
- B. 39
- C. 48
- D. 50

ID: 93779b53 Answer

Correct Answer:

B

Rationale

Choice B is correct. The height of each bar in the bar graph given represents the number of students that voted for the activity specified at the bottom of the bar. The bar for activity 3 has a height that is between 35 and 40. In other words, the number of students that chose activity 3 is between 35 students and 40 students. Of the given choices, 39 is the only value between 35 and 40. Therefore, 39 students chose activity 3.

Choice A is incorrect and may result from conceptual errors.

Choice C is incorrect. This is the number of students that chose activity 5, not activity 3.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty:

Easy

# Question ID 9d935bd8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 9d935bd8

Percent of Residents Who Earned a Bachelor's Degree or Higher

State	Percent of residents
State A	21.9%
State B	27.9%
State C	25.9%
State D	19.5%
State E	30.1%
State F	36.4%
State G	35.5%

A survey was given to residents of all 50 states asking if they had earned a bachelor's degree or higher. The results from 7 of the states are given in the table above. The median percent of residents who earned a bachelor's degree or higher for all 50 states was 26.95%. What is the difference between the median percent of residents who earned a bachelor's degree or higher for these 7 states and the median for all 50 states?

- A. 0.05%
- B. 0.95%
- C. 1.22%
- D. 7.45%

ID: 9d935bd8 Answer

Correct Answer:

B

Rationale

Choice A is correct. The median of a set of numbers is the middle value of the set values when ordered from least to greatest. If the percents in the table are ordered from least to greatest, the middle value is 27.9%. The difference between 27.9% and 26.95% is 0.95%.

Choice C is incorrect and may be the result of calculation errors or not finding the median of the data in the table correctly. Choice D is incorrect and may be the result of finding the mean instead of the median. Choice B is incorrect and may be the result of using the middle value of the unordered list.

Question Difficulty:

Hard

# Question ID 8c5dbd3e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 8c5dbd3e

The number  $w$  is 110% greater than the number  $z$ . The number  $z$  is 55% less than 50. What is the value of  $w$ ?

ID: 8c5dbd3e Answer

Correct Answer:

189/4, 47.25

Rationale

The correct answer is 47.25. It's given that the number  $w$  is 110% greater than the number  $z$ . It follows that  $w = (1 + \frac{110}{100})z$ , or  $w = 2.1z$ . It's also given that the number  $z$  is 55% less than 50. It follows that  $z = (1 - \frac{55}{100})(50)$ , or  $z = 0.45(50)$ , which yields  $z = 22.5$ . Substituting 22.5 for  $z$  in the equation  $w = 2.1z$  yields  $w = 2.1(22.5)$ , which is equivalent to  $w = 47.25$ . Therefore, the value of  $w$  is 47.25. Note that 47.25 and 189/4 are examples of ways to enter a correct answer.

Question Difficulty:

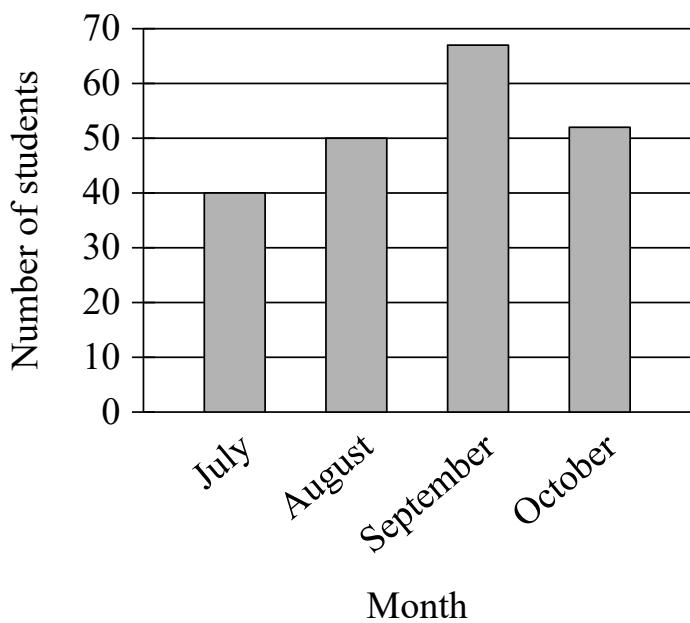
Hard

# Question ID a067c926

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div>

ID: a067c926

The bar graph shows the distribution of the number of students from one school who were born in one of four months.



How many more students were born in August than were born in July?

- A. 90
- B. 50
- C. 40
- D. 10

ID: a067c926 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that the bar graph shows the number of students from one school who were born in either July, August, September, or October. The bar representing the number of students born in August has a height of 50; therefore, 50 students were born in August. The bar representing the number of students born in July has a height of 40; therefore, 40 students were born in July. Thus, there were  $50 - 40$ , or 10 more students born in August than in July.

Choice A is incorrect. This is the total number of students born in July and August.

Choice B is incorrect. This is the number of students born in August.

Choice C is incorrect. This is the number of students born in July.

**Question Difficulty:**

Easy

# Question ID 94c65646

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 94c65646

432 is 96% of what number?

ID: 94c65646 Answer

Correct Answer:

450

Rationale

The correct answer is 450. Let  $x$  represent the number that 432 is 96% of. This can be written as  $(\frac{96}{100})x = 432$ , or  $0.96x = 432$ . Dividing both sides of this equation by 0.96 yields  $x = 450$ . Therefore, 432 is 96% of 450.

Question Difficulty:

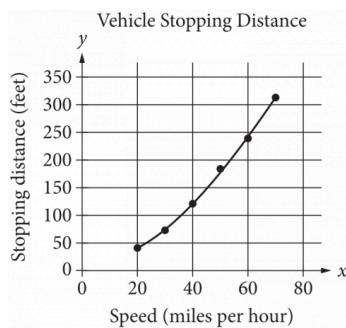
Medium

# Question ID 5c24c861

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 5c24c861

A study was done to determine a new car's stopping distance when it was traveling at different speeds. The study was done on a dry road with good surface conditions. The results are shown below, along with the graph of a quadratic function that models the data.



According to the model, which of the following is the best estimate for the stopping distance, in feet, if the vehicle was traveling 55 miles per hour?

- A. 25
- B. 30
- C. 210
- D. 250

ID: 5c24c861 Answer

**Correct Answer:**

C

**Rationale**

Correct Answer Rationale

Choice C is correct. According to the model, the stopping distance, in feet, of a vehicle traveling 55 miles per hour is about 200 feet. Of the choices given, the best estimate of the stopping distance for a car traveling 55 miles per hour is 210 feet.

Incorrect Answer Rationale

Choices A, B, and D are incorrect and may be the result of incorrectly reading the given quadratic model. The corresponding x-values to the y-values of 25 and 30 are not part of the model. The corresponding x-value to a y-value of 250 is approximately 60 mph, not 55 mph.

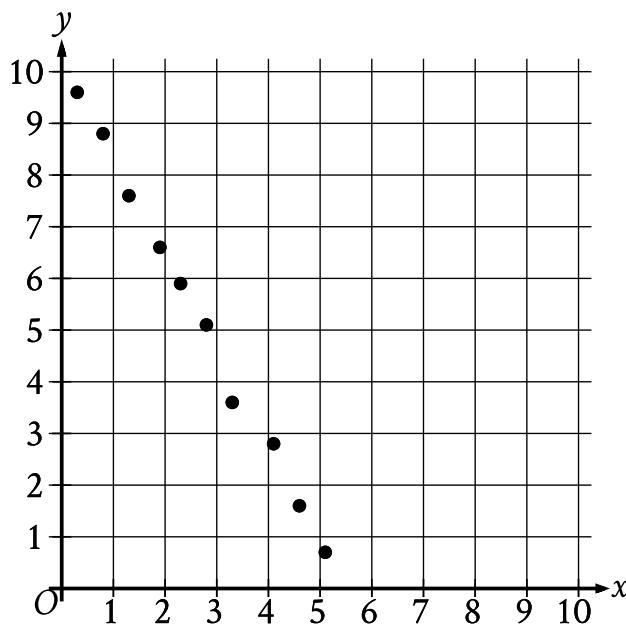
**Question Difficulty:**

Easy

# Question ID 5f3ee607

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 5f3ee607



Which of the following equations is the most appropriate linear model for the data shown in the scatterplot?

- A.  $y = -1.9x - 10.1$
- B.  $y = -1.9x + 10.1$
- C.  $y = 1.9x - 10.1$
- D.  $y = 1.9x + 10.1$

ID: 5f3ee607 Answer

Correct Answer:

B

## Rationale

Choice B is correct. The equation representing a linear model can be written in the form  $y = a + bx$ , or  $y = bx + a$ , where  $b$  is the slope of the graph of the model and  $(0, a)$  is the  $y$ -intercept of the graph of the model. The scatterplot shows that as the  $x$ -values of the data points increase, the  $y$ -values of the data points decrease, which means the graph of an appropriate linear model has a negative slope. Therefore,  $b < 0$ . The scatterplot also shows that the data points are close to the  $y$ -axis at a positive value of  $y$ . Therefore, the  $y$ -intercept of the graph of an appropriate linear model has a positive  $y$ -coordinate, which means  $a > 0$ . Of the given choices, only choice B,  $y = -1.9x + 10.1$ , has a negative value for  $b$ , the slope, and a positive value for  $a$ , the  $y$ -coordinate of the  $y$ -intercept.

Choice A is incorrect. The graph of this model has a  $y$ -intercept with a negative  $y$ -coordinate, not a positive  $y$ -coordinate.

Choice C is incorrect. The graph of this model has a positive slope, not a negative slope, and a  $y$ -intercept with a negative  $y$ -coordinate, not a positive  $y$ -coordinate.

Choice D is incorrect. The graph of this model has a positive slope, not a negative slope.

**Question Difficulty:**

Easy

# Question ID 9e2bf782

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 9e2bf782

A fish hatchery has three tanks for holding fish before they are introduced into the wild. Ten fish weighing less than 5 ounces are placed in tank A. Eleven fish weighing at least 5 ounces but no more than 13 ounces are placed in tank B. Twelve fish weighing more than 13 ounces are placed in tank C. Which of the following could be the median of the weights, in ounces, of these 33 fish?

- A. 4.5
- B. 8
- C. 13.5
- D. 15

ID: 9e2bf782 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The median of a set of numbers is the middle number when the values in the set are ordered from least to greatest. There are 33 fish, so in an ordered list of the weights, the 17th value would be the median weight. The 10 fish in tank A weigh the least, and these 10 weights would be the first 10 values on the ordered list. The 11 fish in tank B have the next set of higher weights, and so would be the 11th through 21st weights in the ordered list, which includes the median weight as the 17th value. The fish in tank B weigh at least 5 ounces but no more than 13 ounces; of the given choices, only 8 ounces falls within this range of values.

Choice A is incorrect. It's given that tank A has ten fish weighing less than 5 ounces. Since there are more than ten fish in tanks B and C combined, the median weight cannot be less than 5 ounces. Choice C and D are incorrect. It's given that tank C has twelve fish weighing more than 13 ounces. There are more than twelve fish in tanks A and B combined, so the median weight can't be more than 13 ounces.

**Question Difficulty:**

Medium

# Question ID 9ba3e283

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 9ba3e283

In State X, Mr. Camp's eighth-grade class consisting of 26 students was surveyed and 34.6 percent of the students reported that they had at least two siblings. The average eighth-grade class size in the state is 26. If the students in Mr. Camp's class are representative of students in the state's eighth-grade classes and there are 1,800 eighth-grade classes in the state, which of the following best estimates the number of eighth-grade students in the state who have fewer than two siblings?

- A. 16,200
- B. 23,400
- C. 30,600
- D. 46,800

ID: 9ba3e283 Answer

Correct Answer:

C

Rationale

Choice C is correct. It is given that 34.6% of 26 students in Mr. Camp's class reported that they had at least two siblings. Since 34.6% of 26 is 8.996, there must have been 9 students in the class who reported having at least two siblings and 17 students who reported that they had fewer than two siblings. It is also given that the average eighth-grade class size in the state is 26 and that Mr. Camp's class is representative of all eighth-grade classes in the state. This means that in each eighth-grade class in the state there are about 17 students who have fewer than two siblings. Therefore, the best estimate of the number of eighth-grade students in the state who have fewer than two siblings is  $17 \times (\text{number of eighth-grade classes in the state})$ , or  $17 \times 1,800 = 30,600$ .

Choice A is incorrect because 16,200 is the best estimate for the number of eighth-grade students in the state who have at least, not fewer than, two siblings. Choice B is incorrect because 23,400 is half of the estimated total number of eighth-grade students in the state; however, since the students in Mr. Camp's class are representative of students in the eighth-grade classes in the state and more than half of the students in Mr. Camp's class have fewer than two siblings, more than half of the students in each eighth-grade class in the state have fewer than two siblings, too. Choice D is incorrect because 46,800 is the estimated total number of eighth-grade students in the state.

Question Difficulty:

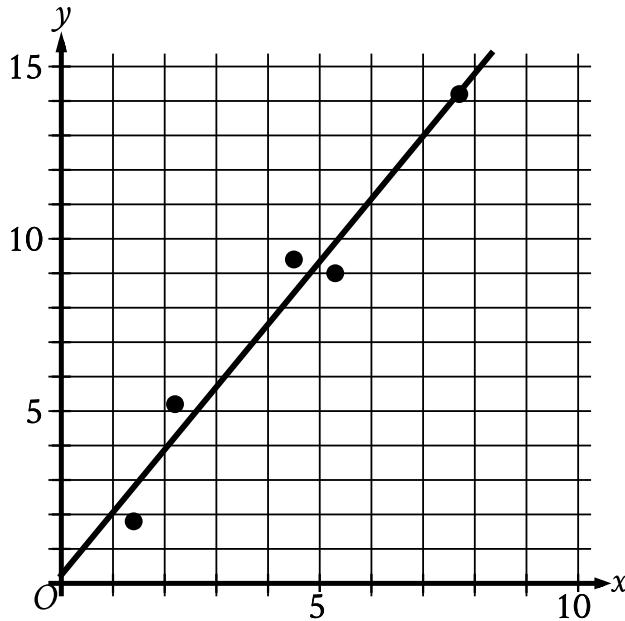
Hard

# Question ID 4cc05491

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: 4cc05491

In the given scatterplot, a line of best fit for the data is shown.



Which of the following is closest to the slope of the line of best fit shown?

- A. 0.2
- B. 0.7
- C. 1.8
- D. 2.6

ID: 4cc05491 Answer

Correct Answer:

C

Rationale

Choice C is correct. A line in the  $xy$ -plane that passes through points  $(x_1, y_1)$  and  $(x_2, y_2)$  has a slope of  $\frac{y_2 - y_1}{x_2 - x_1}$ . The line of best fit shown passes approximately through the points  $(0, 0.2)$  and  $(5, 9.3)$ . It follows that the slope of this line is approximately  $\frac{9.3 - 0.2}{5 - 0}$ , which is equivalent to  $\frac{9.1}{5}$ , or 1.82. Therefore, of the given choices, 1.8 is closest to the slope of the line of best fit shown.

Choice A is incorrect. This value is closest to the  $y$ -intercept of the  $y$ -intercept of the line of best fit shown.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Medium

# Question ID 54cb53cf

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 54cb53cf

The number of zebras in a population in **2018** was **1.27** times the number of zebras in this population in **2014**. If the number of zebras in this population in **2014** is  $p\%$  of the number of zebras in this population in **2018**, what is the value of  $p$ , to the nearest whole number?

ID: 54cb53cf Answer

Correct Answer:

79

Rationale

The correct answer is **79**. Let  $x$  represent the number of zebras in the population in **2014** and let  $y$  represent the number of zebras in the population in **2018**. It's given that the number of zebras in this population in **2018** was **1.27** times the number of zebras in this population in **2014**. It follows that the equation  $y = 1.27x$  represents this situation. Dividing both sides of this equation by **1.27** yields  $\frac{y}{1.27} = x$ , or  $(\frac{1}{1.27})y = x$ . Therefore, the number of zebras in this population in **2014** is  $\frac{1}{1.27}$  times the number of zebras in this population in **2018**. If the number of zebras in this population in **2014** is  $p\%$  of the number of zebras in this population in **2018**, then  $x = \frac{p}{100}y$ . It follows that  $\frac{1}{1.27} = \frac{p}{100}$ , or  $\frac{100}{1.27} = p$ , which means  $p$  is approximately equal to **78.74**. Therefore, the value of  $p$ , to the nearest whole number, is **79**.

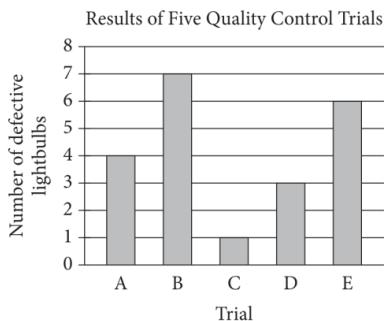
Question Difficulty:

Hard

# Question ID a9647302

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: a9647302



For quality control, a company that manufactures lightbulbs conducted five different trials. In each trial, 500 different lightbulbs were tested. The bar graph above shows the number of defective lightbulbs found in each trial. What is the mean number of defective lightbulbs for the five trials?

- A. 4.0
- B. 4.2
- C. 4.6
- D. 5.0

ID: a9647302 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The numbers of defective lightbulbs found for the five trials are 4, 7, 1, 3, and 6, respectively. The mean is

$$\text{therefore } \frac{4+7+1+3+6}{5} = 4.2.$$

Choice A is incorrect. This is the median number of defective lightbulbs for the five trials. Choice C is incorrect and may result from an arithmetic error. Choice D is incorrect and may result from mistaking the number of trials for the number of defective lightbulbs.

**Question Difficulty:**

Easy

# Question ID 7b731fc3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 7b731fc3

What number is 40% greater than 115?

ID: 7b731fc3 Answer

Correct Answer:

161

Rationale

The correct answer is 161. For a number to be 40% greater than 115, it follows that the number is  $(100\% \text{ of } 115) + (40\% \text{ of } 115)$ , which can be written as  $\frac{100}{100}(115) + \frac{40}{100}(115)$ . This expression is equivalent to  $1(115) + 0.4(115)$ , or  $1.4(115)$ , which is equal to 161. Therefore, 161 is 40% greater than 115.

Question Difficulty:

Medium

# Question ID e9f4521a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: e9f4521a

13 is  $p\%$  of 25. What is the value of  $p$ ?

ID: e9f4521a Answer

Correct Answer:

52

Rationale

The correct answer is 52. It's given that 13 is  $p\%$  of 25. It follows that  $\frac{13}{25} = \frac{p}{100}$ . Multiplying both sides of this equation by 100 gives  $52 = p$ . Therefore, the value of  $p$  is 52.

Question Difficulty:

Medium

# Question ID 1c2f50a6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

**ID: 1c2f50a6**

During a sale, the original prices of all the items in a clothing store have been reduced by 20%. What is the sale price of a jacket with an original price of \$50 ?

- A. \$12
- B. \$30
- C. \$36
- D. \$40

**ID: 1c2f50a6 Answer**

**Correct Answer:**

D

**Rationale**

Choice D is correct. It's given that the original price of the jacket has been reduced by 20%. Multiplying the original price, \$50, by 20% gives the amount, in dollars, that the price of the jacket is reduced by:  $50 \times .20 = 10$ . Subtracting this value from the original price results in the sale price of the jacket:  $\$50 - \$10$ , or \$40.

Choices A, B, and C are incorrect and may result from a conceptual or calculation error.

**Question Difficulty:**

Easy

# Question ID 89c39d77

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 89c39d77

A competition consisted of four different events. One participant completed the first event with an average speed of **20.300** miles per hour. What was this average speed, in yards per hour? (**1 mile = 1,760 yards**)

ID: 89c39d77 Answer

Correct Answer:

35728

Rationale

The correct answer is **35,728**. It's given that **1 mile = 1,760 yards**. It follows that an average speed of **20.300** miles per hour is equivalent to  $\left(\frac{20.300 \text{ miles}}{1 \text{ hour}}\right) \left(\frac{1,760 \text{ yards}}{1 \text{ mile}}\right)$ , or **35,728** yards per hour.

Question Difficulty:

Medium

# Question ID 8193e8cd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 8193e8cd

2, 10, 3, 7, 6

The mean of the list of numbers above is what fraction of the sum of the five numbers?

ID: 8193e8cd Answer

## Rationale

The correct answer is  $\frac{1}{5}$ . The mean of the list of numbers is found by dividing the sum of the numbers by the number of values in the list. Since there are 5 numbers in the list, the mean is  $\frac{1}{5}$  of the sum of the numbers. Note that  $1/5$  and  $.2$  are examples of ways to enter a correct answer.

## Question Difficulty:

Medium

# Question ID dccdb20c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

**ID: dccdb20c**

There are **450** tiles in a box. Of these tiles, **6%** are black. How many black tiles are in the box?

**ID: dccdb20c Answer**

**Correct Answer:**

27

**Rationale**

The correct answer is **27**. It's given that **6%** of the **450** tiles in a box are black. Therefore, the number of black tiles in the box can be calculated by multiplying the number of tiles in the box by  $\frac{6}{100}$ , which is equivalent to  $450\left(\frac{6}{100}\right)$ , or **27**.

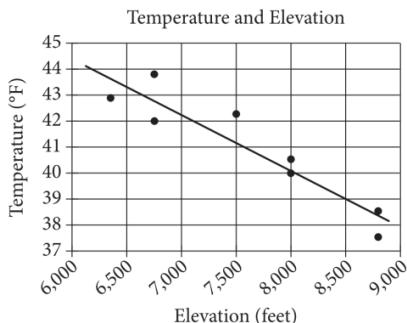
**Question Difficulty:**

Medium

# Question ID 661dfddd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 661dfddd



The scatterplot above shows the high temperature on a certain day and the elevation of 8 different locations in the Lake Tahoe Basin. A line of best fit for the data is also shown. Which of the following statements best describes the association between the elevation and the temperature of locations in the Lake Tahoe Basin?

- A. As the elevation increases, the temperature tends to increase.
- B. As the elevation increases, the temperature tends to decrease.
- C. As the elevation decreases, the temperature tends to decrease.
- D. There is no association between the elevation and the temperature.

ID: 661dfddd Answer

Correct Answer:

B

Rationale

Choice B is correct. The association between the elevation and the temperature of locations in the Lake Tahoe Basin can be described by looking at the direction of the line of best fit. The line of best fit slopes downward, which corresponds to the temperature decreasing as the elevation increases.

Choices A and C are incorrect. Both of these choices would be represented by a line of best fit that slopes from the lower left to the upper right of the graph, which isn't what's shown on the graph. Choice D is incorrect. This choice would be represented by a line of best fit that is horizontal or has a slope very close to 0. This is not what's shown on the graph.

Question Difficulty:

Easy

# Question ID 89f20d9e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: 89f20d9e

The table summarizes the distribution of age and assigned group for **90** participants in a study.

	0–9 years	10–19 years	20+ years	Total
Group A	5	17	8	30
Group B	6	8	16	30
Group C	19	5	6	30
Total	30	30	30	90

One of these participants will be selected at random. What is the probability of selecting a participant from group A, given that the participant is at least **10** years of age?

- A.  $\frac{5}{18}$
- B.  $\frac{5}{12}$
- C.  $\frac{17}{30}$
- D.  $\frac{5}{6}$

ID: 89f20d9e Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. Since the participant will be selected at random, the probability of selecting a participant from group A, given that the participant is at least **10** years of age, is equal to the number of participants from group A who are at least **10** years of age divided by the total number of participants who are at least **10** years of age. Based on the table, in group A, there are **17** participants who are **10–19** years of age and **8** participants who are **20+** years of age. Therefore, there are a total of **17 + 8**, or **25**, participants in group A who are at least **10** years of age. Based on the table, of the total number of participants, there are **30** participants who are **10–19** years of age and **30** participants who are **20+** years of age. Therefore, a total of **30 + 30**, or **60**, of the participants are at least **10** years of age. Thus, the probability of selecting a participant from group A, given that the participant is at least **10** years of age, is  $\frac{25}{60}$ , or  $\frac{5}{12}$ .

Choice A is incorrect. This is the number of participants from group A who are at least **10** years of age divided by the total number of participants, rather than divided by the number of participants who are at least **10** years of age.

Choice C is incorrect. This is the probability of randomly selecting a participant from group A, given that the participant is **10–19** years of age, rather than given that the participant is at least **10** years of age.

Choice D is incorrect. This is the probability of randomly selecting a participant who is at least **10** years of age, given that the participant is in group A.

**Question Difficulty:**  
Hard

# Question ID a03b7e02

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: a03b7e02

The table shows selected values from function  $f$ .

$x$	$f(x)$
-1	16
0	17
1	18
2	19

Which of the following is the best description of function  $f$ ?

- A. Decreasing linear
- B. Increasing linear
- C. Decreasing exponential
- D. Increasing exponential

ID: a03b7e02 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The given values show that as  $x$  increases,  $f(x)$  also increases, which means that  $f$  is an increasing function. Furthermore,  $f(x)$  increases at a constant rate of 1 for each increase of  $x$  by 1. A function with a constant rate of change is linear. Thus, the function  $f$  can be described as an increasing linear function.

Choice A is incorrect. For a decreasing linear function, as  $x$  increases,  $f(x)$  decreases rather than increases.

Choice C is incorrect. For a decreasing exponential function, for each increase of  $x$  by 1,  $f(x)$  decreases by a fixed percentage rather than increases at a constant rate.

Choice D is incorrect. For an increasing exponential function, for each increase of  $x$  by 1,  $f(x)$  increases by a fixed percentage rather than at a constant rate.

**Question Difficulty:**

Easy

# Question ID 97631565

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 97631565

Scott selected **20** employees at random from all **400** employees at a company. He found that **16** of the employees in this sample are enrolled in exactly three professional development courses this year. Based on Scott's findings, which of the following is the best estimate of the number of employees at the company who are enrolled in exactly three professional development courses this year?

- A. **4**
- B. **320**
- C. **380**
- D. **384**

ID: 97631565 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that from the sample of **20** employees at the company, **16** of the employees are enrolled in exactly three professional development courses this year. Since  $(\frac{16}{20})$  is equal to **0.80**, or  $\frac{80}{100}$ , it follows that **80%** of the employees in the sample are enrolled in exactly three professional development courses this year. Therefore, the best estimate for the percentage of employees at the company who are enrolled in exactly three professional development courses this year is **80%**. It's given that there are a total of **400** employees at the company. Therefore, the best estimate of the number of employees at the company who are enrolled in exactly three professional development courses this year is  $(\frac{80}{100})(400)$ , or **320**.

Choice A is incorrect. This is the number of employees from the sample who aren't enrolled in exactly three professional development courses this year.

Choice C is incorrect. This is the number of employees who weren't selected for the sample.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Easy

## Question ID 3d73a58b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 3d73a58b

A gift shop buys souvenirs at a wholesale price of **7.00** dollars each and resells them each at a retail price that is **290%** of the wholesale price. At the end of the season, any remaining souvenirs are marked at a discounted price that is **80%** off the retail price. What is the discounted price of each remaining souvenir, in dollars?

ID: 3d73a58b Answer

Correct Answer:

203/50, 4.06

Rationale

The correct answer is **4.06**. It's given that the retail price is **290%** of the wholesale price of **\$7.00**. Thus, the retail price is **\$7.00** ( $\frac{290}{100}$ ), which is equivalent to **\$7.00(2.9)**, or **\$20.30**. It's also given that the discounted price is **80%** off the retail price. Thus, the discounted price is **\$20.30(1 - \frac{80}{100})**, which is equivalent to **\$20.30(0.20)**, or **\$4.06**.

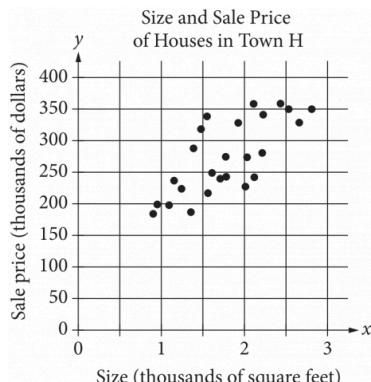
Question Difficulty:

Hard

# Question ID 79137c1b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: 79137c1b



The scatterplot above shows the size  $x$  and the sale price  $y$  of 25 houses for sale in Town H. Which of the following could be an equation for a line of best fit for the data?

- A.  $y = 200x + 100$
- B.  $y = 100x + 100$
- C.  $y = 50x + 100$
- D.  $y = 100x$

ID: 79137c1b Answer

Correct Answer:

B

Rationale

Choice B is correct. From the shape of the cluster of points, the line of best fit should pass roughly through the points  $(1, 200)$  and  $(2.5, 350)$ . Therefore, these two points can be used to find an approximate equation for the line of best fit. The slope of this line of

best fit is therefore  $\frac{y_2 - y_1}{x_2 - x_1} = \frac{350 - 200}{2.5 - 1}$ , or 100. The equation for the line of best fit, in slope-intercept form, is  $y = 100x + b$  for some value of  $b$ . Using the point  $(1, 200)$ , 1 can be substituted for  $x$  and 200 can be substituted for  $y$ :  $200 = 100(1) + b$ , or  $b = 100$ . Substituting this value into the slope-intercept form of the equation gives  $y = 100x + 100$ .

Choice A is incorrect. The line defined by  $y = 200x + 100$  passes through the points  $(1, 300)$  and  $(2, 500)$ , both of which are well above the cluster of points, so it cannot be a line of best fit. Choice C is incorrect. The line defined by  $y = 50x + 100$  passes through the points  $(1, 150)$  and  $(2, 200)$ , both of which lie at the bottom of the cluster of points, so it cannot be a line of best fit.

Choice D is incorrect and may result from correctly calculating the slope of a line of best fit but incorrectly assuming the  $y$ -intercept is at  $(0, 0)$ .

**Question Difficulty:**

Hard

# Question ID b8150b17

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: b8150b17

For a particular machine that produces beads, **29** out of every **100** beads it produces have a defect. A bead produced by the machine will be selected at random. What is the probability of selecting a bead that has a defect?

- A.  $\frac{1}{2,900}$
- B.  $\frac{1}{29}$
- C.  $\frac{29}{100}$
- D.  $\frac{29}{10}$

ID: b8150b17 Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. It's given that **29** out of every **100** beads that the machine produces have a defect. It follows that if the machine produces  $k$  beads, then the number of beads that have a defect is  $\frac{29}{100}k$ , for some constant  $k$ . If a bead produced by the machine will be selected at random, the probability of selecting a bead that has a defect is given by the number of beads with a defect,  $\frac{29}{100}k$ , divided by the number of beads produced by the machine,  $k$ . Therefore, the probability of selecting a bead that has a defect is  $\frac{\frac{29}{100}k}{k}$ , or  $\frac{29}{100}$ .

Choice A is incorrect and may result from conceptual or computational errors.

Choice B is incorrect and may result from conceptual or computational errors.

Choice D is incorrect and may result from conceptual or computational errors.

**Question Difficulty:**

Easy

# Question ID 7d093333

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 7d093333

The area of a rectangular region is increasing at a rate of 250 square feet per hour. Which of the following is closest to this rate in square meters per minute? (Use 1 meter = 3.28 feet.)

- A. 0.39
- B. 1.27
- C. 13.67
- D. 23.24

ID: 7d093333 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that 1 meter = 3.28 feet. It follows that  $1^2$  square meter =  $3.28^2$  square feet, or 1 square meter = 10.7584 square feet. Since 1 hour = 60 minutes, it follows that 250 square feet per hour is equivalent to  $\left(\frac{250 \text{ square feet}}{1 \text{ hour}}\right) \left(\frac{1 \text{ square meter}}{10.7584 \text{ square feet}}\right) \left(\frac{1 \text{ hour}}{60 \text{ minutes}}\right)$ , or  $\frac{250 \text{ square meters}}{645.504 \text{ minutes}}$ , which is approximately 0.3873 square meters per minute. Of the given choices, 0.39 is closest to 0.3873.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

# Question ID 1dcea480

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

## ID: 1dcea480

A bag contains a total of 60 marbles. A marble is to be chosen at random from the bag. If the probability that a blue marble will be chosen is 0.35, how many marbles in the bag are blue?

- A. 21
- B. 25
- C. 35
- D. 39

## ID: 1dcea480 Answer

### Rationale

Choice A is correct. Multiplying the number of marbles in the bag by the probability of selecting a blue marble gives the number of blue marbles in the bag. Since the bag contains a total of 60 marbles and the probability that a blue marble will be selected from the bag is 0.35, there are a total of  $(0.35)(60) = 21$  blue marbles in the bag.

Choice B is incorrect and may result from subtracting 35 from 60. Choice C is incorrect. This would be the number of blue marbles in the bag if there were a total of 100 marbles, not 60 marbles. Choice D is incorrect. This is the number of marbles in the bag that aren't blue.

### Question Difficulty:

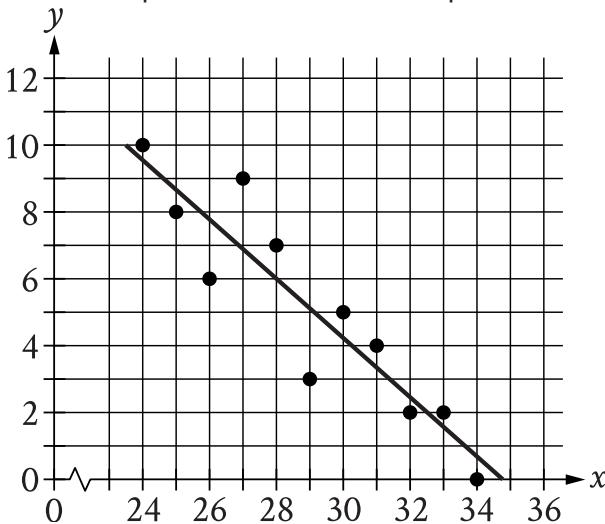
Easy

# Question ID fdfc90e4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: fdfc90e4

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit for the data is also shown.



At  $x = 32$ , which of the following is closest to the  $y$ -value predicted by the line of best fit?

- A. 0.4
- B. 1.5
- C. 2.4
- D. 3.3

ID: fdfc90e4 Answer

Correct Answer:

C

Rationale

Choice C is correct. At  $x = 32$ , the line of best fit has a  $y$ -value between 2 and 3. The only choice with a value between 2 and 3 is choice C.

Choice A is incorrect. This is the difference between the  $y$ -value predicted by the line of best fit and the actual  $y$ -value at  $x = 32$  rather than the  $y$ -value predicted by the line of best fit at  $x = 32$ .

Choice B is incorrect. This is the  $y$ -value predicted by the line of best fit at  $x = 31$  rather than at  $x = 32$ .

Choice D is incorrect. This is the  $y$ -value predicted by the line of best fit at  $x = 33$  rather than at  $x = 32$ .

Question Difficulty:

Medium

# Question ID 674a4084

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 674a4084

An insect moves at a speed of  $\frac{3}{20}$  feet per second. What is this speed, in yards per second? (**3 feet = 1 yard**)

- A.  $\frac{1}{20}$
- B.  $\frac{9}{20}$
- C. 6
- D. 20

ID: 674a4084 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that **3 feet = 1 yard**. It follows that a speed of  $\frac{3}{20}$  feet per second is equivalent to  $\left(\frac{\frac{3}{20} \text{ feet}}{1 \text{ second}}\right) \left(\frac{1 \text{ yard}}{3 \text{ feet}}\right)$ , which is equivalent to  $(\frac{3}{20})(\frac{1}{3})$ , or  $\frac{1}{20}$ , yards per second.

Choice B is incorrect. This is the speed, in feet per second, that's equivalent to  $\frac{3}{20}$  yards per second.

Choice C is incorrect. This is the speed, in yards per second, that's equivalent to 18, not  $\frac{3}{20}$ , feet per second.

Choice D is incorrect. This is the speed, in yards per second, that's equivalent to 60, not  $\frac{3}{20}$ , feet per second.

Question Difficulty:

Medium

# Question ID a0b165f8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

## ID: a0b165f8

A scientist studying the life cycle of dragonflies counted the number of dragonflies in a certain habitat each day for **46** days. On February **15**, there were **99** dragonflies in the habitat. The percent increase in the number of dragonflies in the habitat from January **1** to February **15** was **12.50%**. How many dragonflies were in the habitat on January **1**?

- A. **88**
- B. **87**
- C. **12**
- D. **8**

## ID: a0b165f8 Answer

### Correct Answer:

A

### Rationale

Choice A is correct. It's given that a scientist studying the life cycle of dragonflies counted the number of dragonflies in a certain habitat each day for **46** days. It's also given that on February **15**, there were **99** dragonflies in the habitat and that the percent increase in the number of dragonflies in the habitat from January **1** to February **15** was **12.50%**. This can be represented by the equation

$99 = \left(1 + \frac{12.50}{100}\right)x$ , where  $x$  represents the number of dragonflies in the habitat on January **1**. This equation can be rewritten as  $99 = 1.125x$ . Dividing both sides of this equation by **1.125** yields  $88 = x$ . Therefore, there were **88** dragonflies in the habitat on January **1**.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

### Question Difficulty:

Hard

# Question ID 34e18ce4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 34e18ce4

There are **350** objects in a box. Of these objects, **4%** are balls. How many balls are in the box?

- A. **4**
- B. **14**
- C. **70**
- D. **346**

ID: 34e18ce4 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. It's given that **4%** of the **350** objects in the box are balls. Therefore, the number of balls in the box can be found by calculating **4%** of **350**, which is equal to  $350 \left( \frac{4}{100} \right)$ , or **14**.

Choice A is incorrect. This is the percentage of objects in the box that are balls, not the number of balls in the box.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID c943acba

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: c943acba

On a street with **7** houses, **2** houses are blue. If a house from this street is selected at random, what is the probability of selecting a house that is blue?

- A.  $\frac{1}{7}$
- B.  $\frac{2}{7}$
- C.  $\frac{5}{7}$
- D.  $\frac{7}{7}$

ID: c943acba Answer

Correct Answer:

B

Rationale

Choice B is correct. If a house from the street is selected at random, the probability of selecting a house that is blue is equal to the number of houses on the street that are blue divided by the total number of houses on the street. Since there are **2** blue houses on a street with **7** total houses, the probability of selecting a house that is blue from this street is  $\frac{2}{7}$ .

Choice A is incorrect. This is the probability of selecting a house that is blue from a street on which **1** of the **7** houses is blue.

Choice C is incorrect. This is the probability of selecting a house that is not blue from this street.

Choice D is incorrect. This is the probability of selecting a house that is blue from a street on which all the houses are blue.

Question Difficulty:

Easy

# Question ID 1e562f24

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 1e562f24

To estimate the proportion of a population that has a certain characteristic, a random sample was selected from the population. Based on the sample, it is estimated that the proportion of the population that has the characteristic is **0.49**, with an associated margin of error of **0.04**. Based on this estimate and margin of error, which of the following is the most appropriate conclusion about the proportion of the population that has the characteristic?

- A. It is plausible that the proportion is between **0.45** and **0.53**.
- B. It is plausible that the proportion is less than **0.45**.
- C. The proportion is exactly **0.49**.
- D. It is plausible that the proportion is greater than **0.53**.

ID: 1e562f24 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the estimate for the proportion of the population that has the characteristic is **0.49** with an associated margin of error of **0.04**. Subtracting the margin of error from the estimate and adding the margin of error to the estimate gives an interval of plausible values for the true proportion of the population that has the characteristic. Therefore, it's plausible that the proportion of the population that has this characteristic is between **0.45** and **0.53**.

Choice B is incorrect. A value less than **0.45** is outside the interval of plausible values for the proportion of the population that has the characteristic.

Choice C is incorrect. The value **0.49** is an estimate for the proportion based on this sample. However, since the margin of error for this estimate is known, the most appropriate conclusion is not that the proportion is exactly one value but instead lies in an interval of plausible values.

Choice D is incorrect. A value greater than **0.53** is outside the interval of plausible values for the proportion of the population that has the characteristic.

Question Difficulty:

Medium

# Question ID 89f8d08a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

**ID: 89f8d08a**

A store manager reviewed the receipts from 80 customers who were selected at random from all the customers who made purchases last Thursday. Of those selected, 20 receipts showed that the customer had purchased fruit. If 1,500 customers made purchases last Thursday, which of the following is the most appropriate conclusion?

- A. Exactly 75 customers must have purchased fruit last Thursday.
- B. Exactly 375 customers must have purchased fruit last Thursday.
- C. The best estimate for the number of customers who purchased fruit last Thursday is 75.
- D. The best estimate for the number of customers who purchased fruit last Thursday is 375.

**ID: 89f8d08a Answer**

**Correct Answer:**

D

**Rationale**

Choice D is correct. It's given that the manager took a random selection of the receipts of 80 customers from a total of 1,500. It's also given that of those 80 receipts, 20 showed that the customer had purchased fruit. This means that an appropriate estimate of

the fraction of customers who purchased fruit is  $\frac{20}{80}$ , or  $\frac{1}{4}$ . Multiplying this fraction by the total number of customers yields  $\left(\frac{1}{4}\right)(1,500) = 375$ . Therefore, the best estimate for the number of customers who purchased fruit is 375.

Choices A and B are incorrect because an exact number of customers can't be known from taking a random selection. Additionally, choice A may also be the result of a calculation error. Choice C is incorrect and may result from a calculation error.

**Question Difficulty:**

Medium

# Question ID 54d93874

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 54d93874

	Masses (kilograms)					
Andrew	2.4	2.5	3.6	3.1	2.5	2.7
Maria	x	3.1	2.7	2.9	3.3	2.8

Andrew and Maria each collected six rocks, and the masses of the rocks are shown in the table above. The mean of the masses of the rocks Maria collected is 0.1 kilogram greater than the mean of the masses of the rocks Andrew collected. What is the value of  $x$ ?

ID: 54d93874 Answer

## Rationale

The correct answer is 2.6. Since the mean of a set of numbers can be found by adding the numbers together and dividing by how many numbers there are in the set, the mean mass, in kilograms, of the rocks Andrew collected is

$$\frac{2.4 + 2.5 + 3.6 + 3.1 + 2.5 + 2.7}{6} = \frac{16.8}{6}$$

, or 2.8. Since the mean mass of the rocks Maria collected is 0.1 kilogram greater than the mean mass of rocks Andrew collected, the mean mass of the rocks Maria collected is  $2.8 + 0.1 = 2.9$  kilograms. The

value of  $x$  can be found by writing an equation for finding the mean:

$$\frac{x + 3.1 + 2.7 + 2.9 + 3.3 + 2.8}{6} = 2.9$$

. Solving this equation gives  $x = 2.6$ . Note that 2.6 and 13/5 are examples of ways to enter a correct answer.

## Question Difficulty:

Hard

# Question ID 6a305cd0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

**ID: 6a305cd0**

In a study, the data from a random sample of a population had a mean of 37, with an associated margin of error of 3. Which of the following is the most appropriate conclusion that can be made about the population mean?

- A. It is less than 37.
- B. It is greater than 37.
- C. It is between 34 and 40.
- D. It is less than 34 or greater than 40.

**ID: 6a305cd0 Answer**

**Correct Answer:**

C

**Rationale**

Choice C is correct. It's given that the mean of the data from a random sample of a population is 37, with an associated margin of error of 3. The most appropriate conclusion that can be made is that the mean of the entire population will fall between 37, plus or minus 3. Therefore, the population mean is between  $37 - 3 = 34$  and  $37 + 3 = 40$ .

Choice A is incorrect. While it's an appropriate conclusion that the population mean is as low as  $37 - 3$ , or 34, it isn't appropriate to conclude that the population mean is less than 34. Choice B is incorrect. While it's an appropriate conclusion that the population mean is as high as  $37 + 3$ , or 40, it isn't appropriate to conclude that the population mean is greater than 40. Choice D is incorrect. It isn't an appropriate conclusion that the population mean is less than 34 or greater than 40.

**Question Difficulty:**

Easy

# Question ID 048811bd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div>

ID: 048811bd

What is 10% of 370?

- A. 27
- B. 37
- C. 333
- D. 360

ID: 048811bd Answer

Correct Answer:

B

Rationale

Choice B is correct. 10% of a quantity means  $\frac{10}{100}$  times the quantity. Therefore, 10% of 370 can be represented as  $\frac{10}{100}(370)$ , which is equivalent to 0.10(370), or 37. Therefore, 10% of 370 is 37.

Choice A is incorrect. This is 10% of 270, not 10% of 370.

Choice C is incorrect. This is 90% of 370, not 10% of 370.

Choice D is incorrect. This is 370 – 10, not 10% of 370.

Question Difficulty:

Easy

# Question ID 869a32f1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 869a32f1

The high temperature, in degrees Fahrenheit ( $^{\circ}\text{F}$ ), in a certain city was recorded for each of 5 days. The data are shown below.

Day	1	2	3	4	5
High temperature ( $^{\circ}\text{F}$ )	81	80	81	81	82

Over this 5-day period, which of the following is NOT equal to  $81^{\circ}\text{F}$ ?

- A. Median of the high temperatures
- B. Mean of the high temperatures
- C. Mode of the high temperatures
- D. Range of the high temperatures

ID: 869a32f1 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The range of a data set is the difference between the maximum and the minimum values in the set. The maximum value among the high temperatures in the table is  $82^{\circ}\text{F}$  and the minimum value is  $80^{\circ}\text{F}$ . Therefore, the range is  $82^{\circ}\text{F} - 80^{\circ}\text{F} = 2^{\circ}\text{F}$ .

Choice A is incorrect. The median of a data set is the middle value when the values in the set are ordered from least to greatest. Ordering the high temperatures this way gives the list  $80, 81, 81, 81, 82$ . Therefore, the median high temperature is  $81^{\circ}\text{F}$ . Choice B is incorrect. The mean high temperature is  $\frac{81+80+81+81+82}{5} = \frac{405}{5} = 81$ . Choice C is incorrect. The mode is the value that occurs the greatest number of times. For the set of high temperatures shown, 81 is the value that occurs 3 times, and therefore,  $81^{\circ}\text{F}$  is the mode of the high temperatures.

**Question Difficulty:**

Easy

# Question ID 916ffe9b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 916ffe9b

Poll Results

Angel Cruz	483
Terry Smith	320

The table shows the results of a poll. A total of 803 voters selected at random were asked which candidate they would vote for in the upcoming election. According to the poll, if 6,424 people vote in the election, by how many votes would Angel Cruz be expected to win?

- A. 163
- B. 1,304
- C. 3,864
- D. 5,621

ID: 916ffe9b Answer

Correct Answer:

B

## Rationale

Choice B is correct. It's given that 483 out of 803 voters responded that they would vote for Angel Cruz. Therefore, the proportion of voters from the poll who responded they would vote for Angel Cruz is  $\frac{483}{803}$ . It's also given that there are a total of 6,424 voters in the election. Therefore, the total number of people who would be expected to vote for Angel Cruz is  $6,424 \left( \frac{483}{803} \right)$ , or 3,864. Since 3,864 of the 6,424 total voters would be expected to vote for Angel Cruz, it follows that  $6,424 - 3,864$ , or 2,560 voters would be expected not to vote for Angel Cruz. The difference in the number of votes for and against Angel Cruz is  $3,864 - 2,560$ , or 1,304 votes. Therefore, if 6,424 people vote in the election, Angel Cruz would be expected to win by 1,304 votes.

Choice A is incorrect. This is the difference in the number of voters from the poll who responded that they would vote for and against Angel Cruz.

Choice C is incorrect. This is the total number of people who would be expected to vote for Angel Cruz.

Choice D is incorrect. This is the difference between the total number of people who vote in the election and the number of voters from the poll.

## Question Difficulty:

Hard

# Question ID 8173f32b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 8173f32b

An analyst collected data on the price of a carton of grape tomatoes at **30** locations selected at random in Utah. The mean price of a carton of grape tomatoes in Utah was estimated to be **\$4.23**, with an associated margin of error of **\$0.08**. Which of the following is a plausible statement about the mean price of a carton of grape tomatoes for all locations that sell this product in Utah?

- A. It is between **\$4.15** and **\$4.31**.
- B. It is either less than **\$4.15** or greater than **\$4.31**.
- C. It is less than **\$4.15**.
- D. It is greater than **\$4.31**.

ID: 8173f32b Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the mean price of a carton of grape tomatoes in Utah was estimated to be **\$4.23**, with an associated margin of error of **\$0.08**. It follows that plausible values for this mean price are between **\$4.23 – \$0.08** and **\$4.23 + \$0.08**. Therefore, it's plausible that the mean price of a carton of grape tomatoes for all locations that sell this product in Utah is between **\$4.15** and **\$4.31**.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Easy

# Question ID a3384df0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: a3384df0

Penguin Exhibit			
Type of penguin	Male	Female	Total
Chinstrap	41	59	100
Emperor	8	27	35
Gentoo	49	54	103
Macaroni	42	40	82
Total	140	180	320

The number of penguins in a zoo exhibit, sorted by gender and type of penguin, is shown in the table above. Which type of penguin has a female population that is the

$\frac{1}{3}$  closest to being  $\frac{1}{3}$  of the total female penguin population in the exhibit?

- A. Chinstrap
- B. Emperor
- C. Gentoo
- D. Macaroni

ID: a3384df0 Answer

Correct Answer:

A

Rationale

Choice A is correct. It is given that there are 180 female penguins in the exhibit. Therefore,  $\frac{1}{3}$  of the female penguins is  $\frac{1}{3} \times 180 = 60$  penguins. According to the table, there are 59 female chinstrap penguins, 27 female emperor penguins, 54 female gentoo penguins, and 40 female macaroni penguins. So the female chinstrap penguin population is the closest to 60, or  $\frac{1}{3}$  of the total female population in the exhibit.

Choices B, C, and D are incorrect and may result from reading data from the table incorrectly. Since the total female penguin population is 180,  $\frac{1}{3}$  of the total female penguin population is 60. The numbers of female emperor (27), female gentoo (54), and female macaroni (40) penguins are not as close to 60 as the number of female chinstrap penguins (59).

**Question Difficulty:**

Medium

# Question ID 6670e407

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 6670e407

Number of High School Students Who Completed Summer Internships

High school	Year				
	2008	2009	2010	2011	2012
Foothill	87	80	75	76	70
Valley	44	54	65	76	82
Total	131	134	140	152	152

The table above shows the number of students from two different high schools who completed summer internships in each of five years. No student attended both schools. Which of the following statements are true about the number of students who completed summer internships for the 5 years shown?

1. The mean number from Foothill High School is greater than the mean number from Valley High School.
2. The median number from Foothill High School is greater than the median number from Valley High School.

- A. I only
- B. II only
- C. I and II
- D. Neither I nor II

ID: 6670e407 Answer

Correct Answer:

C

Rationale

Choice C is correct. The mean of a data set is found by dividing the sum of the values by the number of values. Therefore, the mean number of students who completed summer internships from Foothill High School is  $\frac{87+80+75+76+70}{5} = \frac{388}{5} = 77.6$ , or 77.6. Similarly, the mean number from Valley High School is  $\frac{44+54+65+76+82}{5} = \frac{321}{5} = 64.2$ , or 64.2. Thus, the mean number from Foothill High School is greater than the mean number from Valley High School. When a data set has an odd number of elements, the median can be found by ordering the values from least to greatest and determining the value in the middle. Since

there are five values in each data set, the third value in each ordered list is the median. Therefore, the median number from Foothill High School is 76 and the median number from Valley High School is 65. Thus, the median number from Foothill High School is greater than the median number from Valley High School.

Choices A, B, and D are incorrect and may result from various misconceptions or miscalculations.

**Question Difficulty:**

Easy

# Question ID 0a99e5bb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 0a99e5bb

**-13, 4, 23**

A data set of three numbers is shown. If a number from this data set is selected at random, what is the probability of selecting a negative number?

- A. 0
- B.  $\frac{1}{3}$
- C.  $\frac{2}{3}$
- D. 1

ID: 0a99e5bb Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. If a number from the data set is selected at random, the probability of selecting a negative number is the count of negative numbers in the data set divided by the total count of numbers in the data set. It's given that a data set of three numbers is shown. It follows that the total count of numbers in the data set is 3. In the data set shown, -13 is the only negative number. It follows that the count of negative numbers in the data set is 1. Therefore, if a number from the data set is selected at random, the probability of selecting a negative number is  $\frac{1}{3}$ .

Choice A is incorrect. This is the probability of selecting a negative number from a data set that doesn't contain any negative numbers.

Choice C is incorrect. This is the probability of selecting a positive number, not a negative number, from the data set.

Choice D is incorrect. This is the probability of selecting a negative number from a data set that contains only negative numbers.

**Question Difficulty:**

Easy

# Question ID 9b5b23fc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 9b5b23fc

For  $x > 0$ , the function  $f$  is defined as follows:

$f(x)$  equals 201% of  $x$

Which of the following could describe this function?

- A. Decreasing exponential
- B. Decreasing linear
- C. Increasing exponential
- D. Increasing linear

ID: 9b5b23fc Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that for  $x > 0$ ,  $f(x)$  is equal to 201% of  $x$ . This is equivalent to  $f(x) = \frac{201}{100}x$ , or  $f(x) = 2.01x$ , for  $x > 0$ . This function indicates that as  $x$  increases,  $f(x)$  also increases, which means  $f$  is an increasing function.

Furthermore,  $f(x)$  increases at a constant rate of 2.01 for each increase of  $x$  by 1. A function with a constant rate of change is linear. Thus, the function  $f$  can be described as an increasing linear function.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect. This could describe the function  $f(x) = (2.01)^x$ , where  $f(x)$  is equal to 201% of  $f(x - 1)$ , not  $x$ , for  $x > 0$ .

Question Difficulty:

Hard

# Question ID 4e527894

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 4e527894

There are **20** buttons in a bag: **8** white buttons, **2** orange buttons, and **10** brown buttons. If one of these buttons is selected at random, what is the probability of selecting a white button?

- A.  $\frac{2}{20}$
- B.  $\frac{8}{20}$
- C.  $\frac{10}{20}$
- D.  $\frac{12}{20}$

ID: 4e527894 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that there are **20** buttons in a bag and **8** of the buttons are white. If one button from the bag is selected at random, the probability of selecting a white button is the number of white buttons in the bag divided by the total number of buttons in the bag. Therefore, if one button from the bag is selected at random, the probability of selecting a white button is  $\frac{8}{20}$ .

Choice A is incorrect. This is the probability of selecting an orange button from the bag.

Choice C is incorrect. This is the probability of selecting a brown button from the bag.

Choice D is incorrect. This is the probability of selecting a button that isn't white from the bag.

Question Difficulty:

Easy

# Question ID 808f7d6c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 808f7d6c

If  $t = 4u$ , which of the following is equivalent to  $2t$ ?

- A.  $8u$
- B.  $2u$
- C.  $u$
- D.  $\frac{1}{2}u$

ID: 808f7d6c Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that  $t = 4u$ . Multiplying both sides of this equation by 2 yields  $2t = 2(4u)$ , or  $2t = 8u$ .

Choice B is incorrect and may result from dividing, instead of multiplying, the right-hand side of the equation by 2. Choices C and D are incorrect and may result from calculation errors.

Question Difficulty:

Easy

# Question ID af142f8d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: af142f8d

	Amount invested	Balance increase
Account A	\$500	6% annual interest
Account B	\$1,000	\$25 per year

Two investments were made as shown in the table above. The interest in Account A is compounded once per year. Which of the following is true about the investments?

- A. Account A always earns more money per year than Account B.
- B. Account A always earns less money per year than Account B.
- C. Account A earns more money per year than Account B at first but eventually earns less money per year.
- D. Account A earns less money per year than Account B at first but eventually earns more money per year.

ID: af142f8d Answer

Correct Answer:

A

## Rationale

Choice A is correct. Account A starts with \$500 and earns interest at 6% per year, so in the first year Account A earns  $(500)(0.06) = \$30$ , which is greater than the \$25 that Account B earns that year. Compounding interest can be modeled by an increasing exponential function, so each year Account A will earn more money than it did the previous year. Therefore, each year Account A earns at least \$30 in interest. Since Account B always earns \$25 each year, Account A always earns more money per year than Account B.

Choices B and D are incorrect. Account A earns \$30 in the first year, which is greater than the \$25 Account B earns in the first year. Therefore, neither the statement that Account A always earns less money per year than Account B nor the statement that Account A earns less money than Account B at first can be true. Choice C is incorrect. Since compounding interest can be modeled by an increasing exponential function, each year Account A will earn more money than it did the previous year. Therefore, Account A always earns at least \$30 per year, which is more than the \$25 per year that Account B earns.

## Question Difficulty:

Hard

# Question ID 566759ef

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 566759ef

Thomas installed a new stove in his restaurant. At the time of installation, the stove had a value of \$800. Thomas estimates that each year the value of the stove will depreciate by 20% of the previous year's estimated value. What is the estimated value of the stove exactly 2 years after Thomas installed it?

- A. \$480
- B. \$512
- C. \$556
- D. \$640

ID: 566759ef Answer

## Rationale

Choice B is correct. If the stove's value depreciates by 20% of the previous year's estimated value, then each year it retains  $100\% - 20\% = 80\%$ , or 0.80, of the previous year's estimated value. Since the stove's value was \$800 when Thomas installed it, the estimated value after two years would be  $(0.80)(0.80)(\$800) = \$512$ .

Choice A is incorrect. This is the value of the stove if each year it had depreciated by 20% of the original value rather than by 20% of the previous year's estimated value. Choice C is incorrect and may be the result of a computational error. Choice D is incorrect. This is the estimated value of the stove 1 year after Thomas installed it, not 2 years.

## Question Difficulty:

Medium

# Question ID 6e4a60dd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 6e4a60dd

Rita's total bill at a restaurant was \$25.00, including tax. If she left a tip of 20% of the total bill, what was the amount of the tip?

- A. \$3.50
- B. \$4.00
- C. \$4.50
- D. \$5.00

ID: 6e4a60dd Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The total bill was \$25.00. The percentage 20% is equivalent to the decimal 0.2. The tip is the product of the percentage and the total bill; therefore,  $0.2 \times 25 = 5$ , so the tip was \$5.00.

Choices A, B, and C are incorrect and may be the result of incorrectly converting the given percentage or a calculation error.

**Question Difficulty:**

Easy

# Question ID ad1d6adb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3;"></div> <div style="width: 20%; background-color: #0056b3;"></div> <div style="width: 60%; background-color: #e0e0e0;"></div>

## ID: ad1d6adb

The number of coins in a collection increased from **9** to **90**. What was the percent increase in the number of coins in this collection?

- A. **10%**
- B. **81%**
- C. **90%**
- D. **900%**

## ID: ad1d6adb Answer

**Correct Answer:**

D

### Rationale

Choice D is correct. It's given that the number of coins in the collection increased from **9** to **90**. It follows that the number of coins in the collection increased by **90 – 9**, or **81**. Let  $x\%$  represent the percentage that **81** is of **9**. The value of  $x$  can be found using the proportion  $\frac{81}{9} = \frac{x}{100}$ , or  $9 = \frac{x}{100}$ . Multiplying both sides of this equation by **100** yields **900 = x**. Thus, when the number of coins in the collection increased from **9** to **90**, the percent increase was **900%**.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

### Question Difficulty:

Medium

# Question ID 040f2a84

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: 040f2a84

The regular price of a shirt at a store is **\$11.70**. The sale price of the shirt is **80%** less than the regular price, and the sale price is **30%** greater than the store's cost for the shirt. What was the store's cost, in dollars, for the shirt? (Disregard the **\$** sign when entering your answer. For example, if your answer is **\$4.97**, enter **4.97**)

ID: 040f2a84 Answer

**Correct Answer:**

1.8, 9/5

**Rationale**

The correct answer is **1.8**. It's given that the regular price of a shirt at a store is **\$11.70**, and the sale price of the shirt is **80%** less than the regular price. It follows that the sale price of the shirt is  $\$11.70(1 - \frac{80}{100})$ , or  $\$11.70(1 - 0.8)$ , which is equivalent to **\$2.34**. It's also given that the sale price of the shirt is **30%** greater than the store's cost for the shirt. Let  $x$  represent the store's cost for the shirt. It follows that  $2.34 = (1 + \frac{30}{100})x$ , or  $2.34 = 1.3x$ . Dividing both sides of this equation by **1.3** yields  $x = 1.80$ . Therefore, the store's cost, in dollars, for the shirt is **1.80**. Note that 1.8 and 9/5 are examples of ways to enter a correct answer.

**Question Difficulty:**

Hard

# Question ID 9ee22c16

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: 9ee22c16

A random sample of 400 town voters were asked if they plan to vote for Candidate A or Candidate B for mayor. The results were sorted by gender and are shown in the table below.

	Plan to vote for Candidate A	Plan to vote for Candidate B
Female	202	20
Male	34	144

The town has a total of 6,000 voters. Based on the table, what is the best estimate of the number of voters who plan to vote for Candidate A?

ID: 9ee22c16 Answer

## Rationale

The correct answer is 3,540. According to the table, of 400 voters randomly sampled, the total number of men and women who plan to vote for Candidate A is  $202 + 34 = 236$ . The best estimate of the total number of voters in the town who plan to vote for

Candidate A is the fraction of voters in the sample who plan to vote for Candidate A,  $\frac{236}{400}$ , multiplied by the total voter population of 6000. Therefore, the answer is  $\left(\frac{236}{400}\right)(6,000) = 3,540$ .

## Question Difficulty:

Medium

# Question ID 41b71b4e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

**ID: 41b71b4e**

What number is 20% greater than 60?

- A. 50
- B. 72
- C. 75
- D. 132

**ID: 41b71b4e Answer**

**Correct Answer:**

B

**Rationale**

Choice B is correct. The decimal equivalent of 20% is 0.2. The number that is 20% greater than 60 is also 120% of 60. The decimal equivalent of 120% is 1.2, and  $1.2(60) = 72$ .

Alternate approach: 10% of 60 is 6, and 20% of 60 is double that amount, or 12. It follows that the number that is 20% greater than 60 is 12 more than 60, or  $60 + 12 = 72$ .

Choice A is incorrect and may result from dividing, instead of multiplying, 60 by 1.2. Choice C is incorrect because it's 25% greater than 60, rather than 20% greater than 60. Choice D is incorrect and may result from multiplying 60 by 2.2 instead of 1.2.

**Question Difficulty:**

Easy

# Question ID eaab8bc1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 30%; background-color: #cccccc; height: 10px;"></div> <div style="width: 30%; background-color: #cccccc; height: 10px;"></div>

**ID: eaab8bc1**

Out of **300** seeds that were planted, **80%** sprouted. How many of these seeds sprouted?

**ID: eaab8bc1 Answer**

**Correct Answer:**

240

**Rationale**

The correct answer is **240**. It's given that **80%** of the **300** seeds sprouted. Therefore, the number of seeds that sprouted can be calculated by multiplying the number of seeds that were planted by  $\frac{80}{100}$ , which gives  $300(\frac{80}{100})$ , or **240**.

**Question Difficulty:**

Easy

# Question ID 46b2e169

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 20%; background-color: #002B36; height: 10px;"></div> <div style="width: 20%; background-color: #002B36; height: 10px;"></div> <div style="width: 60%; background-color: #D9D9D9; height: 10px;"></div>

ID: 46b2e169

A box contains **13** red pens and **37** blue pens. If one of these pens is selected at random, what is the probability of selecting a red pen? (Express your answer as a decimal or fraction, not as a percent.)

ID: 46b2e169 Answer

**Correct Answer:**

.26, 13/50

**Rationale**

The correct answer is  $\frac{13}{50}$ . It's given that a box contains **13** red pens and **37** blue pens. If one of these pens is selected at random, the probability of selecting a red pen is the number of red pens in the box divided by the number of red and blue pens in the box. The number of red and blue pens in the box is **13 + 37**, or **50**. Since there are **13** red pens in the box, it follows that the probability of selecting a red pen is  $\frac{13}{50}$ . Note that 13/50 and .26 are examples of ways to enter a correct answer.

**Question Difficulty:**

Medium

# Question ID 8213b1b3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 30%; background-color: #005a9f; height: 10px;"></div> <div style="width: 30%; background-color: #005a9f; height: 10px;"></div> <div style="width: 30%; background-color: #005a9f; height: 10px;"></div>

ID: 8213b1b3

According to a set of standards, a certain type of substance can contain a maximum of **0.001%** phosphorus by mass. If a sample of this substance has a mass of **140** grams, what is the maximum mass, in grams, of phosphorus the sample can contain to meet these standards?

ID: 8213b1b3 Answer

Correct Answer:

.0014

Rationale

The correct answer is **.0014**. It's given that a certain type of substance can contain a maximum of **0.001%** phosphorus by mass to meet a set of standards. If a sample of the substance has a mass of **140** grams, it follows that the maximum mass, in grams, of phosphorus the sample can contain to meet the standards is **0.001%** of **140**, or  $\frac{0.001}{100}(140)$ , which is equivalent to **(0.00001)(140)**, or **0.0014**. Note that **.0014** and **0.001** are examples of ways to enter a correct answer.

Question Difficulty:

Hard

# Question ID f8696cd8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 20%; background-color: #003366; height: 10px;"></div> <div style="width: 60%; background-color: #cccccc; height: 10px;"></div>

ID: f8696cd8

	Human Resources	Accounting
Bachelor's degree	4	3
Master's degree	2	6

The table above shows the number of people who work in the Human Resources and Accounting departments of a company and the highest level of education they have completed. A person from one of these departments is to be chosen at random. If the person chosen works in the Human Resources department, what is the probability that the highest level of education the person completed is a master's degree?

A.  $\frac{2}{15}$

B.  $\frac{1}{3}$

C.  $\frac{1}{4}$

D.  $\frac{8}{15}$

ID: f8696cd8 Answer

Correct Answer:

B

Rationale

Choice B is correct. In total, there are 6 people in the Human Resources department. Of those 6, 2 have a master's degree as their highest level of education. Therefore, the probability of an employee selected at random from the Human Resources department

having a master's degree is  $\frac{2}{6}$ , which simplifies to  $\frac{1}{3}$ .

Choice A is incorrect; it is the probability that an employee selected at random from either department will be in the Human Resources department and have a master's degree. Choice C is incorrect; it is the probability that an employee with a master's degree selected at random will be in the Human Resources department. Choice D is incorrect; it is the probability that an employee selected at random from either department will have a master's degree.

Question Difficulty:

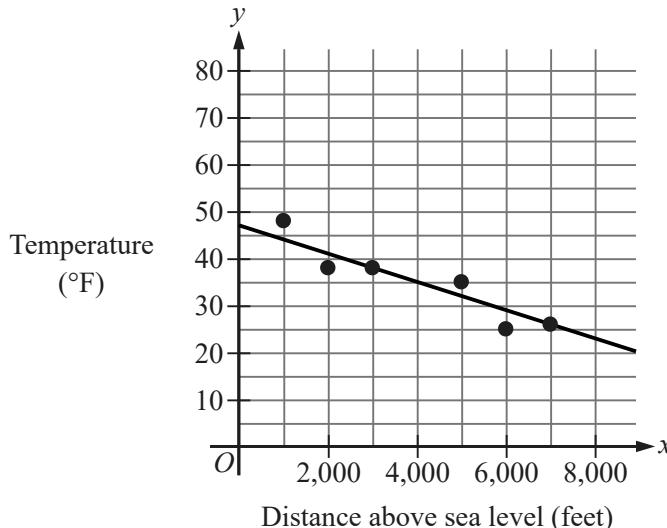
Medium

# Question ID bc59c2d9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: bc59c2d9

The scatterplot shows the temperature, in degrees Fahrenheit ( $^{\circ}\text{F}$ ), and the distance above sea level, in feet, measured at 6 locations on Mount Jefferson. A line of best fit is also shown.



At a distance of 4,000 feet above sea level, what is the temperature, in  $^{\circ}\text{F}$ , predicted by the line of best fit?

- A. 47
- B. 35
- C. 25
- D. 0

ID: bc59c2d9 Answer

Correct Answer:

B

Rationale

Choice B is correct. In the given scatterplot, the  $x$ -values represent the distance above sea level, in feet, and the  $y$ -values represent the temperature, in  $^{\circ}\text{F}$ . The point on the line of best fit with an  $x$ -value of 4,000 has a corresponding  $y$ -value of 35. Therefore, at a distance of 4,000 feet above sea level, the temperature predicted by the line of best fit is  $35^{\circ}\text{F}$ .

Choice A is incorrect. This is the temperature, in  $^{\circ}\text{F}$ , predicted by the line of best fit at a distance of 0 feet above sea level.

Choice C is incorrect. This is the measured temperature, in  $^{\circ}\text{F}$ , at a distance of 6,000 feet above sea level.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

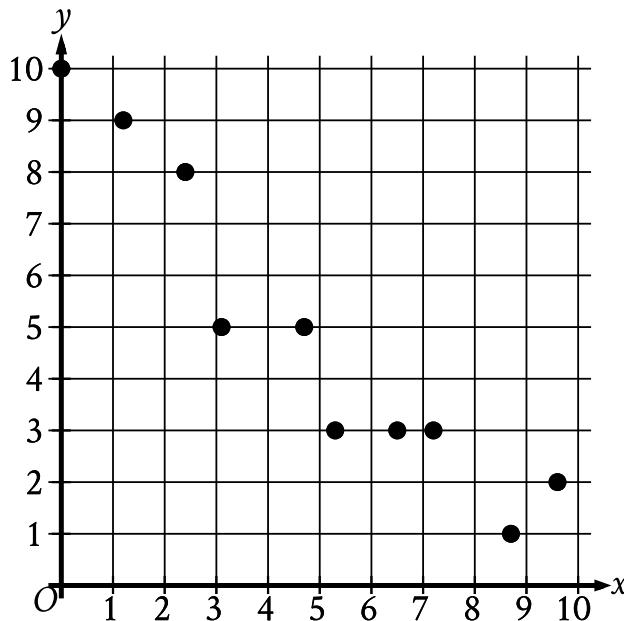
Easy

# Question ID 50b2807e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: 50b2807e

The scatterplot shows the relationship between two variables,  $x$  and  $y$ .



Which of the following equations is the most appropriate linear model for the data shown?

- A.  $y = 0.9 + 9.4x$
- B.  $y = 0.9 - 9.4x$
- C.  $y = 9.4 + 0.9x$
- D.  $y = 9.4 - 0.9x$

ID: 50b2807e Answer

Correct Answer:

D

Rationale

Choice D is correct. The data points suggest that as the variable  $x$  increases, the variable  $y$  decreases, which implies that an appropriate linear model for the data has a negative slope. The data points also show that when  $x$  is close to 0,  $y$  is greater than 9. Therefore, the  $y$ -intercept of the graph of an appropriate linear model has a  $y$ -coordinate greater than 9. The graph of an equation of the form  $y = a + bx$ , where  $a$  and  $b$  are constants, has a  $y$ -intercept with a  $y$ -coordinate of  $a$  and has a slope of  $b$ . Of the given choices, only choice D represents a graph that has a negative slope,  $-0.9$ , and a  $y$ -intercept with a  $y$ -coordinate greater than 9, 9.4.

Choice A is incorrect. The graph of this equation has a positive slope, not a negative slope, and a  $y$ -intercept with a  $y$ -coordinate less than **1**, not greater than **9**.

Choice B is incorrect. The graph of this equation has a  $y$ -intercept with a  $y$ -coordinate less than **1**, not greater than **9**.

Choice C is incorrect. The graph of this equation has a positive slope, not a negative slope.

**Question Difficulty:**

Medium

# Question ID 34f8cd89

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 34f8cd89

37% of the items in a box are green. Of those, 37% are also rectangular. Of the green rectangular items, 42% are also metal. Which of the following is closest to the percentage of the items in the box that are not rectangular green metal items?

- A. 1.16%
- B. 57.50%
- C. 94.25%
- D. 98.84%

ID: 34f8cd89 Answer

Correct Answer:

C

Rationale

Choice C is correct. It's given that 37% of the items in a box are green. Let  $x$  represent the total number of items in the box. It follows that  $\frac{37}{100}x$ , or  $0.37x$ , items in the box are green. It's also given that of those, 37% are also rectangular. Therefore,  $\frac{37}{100}(0.37x)$ , or  $0.1369x$ , items in the box are green rectangular items. It's also given that of the green rectangular items, 42% are also metal. Therefore,  $\frac{42}{100}(0.1369x)$ , or  $0.057498x$ , items in the box are rectangular green metal items. The number of the items in the box that are not rectangular green metal items is the total number of items in the box minus the number of rectangular green metal items in the box. Therefore, the number of items in the box that are not rectangular green metal items is  $x - 0.057498x$ , or  $0.942502x$ . The percentage of items in the box that are not rectangular green metal items is the percentage that  $0.942502x$  is of  $x$ . If  $p\%$  represents this percentage, the value of  $p$  is  $100(\frac{0.942502x}{x})$ , or 94.2502. Of the given choices, 94.25% is closest to the percentage of items in the box that are not rectangular green metal items.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

# Question ID 6fca0144

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 75%; background-color: #005a99; height: 10px;"></div>

ID: 6fca0144

For a baobab tree habitat in South Africa, a scientist randomly selected **50** baobab trees that were **17** years old and randomly assigned them to two groups. Each group was subjected to a different watering pattern for **2** consecutive years to observe whether the watering pattern affects the trees' growth rate. Based on the design of the study, what is the largest group to which these results can be applied?

- A. All the **50** baobab trees that were selected in this habitat
- B. All the baobab trees that were **19** years old in this habitat
- C. All the baobab trees that were **17** years old in South Africa
- D. All the baobab trees that were **17** years old in this habitat

ID: 6fca0144 Answer

Correct Answer:

D

Rationale

Choice D is correct. When a study uses a randomly selected sample, the largest group to which the results of the study can be applied is the population from which the sample was selected. It's given that the scientist randomly selected the trees from the baobab trees in a certain habitat that were **17** years old. Therefore, the largest group to which the results of this study can be applied is all the baobab trees that were **17** years old in this habitat.

Choice A is incorrect. Since the sample was randomly selected from a population, the results can be applied to a larger group than the sample.

Choice B is incorrect. The sample was selected from a population of baobab trees that were **17** years old, not **19** years old.

Choice C is incorrect. The sample was selected from a certain tree habitat in South Africa, not from all the baobab trees that were **17** years old in South Africa.

Question Difficulty:

Hard

# Question ID 20b69297

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 20b69297

Anita created a batch of green paint by mixing 2 ounces of blue paint with 3 ounces of yellow paint. She must mix a second batch using the same ratio of blue and yellow paint as the first batch. If she uses 5 ounces of blue paint for the second batch, how much yellow paint should Anita use?

- A. Exactly 5 ounces
- B. 3 ounces more than the amount of yellow paint used in the first batch
- C. 1.5 times the amount of yellow paint used in the first batch
- D. 1.5 times the amount of blue paint used in the second batch

ID: 20b69297 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that Anita used a ratio of 2 ounces of blue paint to 3 ounces of yellow paint for the first batch. For any batch of paint that uses the same ratio, the amount of yellow paint used will be  $\frac{3}{2}$ , or 1.5, times the amount of blue paint used in the batch. Therefore, the amount of yellow paint Anita will use in the second batch will be 1.5 times the amount of blue paint used in the second batch.

Alternate approach: It's given that Anita used a ratio of 2 ounces of blue paint to 3 ounces of yellow paint for the first batch and that she will use 5 ounces of blue paint for the second batch. A proportion can be set up to solve for  $x$ , the amount of yellow paint she will use for the second batch:  $\frac{2}{3} = \frac{5}{x}$ . Multiplying both sides of this equation by 3 yields  $2 = \frac{15}{x}$ , and multiplying both sides of this equation by  $x$  yields  $2x = 15$ . Dividing both sides of this equation by 2 yields  $x = 7.5$ . Since Anita will use 7.5 ounces of yellow paint for the second batch, this is  $\frac{7.5}{5} = 1.5$  times the amount of blue paint (5 ounces) used in the second batch.

Choices A, B, and C are incorrect and may result from incorrectly interpreting the ratio of blue paint to yellow paint used.

Question Difficulty:

Hard

# Question ID 94237701

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 75%;"><div style="width: 100px; height: 10px; background-color: #005a9f;"></div><div style="width: 100px; height: 10px; background-color: #005a9f;"></div><div style="width: 100px; height: 10px; background-color: #005a9f;"></div></div>

ID: 94237701

For a certain computer game, individuals receive an integer score that ranges from 2 through 10. The table below shows the frequency distribution of the scores of the 9 players in group A and the 11 players in group B.

Score	Score Frequencies	
	Group A	Group B
2	1	0
3	1	0
4	2	0
5	1	4
6	3	2
7	0	0
8	0	2
9	1	1
10	0	2
Total	9	11

The median of the scores for group B is how much greater than the median of the scores for group A?

ID: 94237701 Answer

## Rationale

The correct answer is 1. When there are an odd number of values in a data set, the median of the data set is the middle number when the data values are ordered from least to greatest. The scores for group A, ordered from least to greatest, are 2, 3, 4, 4, 5, 6, 6, and 9. The median of the scores for group A is therefore 5. The scores for group B, ordered from least to greatest, are 5, 5, 5, 5, 6, 6, 8, 8, 9, 10, and 10. The median of the scores for group B is therefore 6. The median score for group B is  $6 - 5 = 1$  more than the median score for group A.

## Question Difficulty:

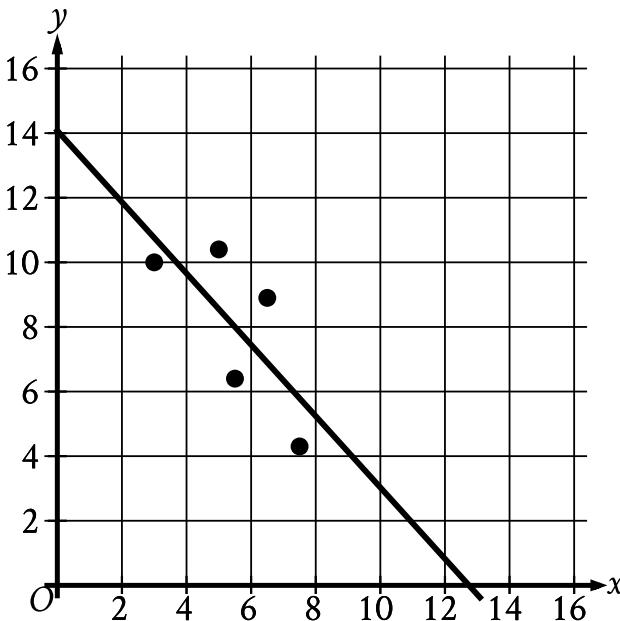
Hard

# Question ID 24a1e6a7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: 24a1e6a7

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit is also shown.



Which of the following is closest to the slope of this line of best fit?

- A. -3.3
- B. -1.1
- C. 1.1
- D. 3.3

ID: 24a1e6a7 Answer

Correct Answer:

B

Rationale

Choice B is correct. A line in the  $xy$ -plane that passes through points  $(x_1, y_1)$  and  $(x_2, y_2)$  has a slope of  $\frac{y_2 - y_1}{x_2 - x_1}$ . The line of best fit shown passes approximately through the points  $(0, 14)$  and  $(13, 0)$ . It follows that the slope of this line of best fit is approximately  $\frac{0 - 14}{13 - 0}$ , or  $-\frac{14}{13}$ . Of the given choices,  $-1.1$  is closest to  $-\frac{14}{13}$ .

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

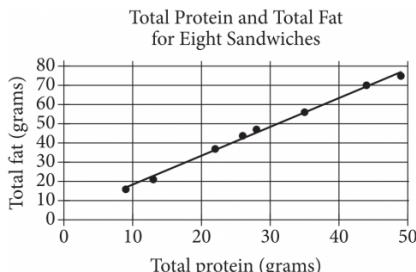
**Question Difficulty:**

Medium

# Question ID 9d95e7ad

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: 9d95e7ad



The scatterplot above shows the numbers of grams of both total protein and total fat for eight sandwiches on a restaurant menu. The line of best fit for the data is also shown. According to the line of best fit, which of the following is closest to the predicted increase in total fat, in grams, for every increase of 1 gram in total protein?

- A. 2.5
- B. 2.0
- C. 1.5
- D. 1.0

ID: 9d95e7ad Answer

Correct Answer:

C

## Rationale

Choice C is correct. The predicted increase in total fat, in grams, for every increase of 1 gram in total protein is represented by the slope of the line of best fit. Any two points on the line can be used to calculate the slope of the line as the change in total fat over the change in total protein. For instance, it can be estimated that the points  $(20, 34)$  and  $(30, 48)$  are on the line of best fit, and the

slope of the line that passes through them is  $\frac{48 - 34}{30 - 20} = \frac{14}{10}$ , or 1.4. Of the choices given, 1.5 is the closest to the slope of the line of best fit.

Choices A, B, and D are incorrect and may be the result of incorrectly finding ordered pairs that lie on the line of best fit or of incorrectly calculating the slope.

Question Difficulty:

Hard

# Question ID 11b06e35

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

**ID: 11b06e35**

The density of a certain solid substance is **813** kilograms per cubic meter. A sample of this substance is in the shape of a cube, where each edge has a length of **0.60** meters. To the nearest whole number, what is the mass, in kilograms, of this sample?

- A. **176**
- B. **488**
- C. **1,355**
- D. **3,764**

**ID: 11b06e35 Answer**

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that the sample is in the shape of a cube with edge lengths of **0.60** meters. Therefore, the volume of the sample is **0.60<sup>3</sup>**, or **0.216**, cubic meters. It's also given that the sample has a density of **813** kilograms per **1** cubic meter. Therefore, the mass of this sample is  $(0.216 \text{ cubic meters}) \left( \frac{813 \text{ kilograms}}{1 \text{ cubic meter}} \right)$ , or **175.608** kilograms. Rounding this mass to the nearest whole number gives **176** kilograms. Therefore, to the nearest whole number, the mass, in kilograms, of this sample is **176**.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

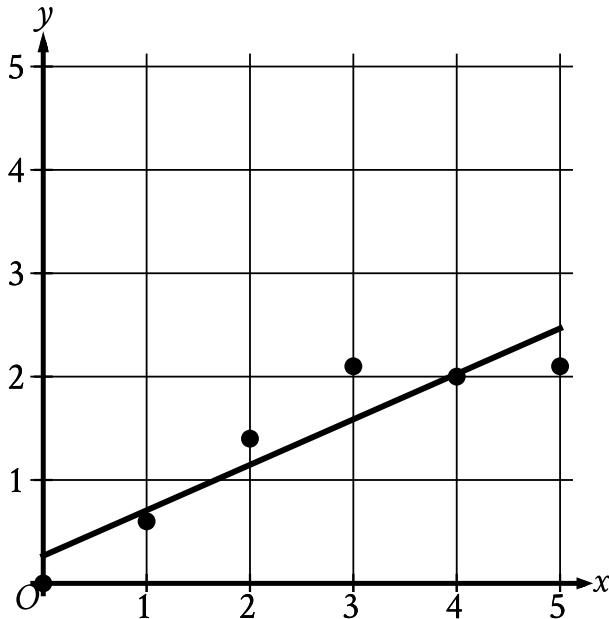
Hard

# Question ID 39aa146d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 39aa146d

The scatterplot shows the relationship between  $x$  and  $y$ . A line of best fit is also shown.



Which of the following is closest to the slope of the line of best fit shown?

- A. **-2.27**
- B. **-0.44**
- C. **0.44**
- D. **2.27**

ID: 39aa146d Answer

Correct Answer:

C

Rationale

Choice C is correct. It's given that the scatterplot shows the relationship between two variables,  $x$  and  $y$ , and a line of best fit is shown. For the line of best fit shown, for each increase in the value of  $x$  by 1, the corresponding value of  $y$  increases by a constant rate. It follows that the relationship between the variables  $x$  and  $y$  has a positive linear trend. A line in the  $xy$ -plane that passes through the points  $(a, b)$  and  $(c, d)$  has a slope of  $\frac{d-b}{c-a}$ . The line of best fit shown passes approximately through the points  $(0, 0.25)$  and  $(4, 2)$ . It follows that the slope of this line is approximately  $\frac{2-0.25}{4-0}$ , which is equivalent to **0.4375**. Therefore, of the given choices, **0.44** is closest to the slope of the line of best fit shown.

Choice A is incorrect. This is the slope of a line of best fit for a relationship between  $x$  and  $y$  that has a negative, rather than a positive, linear trend.

Choice B is incorrect. This is the slope of a line of best fit for a relationship between  $x$  and  $y$  that has a negative, rather than a positive, linear trend.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID 58171b5e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 58171b5e

Each year, the value of an investment increases by **0.49%** of its value the previous year. Which of the following functions best models how the value of the investment changes over time?

- A. Decreasing exponential
- B. Decreasing linear
- C. Increasing exponential
- D. Increasing linear

ID: 58171b5e Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. Because the value of the investment increases each year, the function that best models how the value of the investment changes over time is an increasing function. It's given that each year, the value of the investment increases by **0.49%** of its value the previous year. Since the value of the investment changes by a fixed percentage each year, the function that best models how the value of the investment changes over time is an exponential function. Therefore, the function that best models how the value of the investment changes over time is an increasing exponential function.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

**Question Difficulty:**

Medium

# Question ID d7a3179d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: d7a3179d

How many yards are equivalent to **1,116** inches? (**1 yard = 36 inches**)

ID: d7a3179d Answer

Correct Answer:

31

Rationale

The correct answer is **31**. It's given that **1** yard is equal to **36** inches. Therefore, **1,116** inches is equivalent to  $(1,116 \text{ inches}) \left( \frac{1 \text{ yard}}{36 \text{ inches}} \right)$ , or **31** yards.

Question Difficulty:

Easy

# Question ID d6456c7a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: d6456c7a

A certain park has an area of **11,863,808** square yards. What is the area, in square miles, of this park? (**1 mile = 1,760 yards**)

- A. **1.96**
- B. **3.83**
- C. **3,444.39**
- D. **6,740.8**

ID: d6456c7a Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. Since 1 mile is equal to 1,760 yards, 1 square mile is equal to  $1,760^2$ , or 3,097,600, square yards. It's given that the park has an area of **11,863,808** square yards. Therefore, the park has an area of

$(11,863,808 \text{ square yards}) \left( \frac{1 \text{ square mile}}{3,097,600 \text{ square yards}} \right)$ , or  $\frac{11,863,808}{3,097,600}$  square miles. Thus, the area, in square miles, of the park is **3.83**.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the square root of the area of the park in square yards, not the area of the park in square miles.

Choice D is incorrect and may result from converting **11,863,808** yards to miles, rather than converting **11,863,808** square yards to square miles.

**Question Difficulty:**

Hard

# Question ID 4347a032

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 4347a032

How many teaspoons are equivalent to **44** tablespoons? (**3 teaspoons = 1 tablespoon**)

- A. **47**
- B. **88**
- C. **132**
- D. **176**

ID: 4347a032 Answer

Correct Answer:

C

Rationale

Choice C is correct. It's given that **3** teaspoons is equivalent to **1** tablespoon. Therefore, **44** tablespoons is equivalent to  $(44 \text{ tablespoons}) \left( \frac{3 \text{ teaspoons}}{1 \text{ tablespoon}} \right)$ , or **132** teaspoons.

Choice A is incorrect. This is equivalent to approximately **15.66** tablespoons, not **44** tablespoons.

Choice B is incorrect. This is equivalent to approximately **29.33** tablespoons, not **44** tablespoons.

Choice D is incorrect. This is equivalent to approximately **58.66** tablespoons, not **44** tablespoons.

Question Difficulty:

Easy

# Question ID 51c9d65f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

## ID: 51c9d65f

For a certain rectangular region, the ratio of its length to its width is **35** to **10**. If the width of the rectangular region increases by **7** units, how must the length change to maintain this ratio?

- A. It must decrease by **24.5** units.
- B. It must increase by **24.5** units.
- C. It must decrease by **7** units.
- D. It must increase by **7** units.

## ID: 51c9d65f Answer

**Correct Answer:**

B

### Rationale

Choice B is correct. It's given that the ratio of the rectangular region's length to its width is **35** to **10**. This can be written as a proportion:  $\frac{\text{length}}{\text{width}} = \frac{35}{10}$ , or  $\frac{\ell}{w} = \frac{35}{10}$ . This proportion can be rewritten as  $10\ell = 35w$ , or  $\ell = 3.5w$ . If the width of the rectangular region increases by **7**, then the length will increase by some number  $x$  in order to maintain this ratio. The value of  $x$  can be found by replacing  $\ell$  with  $\ell + x$  and  $w$  with  $w + 7$  in the equation, which gives  $\ell + x = 3.5(w + 7)$ . This equation can be rewritten using the distributive property as  $\ell + x = 3.5w + 24.5$ . Since  $\ell = 3.5w$ , the right-hand side of this equation can be rewritten by substituting  $\ell$  for  $3.5w$ , which gives  $\ell + x = \ell + 24.5$ , or  $x = 24.5$ . Therefore, if the width of the rectangular region increases by **7** units, the length must increase by **24.5** units in order to maintain the given ratio.

Choice A is incorrect. If the width of the rectangular region increases, the length must also increase, not decrease.

Choice C is incorrect. If the width of the rectangular region increases, the length must also increase, not decrease.

Choice D is incorrect. Since the ratio of the length to the width of the rectangular region is **35** to **10**, if the width of the rectangular region increases by **7** units, the length would have to increase by a proportional amount, which would have to be greater than **7** units.

### Question Difficulty:

Medium

# Question ID 763e6769

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 763e6769

The ratio  $x$  to  $y$  is equivalent to the ratio 12 to  $t$ . When  $x = 156$ , what is the value of  $y$  in terms of  $t$ ?

- A.  $13t$
- B.  $12t$
- C.  $144t$
- D.  $168t$

ID: 763e6769 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the ratio  $x$  to  $y$  is equivalent to the ratio 12 to  $t$ . This can be represented by  $\frac{x}{y} = \frac{12}{t}$ . Substituting 156 for  $x$  in this equation yields  $\frac{156}{y} = \frac{12}{t}$ . This can be rewritten as  $12y = 156t$ . Dividing both sides of this equation by 12 yields  $y = 13t$ . Therefore, when  $x = 156$ , the value of  $y$  in terms of  $t$  is  $13t$ .

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Easy

# Question ID 25faa756

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 25faa756

The number  $a$  is 60% greater than the positive number  $b$ . The number  $c$  is 45% less than  $a$ . The number  $c$  is how many times  $b$ ?

ID: 25faa756 Answer

Correct Answer:

.88, 22/25

Rationale

The correct answer is .88. It's given that the number  $a$  is 60% greater than the positive number  $b$ . Therefore,  $a = (1 + \frac{60}{100})b$ , which is equivalent to  $a = (1 + 0.60)b$ , or  $a = 1.60b$ . It's also given that the number  $c$  is 45% less than  $a$ . Therefore,  $c = (1 - \frac{45}{100})a$ , which is equivalent to  $c = (1 - 0.45)a$ , or  $c = 0.55a$ . Since  $a = 1.60b$ , substituting  $1.60b$  for  $a$  in the equation  $c = 0.55a$  yields  $c = 0.55(1.60b)$ , or  $c = 0.88b$ . Thus, the number  $c$  is 0.88 times the number  $b$ . Note that .88 and 22/25 are examples of ways to enter a correct answer.

Question Difficulty:

Hard

# Question ID ad911622

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: ad911622

The value of a collectible comic book increased by **167%** from the end of **2011** to the end of **2012** and then decreased by **16%** from the end of **2012** to the end of **2013**. What was the net percentage increase in the value of the collectible comic book from the end of **2011** to the end of **2013**?

- A. **124.28%**
- B. **140.28%**
- C. **151.00%**
- D. **209.72%**

ID: ad911622 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that the value of the comic book increased by **167%** from the end of **2011** to the end of **2012**. Therefore, if the value of the comic book at the end of **2011** was  $x$  dollars, then the value, in dollars, of the comic book at the end of **2012** was  $x + (\frac{167}{100})x$ , which can be rewritten as  $1x + 1.67x$ , or  $2.67x$ . It's also given that the value of the comic book decreased by **16%** from the end of **2012** to the end of **2013**. Therefore, the value, in dollars, of the comic book at the end of **2013** was  $2.67x - 2.67x(\frac{16}{100})$ , which can be rewritten as  $2.67x - (2.67x)(0.16)$ , or  $2.2428x$ . Thus, if the value of the comic book at the end of **2011** was  $x$  dollars, and the value of the comic book at the end of **2013** was  $2.2428x$  dollars, then from the end of **2011** to the end of **2013**, the value of the comic book increased by  $2.2428x - 1x$ , or  $1.2428x$ , dollars. Therefore, the increase in the value of the comic book from the end of **2011** to the end of **2013** is equal to **1.2428** times the value of the comic book at the end of **2011**. It follows that from the end of **2011** to the end of **2013**, the net percentage increase in the value of the comic book was  $(1.2428)(100)\%$ , or **124.28%**.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the difference between the net percentage increase in the value of the comic book from the end of **2011** to the end of **2012** and the net percentage decrease in the value of the comic book from the end of **2012** to the end of **2013**, not the net percentage increase in the value of the comic book from the end of **2011** to the end of **2013**.

Choice D is incorrect. This is the net percentage increase in the value of the comic book from the end of **2011** to the end of **2013**, if the value of the comic book increased by **167%** from the end of **2011** to the end of **2012** and then increased, not decreased, by **16%** from the end of **2012** to the end of **2013**.

**Question Difficulty:**

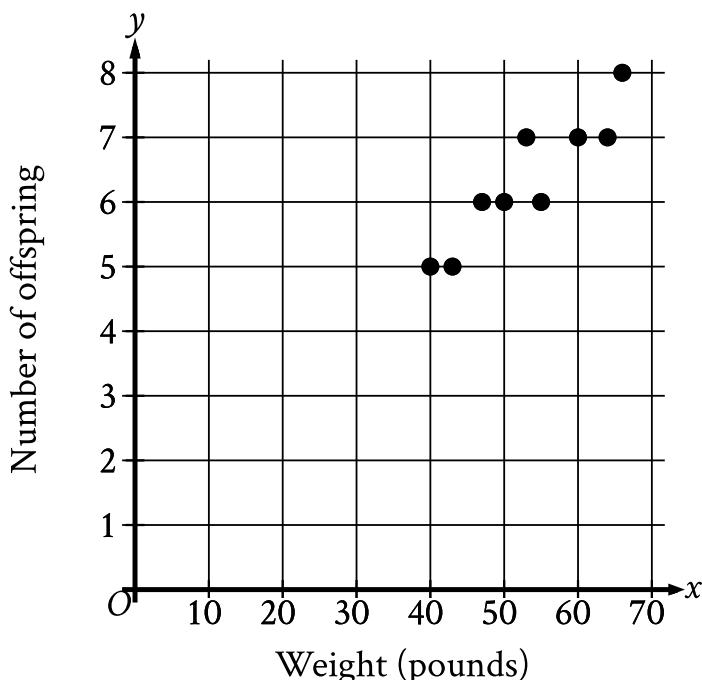
Hard

# Question ID 8d63b6f1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 8d63b6f1

The scatterplot shows the relationship between the weight, in pounds, of each of 9 female gray wolves on April 30 and the number of offspring each gray wolf produced.



How many offspring did the **50**-pound gray wolf produce?

- A. 8
- B. 7
- C. 6
- D. 5

ID: 8d63b6f1 Answer

Correct Answer:

C

Rationale

Choice C is correct. For each point on the scatterplot shown, the  $x$ -value represents the weight, in pounds, of a female gray wolf and the  $y$ -value represents the number of offspring that wolf produced. The point on the graph with an  $x$ -value of **50** has a  $y$ -value of **6**. Therefore, the **50**-pound gray wolf produced **6** offspring.

Choice A is incorrect. One of the wolves produced **8** offspring, but its weight was greater than **50** pounds.

Choice B is incorrect. Three of the wolves produced **7** offspring each, but their weights were each greater than **50** pounds.

Choice D is incorrect. Two of the wolves produced **5** offspring each, but their weights were each less than **50** pounds.

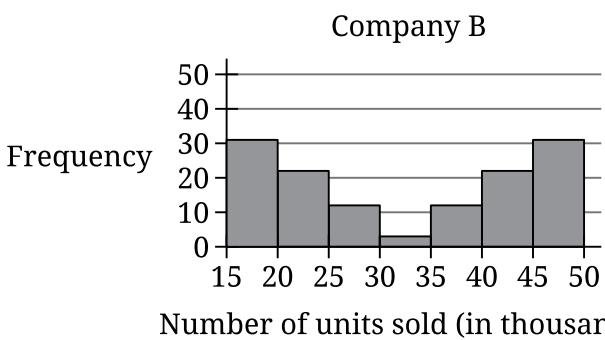
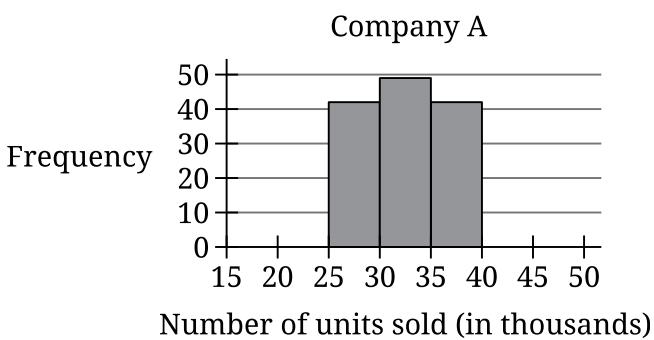
**Question Difficulty:**

Easy

# Question ID 25fc031a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a7f; height: 10px;"></div> <div style="width: 25%; background-color: #005a7f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 25fc031a



The histograms summarize the distributions of number of units sold, in thousands, for company A and company B. Which statement best compares the standard deviations of number of units sold for these companies?

- A. The standard deviation of number of units sold for company A is less than the standard deviation of number of units sold for company B.
- B. The standard deviation of number of units sold for company A is greater than the standard deviation of number of units sold for company B.
- C. The standard deviation of number of units sold for company A is equal to the standard deviation of number of units sold for company B.
- D. There is not enough information to compare the standard deviations.

ID: 25fc031a Answer

Correct Answer:

A

Rationale

Choice A is correct. Standard deviation measures the spread of a given data set from its mean. In a data set with a smaller standard deviation, there are more values close to the mean. In a data set with a greater standard deviation, there are more values farther from the mean. The two histograms shown have the same scale on the horizontal axis. Therefore, their standard deviations can be compared by visually comparing the spreads of their histograms. The distribution summarized by each histogram is

symmetric. Therefore, the mean of the data set for each histogram is a value in the middle bar of that histogram. The middle bar of each histogram has a value of at least **30** thousand units sold but less than **35** thousand units sold. Therefore, the mean of the data set for each histogram is at least **30** thousand and less than **35** thousand. The histogram for company A shows all the values in that data set are close to the mean. For company B, the histogram shows there are fewer values close to the mean and more values farther from the mean. Therefore, the standard deviation of number of units sold for company A is less than the standard deviation of number of units sold for company B.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Medium

## Question ID d72a2b4d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 20%; background-color: #0056b3; height: 10px;"></div> <div style="width: 60%; background-color: #e0e0e0; height: 10px;"></div>

ID: d72a2b4d

In March, the price of a collectible card was **\$15.50**. In April, the price of the collectible card was **\$17.36**. The price of the collectible card in April was  $p\%$  of the price of the collectible card in March. What is the value of  $p$ ?

- A. 12
- B. 88
- C. 112
- D. 188

ID: d72a2b4d Answer

Correct Answer:

C

Rationale

Choice C is correct. It's given that the price of the collectible card was **\$15.50** in March and **\$17.36** in April. It's also given that the price of the collectible card in April was  $p\%$  of the price in March. It follows that **\$17.36** is  $p\%$  of **\$15.50**. Therefore, the value of  $p$  can be calculated by solving the equation  $17.36 = \left(\frac{p}{100}\right)(15.50)$ , or  $17.36 = \frac{15.50p}{100}$ . Multiplying each side of this equation by 100 yields  $1,736 = 15.50p$ . Dividing each side of this equation by 15.50 yields  $112 = p$ . Therefore, the value of  $p$  is **112**.

Choice A is incorrect. **12%** is the percent increase in the price of the collectible card from March to April.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

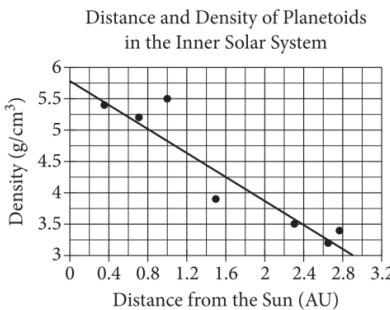
Question Difficulty:

Medium

# Question ID cf0ae57a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: cf0ae57a



The scatterplot above shows the densities of 7 planetoids, in grams per cubic centimeter, with respect to their average distances from the Sun in astronomical units (AU). The line of best fit is also shown. An astronomer has discovered a new planetoid about 1.2 AU from the Sun. According to the line of best fit, which of the following best approximates the density of the planetoid, in grams per cubic centimeter?

- A. 3.6
- B. 4.1
- C. 4.6
- D. 5.5

ID: cf0ae57a Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. According to the line of best fit, a planetoid with a distance from the Sun of 1.2 AU has a predicted density between  $4.5 \text{ g/cm}^3$  and  $4.75 \text{ g/cm}^3$ . The only choice in this range is 4.6.

Choices A, B, and D are incorrect and may result from misreading the information in the scatterplot.

**Question Difficulty:**

Easy

# Question ID 4e375d1f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 4e375d1f

How many meters are equivalent to **2,300** centimeters? (**100 centimeters = 1 meter**)

- A. **0.043**
- B. **23**
- C. **2,400**
- D. **230,000**

ID: 4e375d1f Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that **100** centimeters is equal to **1** meter. Therefore, **2,300** centimeters is equivalent to  $(2,300 \text{ centimeters}) \left( \frac{1 \text{ meter}}{100 \text{ centimeters}} \right)$ , or **23** meters.

Choice A is incorrect. **0.043** meters is equivalent to **4.3**, not **2,300**, centimeters.

Choice C is incorrect. **2,400** meters is equivalent to **240,000**, not **2,300**, centimeters.

Choice D is incorrect. **230,000** meters is equivalent to **23,000,000**, not **2,300**, centimeters.

Question Difficulty:

Easy

# Question ID 771ee744

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 771ee744

There are **320** marbles in a container. Of these marbles, **10%** are red. How many marbles in the container are red?

- A. **32**
- B. **288**
- C. **320**
- D. **352**

ID: 771ee744 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that **10%** of the **320** marbles in a container are red. Therefore, the number of red marbles can be calculated by multiplying the number of marbles in the container by  $\frac{10}{100}$ , which gives  $320(\frac{10}{100})$ , or **32**.

Choice B is incorrect. This is the number of marbles in the container that aren't red.

Choice C is incorrect. This is the total number of marbles in the container.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID e9ed719f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: e9ed719f

The table summarizes the distribution of color and shape for **100** tiles of equal area.

	Red	Blue	Yellow	Total
Square	10	20	25	55
Pentagon	20	10	15	45
Total	30	30	40	100

If one of these tiles is selected at random, what is the probability of selecting a red tile? (Express your answer as a decimal or fraction, not as a percent.)

ID: e9ed719f Answer

**Correct Answer:**

0.3, 3/10

**Rationale**

The correct answer is  $\frac{3}{10}$ . It's given that there are a total of **100** tiles of equal area, which is the total number of possible outcomes. According to the table, there are a total of **30** red tiles. The probability of an event occurring is the ratio of the number of favorable outcomes to the total number of possible outcomes. By definition, the probability of selecting a red tile is given by  $\frac{30}{100}$ , or  $\frac{3}{10}$ . Note that 3/10 and .3 are examples of ways to enter a correct answer.

**Question Difficulty:**

Medium

# Question ID 85939da5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 85939da5

Texting behavior	Talks on cell phone daily	Does not talk on cell phone daily	Total
Light	110	146	256
Medium	139	164	303
Heavy	166	74	240
<b>Total</b>	<b>415</b>	<b>384</b>	<b>799</b>

In a study of cell phone use, 799 randomly selected US teens were asked how often they talked on a cell phone and about their texting behavior. The data are summarized in the table above. Based on the data from the study, an estimate of the percent of US teens who are heavy texters is 30% and the associated margin of error is 3%. Which of the following is a correct statement based on the given margin of error?

- A. Approximately 3% of the teens in the study who are classified as heavy texters are not really heavy texters.
- B. It is not possible that the percent of all US teens who are heavy texters is less than 27%.
- C. The percent of all US teens who are heavy texters is 33%.
- D. It is doubtful that the percent of all US teens who are heavy texters is 35%.

ID: 85939da5 Answer

Correct Answer:

D

Rationale

Choice D is correct. The given margin of error of 3% indicates that the actual percent of all US teens who are heavy texters is likely within 3% of the estimate of 30%, or between 27% and 33%. Therefore, it is unlikely, or doubtful, that the percent of all US teens who are heavy texters would be 35%.

Choice A is incorrect. The margin of error doesn't provide any information about the accuracy of reporting in the study. Choice B is incorrect. Based on the estimate and given margin of error, it is unlikely that the percent of all US teens who are heavy texters would be less than 27%, but it is possible. Choice C is incorrect. While the percent of all US teens who are heavy texters is likely between 27% and 33%, any value within this interval is equally likely. We can't be certain that the value is exactly 33%.

Question Difficulty:

Hard

# Question ID 3c8fdc40

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 3c8fdc40

A printer produces posters at a constant rate of **42** posters per minute. At what rate, in posters per hour, does the printer produce the posters?

ID: 3c8fdc40 Answer

**Correct Answer:**

2520

**Rationale**

The correct answer is **2,520**. There are **60** minutes in one hour. At a rate of **42** posters per minute, the number of posters produced in one hour can be determined by  $\left(\frac{42 \text{ posters}}{1 \text{ minute}}\right) \left(\frac{60 \text{ minutes}}{1 \text{ hour}}\right)$ , which is **2,520** posters per hour.

**Question Difficulty:**

Easy

# Question ID eccbf957

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: eccbf957

Each face of a fair 14-sided die is labeled with a number from 1 through 14, with a different number appearing on each face. If the die is rolled one time, what is the probability of rolling a 2?

- A.  $\frac{1}{14}$
- B.  $\frac{2}{14}$
- C.  $\frac{12}{14}$
- D.  $\frac{13}{14}$

ID: eccbf957 Answer

Correct Answer:

A

Rationale

Choice A is correct. The total number of possible outcomes for rolling a fair 14-sided die is 14. The number of possible outcomes for rolling a 2 is 1. The probability of rolling a 2 is the number of possible outcomes for rolling a 2 divided by the total number of possible outcomes, or  $\frac{1}{14}$ .

Choice B is incorrect. This is the probability of rolling a number no greater than 2.

Choice C is incorrect. This is the probability of rolling a number greater than 2.

Choice D is incorrect. This is the probability of rolling a number other than 2.

Question Difficulty:

Easy

# Question ID affb2315

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: affb2315

There are **55** students in Spanish club. A sample of the Spanish club students was selected at random and asked whether they intend to enroll in a new study program. Of those surveyed, **20%** responded that they intend to enroll in the study program. Based on this survey, which of the following is the best estimate of the total number of Spanish club students who intend to enroll in the study program?

- A. **11**
- B. **20**
- C. **44**
- D. **55**

ID: affb2315 Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that **20%** of the students surveyed responded that they intend to enroll in the study program. Therefore, the proportion of students in Spanish club who intend to enroll in the study program, based on the survey, is **0.20**. Since there are **55** total students in Spanish club, the best estimate for the total number of these students who intend to enroll in the study program is **55(0.20)**, or **11**.

Choice B is incorrect. This is the best estimate for the percentage, rather than the total number, of students in Spanish club who intend to enroll in the study program.

Choice C is incorrect. This is the best estimate for the total number of Spanish club students who do not intend to enroll in the study program.

Choice D is incorrect. This is the total number of students in Spanish club.

**Question Difficulty:**

Easy

# Question ID 954943a4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 954943a4

Jennifer bought a box of Crunchy Grain cereal. The nutrition facts on the box state that

a serving size of the cereal is  $\frac{3}{4}$  cup and provides 210 calories, 50 of which are calories from fat. In addition, each serving of the cereal provides 180 milligrams of potassium, which is 5% of the daily allowance for adults. If  $p$  percent of an adult's daily allowance of potassium is provided by  $x$  servings of Crunchy Grain cereal per day, which of the following expresses  $p$  in terms of  $x$ ?

- A.  $p = 0.5x$
- B.  $p = 5x$
- C.  $p = (0.05)^x$
- D.  $p = (1.05)^x$

ID: 954943a4 Answer

Correct Answer:

B

Rationale

Choice B is correct. It's given that each serving of Crunchy Grain cereal provides 5% of an adult's daily allowance of potassium, so  $x$  servings would provide  $x$  times 5%. The percentage of an adult's daily allowance of potassium,  $p$ , is 5 times the number of servings,  $x$ . Therefore, the percentage of an adult's daily allowance of potassium can be expressed as  $p = 5x$ .

Choices A, C, and D are incorrect and may result from incorrectly converting 5% to its decimal equivalent, which isn't necessary since  $p$  is expressed as a percentage. Additionally, choices C and D are incorrect because the context should be represented by a linear relationship, not by an exponential relationship.

Question Difficulty:

Hard

# Question ID 1baffbcf

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 1baffbcf

The expression  $0.35x$  represents the result of decreasing a positive quantity  $x$  by what percent?

- A. 3.5%
- B. 35%
- C. 6.5%
- D. 65%

ID: 1baffbcf Answer

Correct Answer:

D

Rationale

Choice D is correct. Let  $n\%$  represent the percent by which the positive quantity  $x$  is decreased to result in  $0.35x$ . The value of  $n$  can be found by solving the equation  $x - \left(\frac{n}{100}\right)x = 0.35x$ . Since  $x$  is a common factor of each of the terms on the left-hand side of this equation, the equation can be rewritten as  $x\left(1 - \frac{n}{100}\right) = 0.35x$ . Dividing each side of this equation by  $x$  yields  $1 - \frac{n}{100} = 0.35$ . Multiplying each side of this equation by 100 yields  $100 - n = 35$ . Subtracting 100 from each side of this equation yields  $-n = -65$ . Dividing each side of this equation by  $-1$  yields  $n = 65$ . Therefore, the expression  $0.35x$  represents the result of decreasing the positive quantity  $x$  by 65%.

Choice A is incorrect. Decreasing the quantity  $x$  by 3.5% yields  $x - 0.035x$ , or  $0.965x$ , not  $0.35x$ .

Choice B is incorrect. Decreasing the quantity  $x$  by 35% yields  $x - 0.35x$ , or  $0.65x$ , not  $0.35x$ .

Choice C is incorrect. Decreasing the quantity  $x$  by 6.5% yields  $x - 0.065x$ , or  $0.935x$ , not  $0.35x$ .

Question Difficulty:

Hard

# Question ID a5b069b4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: a5b069b4

4, 10, 18, 4, 4, 5, 6, 5

What is the median of the data set shown?

- A. 4
- B. 5
- C. 7
- D. 14

ID: a5b069b4 Answer

Correct Answer:

B

Rationale

Choice B is correct. If a data set contains an even number of data values, when the data values are listed in ascending or descending order, the median is between the two middle values. The given data set contains 8 values. When listed in ascending order, the data set is 4, 4, 4, 5, 5, 6, 10, 18 and the two middle values are 5 and 5. Since the two middle values are the same, the median must be 5.

Choice A is incorrect. This value is between the two middle values in the list shown, not the two middle values when the data values are listed in ascending or descending order.

Choice C is incorrect. This is the mean, not the median, of the data set.

Choice D is incorrect. This is the range, not the median, of the data set.

Question Difficulty:

Medium

# Question ID b1b5300b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: b1b5300b

Prices of 14 Different Cars

Type of car	Priced at no more than \$25,000	Priced greater than \$25,000	Total
Nonhybrid	5	3	8
Hybrid	2	4	6
Total	7	7	14

The table above shows information about 14 cars listed for sale on an auto dealership's website. If one of the cars listed for sale is selected at random, what is the probability that the car selected will be a hybrid car priced at no more than \$25,000?

A.  $\frac{1}{7}$

B.  $\frac{2}{7}$

C.  $\frac{1}{3}$

D.  $\frac{4}{7}$

ID: b1b5300b Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that there are 2 hybrid cars priced at no more than \$25,000. It's also given that there are 14 cars total for sale. Therefore, the probability of selecting a hybrid priced at no more than \$25,000 when one car is chosen at random is

$$\frac{2}{14} = \frac{1}{7}.$$

Choice B is incorrect. This is the probability of selecting a hybrid car priced greater than \$25,000 when choosing one car at random. Choice C is incorrect. This is the probability, when choosing randomly from only the hybrid cars, of selecting one priced at no more than \$25,000. Choice D is incorrect. This is the probability of selecting a hybrid car when selecting at random from only the cars priced greater than \$25,000.

**Question Difficulty:**

Medium

# Question ID d28c29e1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: d28c29e1

The International Space Station orbits Earth at an average speed of 4.76 miles per second. What is the space station's average speed in miles per hour?

- A. 285.6
- B. 571.2
- C. 856.8
- D. 17,136.0

ID: d28c29e1 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. Since 1 minute = 60 seconds and 1 hour = 60 minutes, it follows that 1 hour = (60)(60), or 3,600 seconds.

Using this conversion factor, the space station's average speed of 4.76 miles per second is equal to an average speed of

$$\frac{4.76 \text{ miles}}{\text{second}} \times \frac{3,600 \text{ seconds}}{\text{hour}} = \frac{17,136 \text{ miles}}{\text{hour}}, \text{ or } 17,136 \text{ miles per hour.}$$

Choice A is incorrect. This is the space station's average speed in miles per minute. Choice B is incorrect. This is double the space station's average speed in miles per minute, or the number of miles the space station travels on average in 2 minutes. Choice C is incorrect. This is triple the space station's average speed in miles per minute, or the number of miles the space station travels on average in 3 minutes.

**Question Difficulty:**

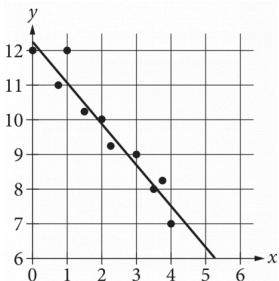
Medium

# Question ID 1adb39f0

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 1adb39f0

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit for the data is also shown. Which of the following is closest to the difference between the  $y$ -coordinate of the data point with  $x = 1$  and the  $y$ -value predicted by the line of best fit at  $x = 1$ ?



- A. 1
- B. 2
- C. 5
- D. 12

ID: 1adb39f0 Answer

Correct Answer:

A

Rationale

Choice A is correct. The data point with  $x = 1$  has a  $y$ -coordinate of 12. The  $y$ -value predicted by the line of best fit at  $x = 1$  is approximately 11. The difference between the  $y$ -coordinate of the data point and the  $y$ -value predicted by the line of best fit at  $x = 1$  is  $12 - 11$ , or 1.

Choices B and C are incorrect and may result from incorrectly reading the scatterplot. Choice D is incorrect. This is the  $y$ -coordinate of the data point at  $x = 1$ .

Question Difficulty:

Medium

# Question ID 3f5398a6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 3f5398a6

For a person  $m$  miles from a flash of lightning, the length of the time interval from the moment the person sees the lightning to the moment the person hears the thunder is  $k$  seconds. The ratio of  $m$  to  $k$  can be estimated to be 1 to 5. According to this estimate, the person is how many miles from a flash of lightning if the time interval is 25 seconds?

- A. 10
- B. 9
- C. 6
- D. 5

ID: 3f5398a6 Answer

## Rationale

Choice D is correct. It's given that the ratio of  $m$  to  $k$  is estimated to be 1 to 5. Therefore, when  $k = 25$ , the relationship between

these ratios can be expressed by the proportion  $\frac{m}{25} = \frac{1}{5}$ . Multiplying both sides of this equation by 25 yields  $m = 5$ .

Choices A, B, and C are incorrect and may result from calculation errors.

## Question Difficulty:

Easy

# Question ID b4912cc5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: b4912cc5

The population density of Iceland, in people per square kilometer of land area, increased from 2.5 in 1990 to 3.3 in 2014. During this time period, the land area of Iceland was 100,250 square kilometers. By how many people did Iceland's population increase from 1990 to 2014?

- A. 330,825
- B. 132,330
- C. 125,312
- D. 80,200

ID: b4912cc5 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The increase in Iceland's population can be found by multiplying the increase in population density, in people per square kilometer, by the area, in square kilometers. It's given that the population density of Iceland was 2.5 people per square kilometer in 1990 and 3.3 people per square kilometer in 2014. The increase in population density can be found by subtracting 2.5 from 3.3, which yields 0.8. It's given that the land area of Iceland was 100,250 square kilometers. Thus, the increase in population is  $0.8(100,250)$ , or 80,200.

Alternate approach: It's given that the population density of Iceland, in people per square kilometer of land area, in 1990 was 2.5. Since the land area of Iceland was 100,250 square kilometers, it follows that the population of Iceland in 1990 was  $2.5(100,250)$ , or 250,625. Similarly, the population of Iceland in 2014 was  $3.3(100,250)$ , or 330,825. The population increase is the difference in the population from 1990 to 2014, or  $330,825 - 250,625$ , which yields 80,200. Therefore, Iceland's population increased by 80,200 from 1990 to 2014.

Choice A is incorrect. This is the population of Iceland in 2014. Choice B is incorrect and may result from dividing 3.3 by 2.5, instead of subtracting 2.5 from 3.3. Choice C is incorrect and may result from dividing the population of Iceland in 1990 by 2.

**Question Difficulty:**

Medium

# Question ID f890dc20

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: f890dc20

2, 2, 2, 3, 4, 4, 11

What is the median of the seven data values shown?

- A. 2
- B. 3
- C. 4
- D. 9

ID: f890dc20 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. When a data set has an odd number of values, the median can be found by ordering the values from least to greatest and determining the value in the middle. Since the values are already presented in order from least to greatest and there are 7 values, the median is the fourth value in the list. Therefore, the median is 3.

Choice A is incorrect. This is the mode. Choice C is incorrect. This is the mean. Choice D is incorrect. This is the range.

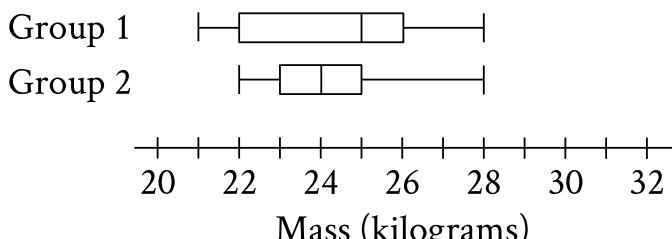
**Question Difficulty:**

Easy

# Question ID d3b9c8d8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div> <div style="width: 100px; height: 10px; background-color: #005a9f;"></div>

ID: d3b9c8d8



The box plots summarize the masses, in kilograms, of two groups of gazelles. Based on the box plots, which of the following statements must be true?

- A. The mean mass of group 1 is greater than the mean mass of group 2.
- B. The mean mass of group 1 is less than the mean mass of group 2.
- C. The median mass of group 1 is greater than the median mass of group 2.
- D. The median mass of group 1 is less than the median mass of group 2.

ID: d3b9c8d8 Answer

Correct Answer:

C

Rationale

Choice C is correct. The median of a data set represented in a box plot is represented by the vertical line within the box. It follows that the median mass of the gazelles in group 1 is 25 kilograms, and the median mass of the gazelles in group 2 is 24 kilograms. Since 25 kilograms is greater than 24 kilograms, the median mass of group 1 is greater than the median mass of group 2.

Choice A is incorrect. The mean mass of each of the two groups cannot be determined from the box plots.

Choice B is incorrect. The mean mass of each of the two groups cannot be determined from the box plots.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

# Question ID 65c49824

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 65c49824

A school district is forming a committee to discuss plans for the construction of a new high school. Of those invited to join the committee, 15% are parents of students, 45% are teachers from the current high school, 25% are school and district administrators, and the remaining 6 individuals are students. How many more teachers were invited to join the committee than school and district administrators?

ID: 65c49824 Answer

## Rationale

The correct answer is 8. The 6 students represent  $(100 - 15 - 45 - 25)\% = 15\%$  of those invited to join the committee. If  $x$  people were invited to join the committee, then  $0.15x = 6$ . Thus, there were  $\frac{6}{0.15} = 40$  people invited to join the committee. It follows that there were  $0.45(40) = 18$  teachers and  $0.25(40) = 10$  school and district administrators invited to join the committee. Therefore, there were 8 more teachers than school and district administrators invited to join the committee.

## Question Difficulty:

Hard

# Question ID 825b7490

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: 825b7490

The ratio **140** to  **$m$**  is equivalent to the ratio **4** to **28**. What is the value of  **$m$** ?

ID: 825b7490 Answer

Correct Answer:

980

Rationale

The correct answer is **980**. It's given that the ratio **140** to  **$m$**  is equivalent to the ratio **4** to **28**. Therefore, the value of  **$m$**  can be found by solving the equation  $\frac{140}{m} = \frac{4}{28}$ . Multiplying each side of this equation by  **$m$**  yields  $140 = \frac{4m}{28}$ . Multiplying each side of this equation by **28** yields  $3,920 = 4m$ . Dividing each side of this equation by **4** yields  $980 = m$ . Therefore, the value of  **$m$**  is **980**.

Question Difficulty:

Medium

# Question ID 86636d8f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a99; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div>

ID: 86636d8f

A customer spent \$27 to purchase oranges at \$3 per pound. How many pounds of oranges did the customer purchase?

ID: 86636d8f Answer

Correct Answer:

9

Rationale

The correct answer is 9. It's given that the customer spent \$27 to purchase oranges at \$3 per pound. Therefore, the number of pounds of oranges the customer purchased is  $\$27 \left( \frac{1 \text{ pound}}{\$3} \right)$ , or 9 pounds.

Question Difficulty:

Easy

# Question ID fe4c1c9e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: fe4c1c9e

A mechanical device in a workshop produces items at a constant rate of **60** items per hour. At this rate, how many items will the mechanical device produce in **3** hours?

ID: fe4c1c9e Answer

Correct Answer:

180

Rationale

The correct answer is **180**. It's given that a mechanical device produces items at a constant rate of **60** items per hour. This rate can be written as  $\frac{60 \text{ items}}{1 \text{ hour}}$ . Let  $x$  represent the number of items the mechanical device will produce in **3** hours at the given rate. It follows that  $\frac{60 \text{ items}}{1 \text{ hour}} = \frac{x \text{ items}}{3 \text{ hours}}$ , which can be written as  $\frac{60}{1} = \frac{x}{3}$ , or  $60 = \frac{x}{3}$ . Multiplying each side of this equation by **3** yields  $180 = x$ . Therefore, at the given rate, the mechanical device will produce **180** items in **3** hours.

Alternate approach: It's given that a mechanical device produces items at a constant rate of **60** items per hour. At this rate, the mechanical device will produce  $(\frac{60 \text{ items}}{1 \text{ hour}})(3 \text{ hours})$ , or **180** items in **3** hours.

Question Difficulty:

Easy

# Question ID 1ea09200

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 1ea09200

A sample of 40 fourth-grade students was selected at random from a certain school. The 40 students completed a survey about the morning announcements, and 32 thought the announcements were helpful. Which of the following is the largest population to which the results of the survey can be applied?

- A. The 40 students who were surveyed
- B. All fourth-grade students at the school
- C. All students at the school
- D. All fourth-grade students in the county in which the school is located

ID: 1ea09200 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. Selecting a sample of a reasonable size at random to use for a survey allows the results from that survey to be applied to the population from which the sample was selected, but not beyond this population. In this case, the population from which the sample was selected is all fourth-grade students at a certain school. Therefore, the results of the survey can be applied to all fourth-grade students at the school.

Choice A is incorrect. The results of the survey can be applied to the 40 students who were surveyed. However, this isn't the largest group to which the results of the survey can be applied. Choices C and D are incorrect. Since the sample was selected at random from among the fourth-grade students at a certain school, the results of the survey can't be applied to other students at the school or to other fourth-grade students who weren't represented in the survey results. Students in other grades in the school or other fourth-grade students in the country may feel differently about announcements than the fourth-grade students at the school.

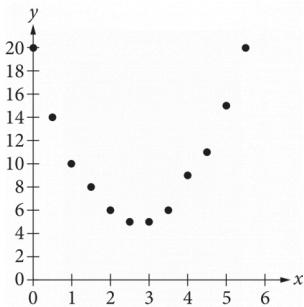
**Question Difficulty:**

Hard

# Question ID 82aaa0a1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 82aaa0a1



Of the following, which is the best model for the data in the scatterplot?

- A.  $y = 2x^2 - 11x - 20$
- B.  $y = 2x^2 - 11x + 20$
- C.  $y = 2x^2 - 5x - 3$
- D.  $y = 2x^2 - 5x + 3$

ID: 82aaa0a1 Answer

Correct Answer:

B

## Rationale

Choice B is correct. The graphical model that most closely fits the data in the scatterplot is a model in which the number of data points above and below the model are approximately balanced. Fitting a graphical model to the data shown results in an upward-facing parabola with a y-intercept near  $(0, 20)$  and a vertex with an approximate x-value of 2.5. Of the given choices, only choice B gives an equation of an upward-facing parabola with a y-intercept at  $(0, 20)$ . Furthermore, substituting 2.5 for x into the equation in choice B yields  $y = 5$ . This is approximately the y-value of the vertex of the model.

Choices A, C, and D are incorrect. These equations don't give a graphical model that best fits the data. At  $x = 0$ , they have y-values of  $-20$ ,  $-3$ , and  $3$ , respectively. At  $x = 2.5$ , they have y-values of  $-35$ ,  $-3$ , and  $3$ , respectively.

## Question Difficulty:

Easy

# Question ID 37930b2a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	<div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 25%; background-color: #005a9f; height: 10px;"></div> <div style="width: 50%; background-color: #e0e0e0; height: 10px;"></div>

ID: 37930b2a

Residents of a town were surveyed to determine whether they are satisfied with the concession stand at the local park. A random sample of 200 residents was selected. All 200 responded, and 87% said they are satisfied. Based on this information, which of the following statements must be true?

- I. Of all the town residents, 87% would say they are satisfied with the concession stand at the local park.
  - II. If another random sample of 200 residents were surveyed, 87% would say they are satisfied.
- A. Neither
- B. I only
- C. II only
- D. I and II

ID: 37930b2a Answer

**Correct Answer:**

A

**Rationale**

Choice A is correct. The purpose of surveying a random sample of residents is to approximate the percent of the town residents that are satisfied with the concession stand. The sample doesn't necessarily get the same result as surveying every resident of the town, nor would another sample necessarily have identical results. Therefore, although it's possible that either statement I or statement II could prove true by surveying every resident of the town, these statements cannot be proven true solely based on the results of the sample.

Choice B is incorrect because surveying a sample of the town residents may not have the same result as surveying all the town residents. Choices C and D are incorrect because surveying a different sample of residents could yield different results.

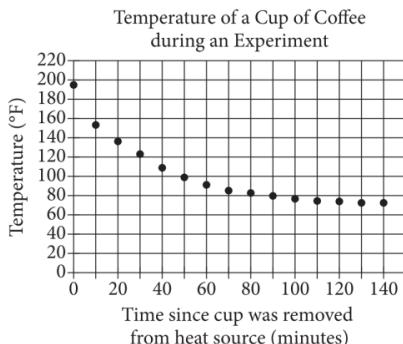
**Question Difficulty:**

Medium

# Question ID 83272c51

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 83272c51



In an experiment, a heated cup of coffee is removed from a heat source, and the cup of coffee is then left in a room that is kept at a constant temperature. The graph above shows the temperature, in degrees Fahrenheit (°F), of the coffee immediately after being removed from the heat source and at 10-minute intervals thereafter. During which of the following 10-minute intervals does the temperature of the coffee decrease at the greatest average rate?

- A. Between 0 and 10 minutes
- B. Between 30 and 40 minutes
- C. Between 50 and 60 minutes
- D. Between 90 and 100 minutes

ID: 83272c51 Answer

Correct Answer:

A

## Rationale

Choice A is correct. The average rate of change in temperature of the coffee in degrees Fahrenheit per minute is calculated by dividing the difference between two recorded temperatures by the number of minutes in the corresponding interval of time. Since the time intervals given are all 10 minutes, the average rate of change is greatest for the points with the greatest difference in temperature. Of the choices, the greatest difference in temperature occurs between 0 and 10 minutes.

Choices B, C, and D are incorrect and may result from misinterpreting the average rate of change from the graph.

## Question Difficulty:

Easy

## Question ID 3310c2ab

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 3310c2ab

How many fluid ounces are equivalent to **76** quarts? (**8 fluid ounces = 1 cup** and **4 cups = 1 quart**)

ID: 3310c2ab Answer

Correct Answer:

2432

Rationale

The correct answer is **2,432**. It's given that **4 cups = 1 quart**. It follows that **76** quarts is equivalent to  $(76 \text{ quarts}) \left( \frac{4 \text{ cups}}{1 \text{ quart}} \right)$ , or **304** cups. It's also given that **8 fluid ounces = 1 cup**. It follows that **304** cups is equivalent to  $(304 \text{ cups}) \left( \frac{8 \text{ fluid ounces}}{1 \text{ cup}} \right)$ , or **2,432** fluid ounces.

Question Difficulty:

Medium

# Question ID 4c774b00

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: 4c774b00

Ages of 20 Students Enrolled in a College Class

Age	Frequency
18	6
19	5
20	4
21	2
22	1
23	1
30	1

The table above shows the distribution of ages of the 20 students enrolled in a college class. Which of the following gives the correct order of the mean, median, and mode of the ages?

- A. mode < median < mean
- B. mode < mean < median
- C. median < mode < mean
- D. mean < mode < median

ID: 4c774b00 Answer

Correct Answer:

A

## Rationale

Choice A is correct. The mode is the data value with the highest frequency. So for the data shown, the mode is 18. The median is the middle data value when the data values are sorted from least to greatest. Since there are 20 ages ordered, the median is the average of the two middle values, the 10th and 11th, which for these data are both 19. Therefore, the median is 19. The mean is the sum of the data values divided by the number of the data values. So for these data, the mean is

$$\frac{(18 \times 6) + (19 \times 5) + (20 \times 4) + (21 \times 2) + (22 \times 1) + (23 \times 1) + (30 \times 1)}{20} = 20$$

Since the mode is 18, the median is 19, and the mean is 20, mode < median < mean.

Choices B and D are incorrect because the mean is greater than the median. Choice C is incorrect because the median is greater than the mode.

Alternate approach: After determining the mode, 18, and the median, 19, it remains to determine whether the mean is less than 19 or more than 19. Because the mean is a balancing point, there is as much deviation below the mean as above the mean. It is possible to compare the data to 19 to determine the balance of deviation above and below the mean. There is a total deviation of only 6 below 19 (the 6 values of 18); however, the data value 30 alone deviates by 11 above 19. Thus the mean must be greater than 19.

**Question Difficulty:**

Medium

# Question ID 1353b86e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 1353b86e

Colors of  
Marbles in a  
Bag

Color	Number
Red	8
Blue	10
Green	22
Total	40

The table shows the number of different colors of marbles in a bag. If a marble is chosen at random from the bag, what is the probability that the marble will be blue?

A.  $\frac{30}{40}$

B.  $\frac{22}{40}$

C.  $\frac{18}{40}$

D.  $\frac{10}{40}$

ID: 1353b86e Answer

Correct Answer:

D

Rationale

Choice D is correct. If a marble is chosen at random from the bag, the probability of choosing a marble of a certain color is the number of marbles of that color divided by the total number of marbles in the bag. Since there are 10 blue marbles in the bag, and

there are 40 total marbles in the bag, the probability that the marble chosen will be blue is  $\frac{10}{40}$ .

Choices A, B, and C are incorrect. These represent the probability that the marble chosen won't be blue (choice A), will be green (choice B), and won't be green (choice C).

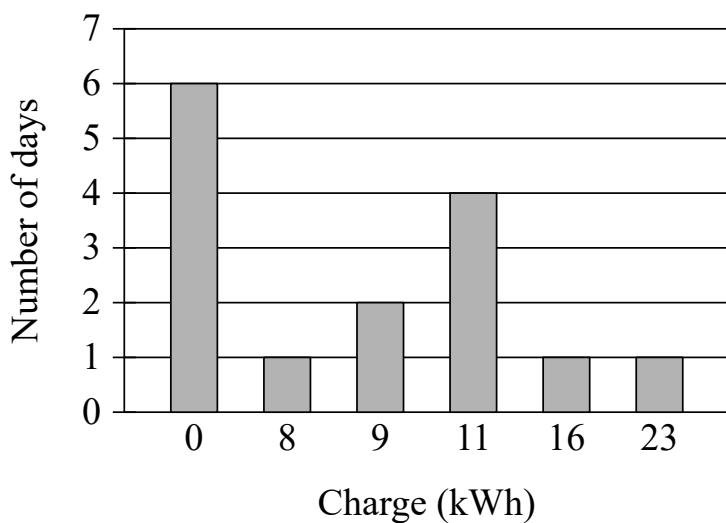
**Question Difficulty:**  
Easy

# Question ID 29fa7970

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div> <div style="width: 25%; background-color: #cccccc; height: 10px;"></div>

ID: 29fa7970

The bar graph summarizes the charge, in kilowatt-hours (**kWh**), a battery received each day for **15** days.



For how many of these **15** days did the battery receive a charge of **0 kWh**?

- A. 0
- B. 1
- C. 4
- D. 6

ID: 29fa7970 Answer

Correct Answer:

D

## Rationale

Choice D is correct. It's given that the bar graph summarizes the charge, in kilowatt-hours (**kWh**), a battery received each day for **15** days. The height of each bar in the bar graph shown represents the number of days the battery received the charge, in **kWh**, specified at the bottom of the bar. The bar for a charge of **0 kWh** reaches a height of **6**. Therefore, the battery received a charge of **0 kWh** for **6** of these days.

Choice A is incorrect. This is the charge, in **kWh**, that the battery received, not the number of days the battery received this charge.

Choice B is incorrect. This is the number of days the battery received a charge of either **8, 16, or 23 kWh**.

Choice C is incorrect. This is the number of days the battery received a charge of **11 kWh**.

**Question Difficulty:**

Easy

# Question ID d89c1513

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: d89c1513

Customer Purchases at a Gas Station

	Beverage purchased	Beverage not purchased	Total
Gasoline purchased	60	25	85
Gasoline not purchased	35	15	50
Total	90	40	135

On Tuesday, a local gas station had 135 customers. The table above summarizes whether or not the customers on Tuesday purchased gasoline, a beverage, both, or neither. Based on the data in the table, what is the probability that a gas station customer selected at random on that day did not purchase gasoline?

A.  $\frac{15}{50}$

B.  $\frac{15}{40}$

C.  $\frac{35}{50}$

D.  $\frac{50}{135}$

ID: d89c1513 Answer

Correct Answer:

D

Rationale

Choice D is correct. The total number of gas station customers on Tuesday was 135. The table shows that the number of customers who did not purchase gasoline was 50. Finding the ratio of the number of customers who did not purchase gasoline to the total number of customers gives the probability that a customer selected at random on that day did not purchase gasoline,

which is  $\frac{50}{135}$ .

Choice A is incorrect and may result from finding the probability that a customer did not purchase a beverage, given that the customer did not purchase gasoline. Choice B is incorrect and may result from finding the probability that a customer did not purchase gasoline, given that the customer did not purchase a beverage. Choice C is incorrect and may result from finding the probability that a customer did purchase a beverage, given that the customer did not purchase gasoline.

**Question Difficulty:**

Easy

# Question ID 52f9a246

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 52f9a246

4, 4, 4, 4, 8, 8, 8, 13, 13

Which frequency table correctly represents the data listed?

A.

Number	Frequency
4	4
8	3
13	2

B.

Number	Frequency
4	4
3	8
2	13

C.

Number	Frequency
4	16
8	24
13	26

D.

Number	Frequency
16	4
24	8
26	13

ID: 52f9a246 Answer

Correct Answer:

A

Rationale

Choice A is correct. A frequency table is a table that lists the data value and shows the number of times the data value occurs. In the data listed, the number 4 occurs four times, the number 8 occurs three times, and the number 13 occurs two times. This corresponds to the table in choice A.

Choice B is incorrect. This table has the values for number and frequency reversed.

Choice C is incorrect because the frequency values don't represent the data listed.

Choice D is incorrect. This table represents the listed number values as the frequency values.

**Question Difficulty:**

Easy

# Question ID 000259aa

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 000259aa

A group of monarch butterflies migrated from Chicago, Illinois, to Michoacán, Mexico, flying a total of 2,100 miles. It took a single butterfly in the group 120 days to travel this route one way. On average, how many miles did the butterfly travel per day?

- A. 0.057
- B. 0.729
- C. 17.5
- D. 24

ID: 000259aa Answer

## Rationale

Choice C is correct. If the butterfly traveled 2,100 miles in 120 days, then it traveled, on average,  $\frac{2,100 \text{ miles}}{120 \text{ days}} = 17.5$  miles per day.

Choice A is incorrect. This is approximately the average amount of time, in days, it took the butterfly to fly one mile:

$\frac{120 \text{ days}}{2,100 \text{ miles}} = 0.057$  days per mile. Choice B is incorrect and may result from an arithmetic error. Choice D is incorrect. This is the number of hours in a day rather than the number of miles flown per day.

## Question Difficulty:

Easy

# Question ID a456cf2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 25%; background-color: #005a7f;"></div> <div style="width: 50%; background-color: #e0e0e0;"></div>

ID: a456cf2

Data value	Frequency
6	3
7	3
8	8
9	8
10	9
11	11
12	9
13	0
14	6

The frequency table summarizes the **57** data values in a data set. What is the maximum data value in the data set?

ID: a456cf2 Answer

Correct Answer:

14

Rationale

The correct answer is **14**. The maximum value is the largest value in the data set. The frequency refers to the number of times a data value occurs. The given frequency table shows that for this data set, the data value **6** occurs three times, the data value **7** occurs three times, the data value **8** occurs eight times, the data value **9** occurs eight times, the data value **10** occurs nine times, the data value **11** occurs eleven times, the data value **12** occurs nine times, the data value **13** occurs zero times, and the data value **14** occurs six times. Therefore, the maximum data value in the data set is **14**.

Question Difficulty:

Medium

# Question ID e1ad3d41

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 50%; background-color: #cccccc; height: 10px;"></div>

ID: e1ad3d41

Coat color	Eye color		
	Deep blue	Light brown	Total
Cream-tortoiseshell	16	16	32
Chocolate	12	4	16
Total	28	20	48

The data on the coat color and eye color for 48 Himalayan kittens available for adoption were collected and summarized in the table above. What fraction of the chocolate-colored kittens has deep blue eyes?

A.  $\frac{12}{48}$

B.  $\frac{12}{28}$

C.  $\frac{16}{32}$

D.  $\frac{12}{16}$

ID: e1ad3d41 Answer

Correct Answer:

D

## Rationale

Choice D is correct. The table shows that there are a total of 16 kittens that have a chocolate-colored coat. Of the 16 with a chocolate-colored coat, 12 have deep blue eyes. Therefore, the fraction of chocolate-colored kittens with deep blue eyes is simply the ratio of those two numbers, or  $\frac{12}{16}$ .

Choice A is incorrect; this is the fraction of all chocolate-colored kittens. Choice B is incorrect; this is the fraction of kittens with deep blue eyes that have a chocolate-colored coat. Choice C is incorrect; this is the fraction of cream-tortoiseshell-colored kittens with deep blue eyes.

## Question Difficulty:

Medium

# Question ID 3726e079

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: 3726e079

If  $\frac{x}{y} = 4$  and  $\frac{24x}{ny} = 4$ , what is the value of  $n$ ?

ID: 3726e079 Answer

Correct Answer:

24

Rationale

The correct answer is 24. The equation  $\frac{24x}{ny} = 4$  can be rewritten as  $\left(\frac{24}{n}\right)\left(\frac{x}{y}\right) = 4$ . It's given that  $\frac{x}{y} = 4$ . Substituting 4 for  $\frac{x}{y}$  in the equation  $\left(\frac{24}{n}\right)\left(\frac{x}{y}\right) = 4$  yields  $\left(\frac{24}{n}\right)(4) = 4$ . Multiplying both sides of this equation by  $n$  yields  $(24)(4) = 4n$ . Dividing both sides of this equation by 4 yields  $24 = n$ . Therefore, the value of  $n$  is 24.

Question Difficulty:

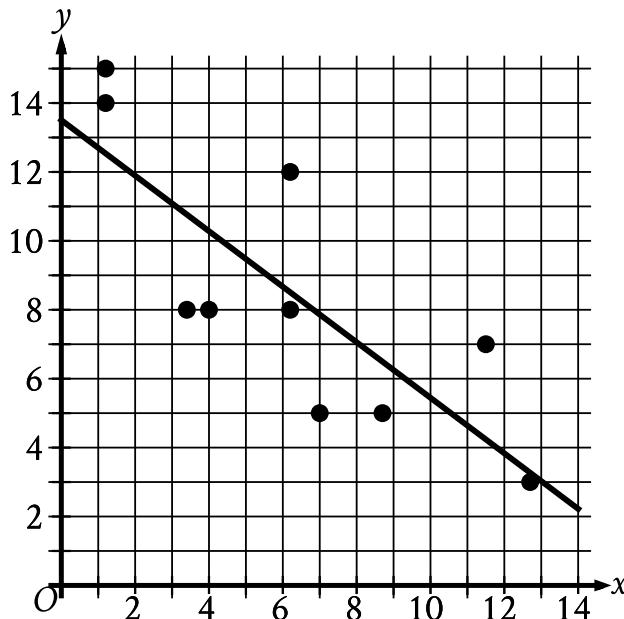
Medium

# Question ID 8baf2118

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

ID: 8baf2118

The scatterplot shows the relationship between two variables,  $x$  and  $y$ . A line of best fit is also shown.



Which of the following equations best represents the line of best fit shown?

- A.  $y = 13.5 + 0.8x$
- B.  $y = 13.5 - 0.8x$
- C.  $y = -13.5 + 0.8x$
- D.  $y = -13.5 - 0.8x$

ID: 8baf2118 Answer

Correct Answer:

B

Rationale

Choice B is correct. The line of best fit shown intersects the  $y$ -axis at a positive  $y$ -value and has a negative slope. The graph of an equation of the form  $y = a + bx$ , where  $a$  and  $b$  are constants, intersects the  $y$ -axis at a  $y$ -value of  $a$  and has a slope of  $b$ . Of the given choices, only choice B represents a line that intersects the  $y$ -axis at a positive  $y$ -value, 13.5, and has a negative slope,  $-0.8$ .

Choice A is incorrect. This equation represents a line that has a positive slope, not a negative slope.

Choice C is incorrect. This equation represents a line that intersects the  $y$ -axis at a negative  $y$ -value, not a positive  $y$ -value, and has a positive slope, not a negative slope.

Choice D is incorrect. This equation represents a line that intersects the  $y$ -axis at a negative  $y$ -value, not a positive  $y$ -value.

**Question Difficulty:**

Easy

# Question ID 05195d8a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 20%; background-color: #005a9f;"></div> <div style="width: 20%; background-color: #005a9f;"></div> <div style="width: 60%; background-color: #e0e0e0;"></div>

ID: 05195d8a

In a sample, 80% of the items are faulty. There are 88 faulty items in the sample. How many total items are in the sample?

ID: 05195d8a Answer

Correct Answer:

110

Rationale

The correct answer is 110. Let  $x$  represent the total number of items in the sample. It's given that 80% of the items are faulty and that there are 88 faulty items in the sample. Therefore, 80% of  $x$  is 88. Since 80% can be rewritten as  $\frac{80}{100}$ , it follows that  $\frac{80}{100}x = 88$ . Multiplying both sides of this equation by 100 yields  $80x = 8,800$ . Dividing both sides of this equation by 80 yields  $x = 110$ . Therefore, there are 110 total items in the sample.

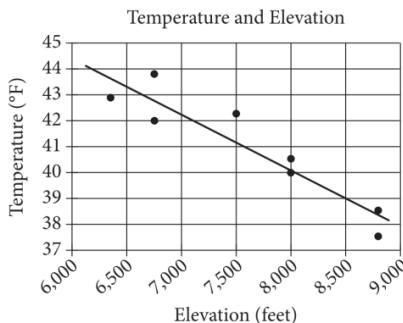
Question Difficulty:

Medium

# Question ID ac5b6558

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 25%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 25%; background-color: #e0e0e0; height: 10px;"></div>

ID: ac5b6558



The scatterplot above shows the high temperature on a certain day and the elevation of 8 different locations in the Lake Tahoe Basin. A line of best fit for the data is also shown. What temperature is predicted by the line of best fit for a location in the Lake Tahoe Basin with an elevation of 8,500 feet?

- A. 37°F
- B. 39°F
- C. 41°F
- D. 43°F

ID: ac5b6558 Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. The line of best fit passes through the point (8,500, 39). Therefore, the line of best fit predicts a temperature of 39°F for a location in Lake Tahoe Basin with an elevation of 8,500 feet.

Choice A is incorrect. This is the lowest temperature listed on the scatterplot, and the line of best fit never crosses this value for any of the elevations shown. Choice C is incorrect. According to the line of best fit, the temperature of 41°F is predicted for an elevation of slightly greater than 7,500 feet, not an elevation of 8,500 feet. Choice D is incorrect. According to the line of best fit, the temperature of 43°F is predicted for an elevation of roughly 6,700 feet, not an elevation of 8,500 feet.

**Question Difficulty:**

Easy

# Question ID 46545dd6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div>

ID: 46545dd6

Number of High School Students Who Completed Summer Internships

High school	Year				
	2008	2009	2010	2011	2012
Foothill	87	80	75	76	70
Valley	44	54	65	76	82
Total	131	134	140	152	152

The table above shows the number of students from two different high schools who completed summer internships in each of five years. No student attended both schools. Of the students who completed a summer internship in 2010, which of the following represents the fraction of students who were from Valley High School?

A.  $\frac{10}{140}$

B.  $\frac{65}{140}$

C.  $\frac{75}{140}$

D.  $\frac{65}{75}$

ID: 46545dd6 Answer

Correct Answer:

B

Rationale

Choice B is correct. According to the table, 140 students from the two high schools completed summer internships in 2010. Of these, 65 were from Valley High School. Therefore, of the students who completed summer internships in 2010,  $\frac{65}{140}$  represents the fraction who were from Valley High School.

Choice A is incorrect. This is the difference between the numbers of students from the two high schools who completed internships in 2010 divided by the total number of students from the two schools who completed internships that year. Choice C is incorrect. This is the fraction of students from Foothill High School who completed internships out of all the students who

completed internships in 2010. Choice D is incorrect. This is the number of students from Valley High School who completed internships in 2010 divided by the number of students from Foothill High School who completed internships in 2010.

**Question Difficulty:**

Easy

# Question ID 58a71e06

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div>

ID: 58a71e06

Of 300,000 paper clips, 234,000 are size large. What percentage of the paper clips are size large?

- A. 22%
- B. 33%
- C. 66%
- D. 78%

ID: 58a71e06 Answer

**Correct Answer:**

D

**Rationale**

Choice D is correct. The proportion of the paper clips that are size large can be written as  $\frac{234,000}{300,000}$ , or 0.78. Therefore, the percentage of the paper clips that are size large is 0.78(100), or 78%.

Choice A is incorrect. This is the percentage of the paper clips that are not size large.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID 4aaa9c42

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #0056b3; height: 10px;"></div>

ID: 4aaa9c42

The positive number  $a$  is 2,241% of the sum of the positive numbers  $b$  and  $c$ , and  $b$  is 83% of  $c$ . What percent of  $b$  is  $a$ ?

- A. 23.24%
- B. 49.41%
- C. 2,324%
- D. 4,941%

ID: 4aaa9c42 Answer

Correct Answer:

D

Rationale

Choice D is correct. It's given that  $a$  is 2,241% of the sum of  $b$  and  $c$ . This can be represented by the equation  $a = \left(\frac{2,241}{100}\right)(b + c)$ , or  $a = 22.41(b + c)$ . It's also given that  $b$  is 83% of  $c$ . This can be represented by the equation  $b = \left(\frac{83}{100}\right)c$ , or  $b = 0.83c$ . Dividing both sides of this equation by 0.83 yields  $\frac{b}{0.83} = c$ . Substituting  $\frac{b}{0.83}$  for  $c$  in the equation  $a = 22.41(b + c)$  yields  $a = 22.41\left(b + \frac{b}{0.83}\right)$ , or  $a = 22.41\left(\frac{1.83b}{0.83}\right)$ , which is equivalent to  $a = \frac{41.0103b}{0.83}$ , or  $a = 49.41b$ . This equation is equivalent to  $a = \left(\frac{4,941}{100}\right)b$ ; therefore,  $a$  is 4,941% of  $b$ .

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty:

Hard

# Question ID 16cea46c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	<div style="width: 25%; background-color: #005a9f;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div>

ID: 16cea46c

Voice type	Number of singers
Countertenor	4
Tenor	6
Baritone	10
Bass	5

A total of 25 men registered for singing lessons. The frequency table shows how many of these singers have certain voice types. If one of these singers is selected at random, what is the probability he is a baritone?

- A. 0.10
- B. 0.40
- C. 0.60
- D. 0.67

ID: 16cea46c Answer

Correct Answer:

B

Rationale

Choice B is correct. This probability is calculated by dividing the number of baritone singers by the total number of men registered for singing lessons. It's given that a total of 25 men registered for singing lessons and that there are 10 baritones. Therefore, the

$\frac{10}{25}$

probability of selecting a baritone from this group at random is  $\frac{10}{25}$ , which is equivalent to 0.40.

Choice A is incorrect. This would be the probability of selecting a baritone at random if there were 100 total men who registered for singing lessons. Choice C is incorrect. This is the probability of selecting a singer at random who isn't a baritone. Choice D is incorrect. This would be the probability of selecting a baritone at random if there were 15 total men registered for singing lessons.

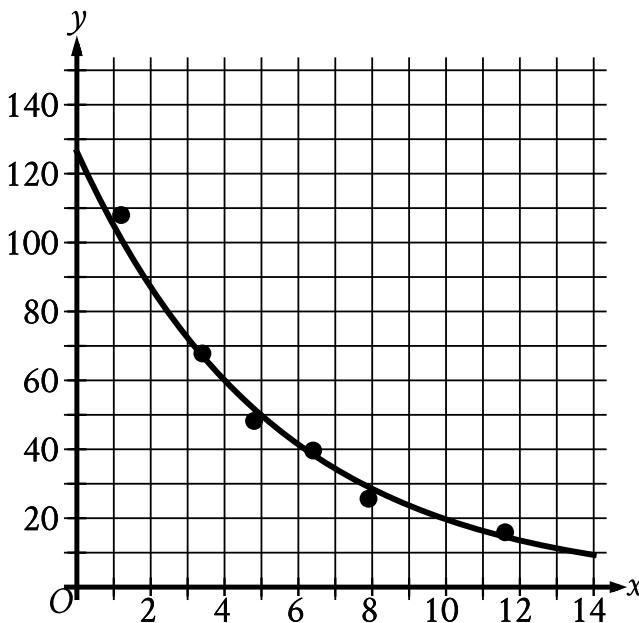
Question Difficulty:

Easy

# Question ID fb866265

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: fb866265



The scatterplot shows the relationship between two variables,  $x$  and  $y$ . An equation for the exponential model shown can be written as  $y = a(b)^x$ , where  $a$  and  $b$  are positive constants. Which of the following is closest to the value of  $b$ ?

- A. 0.83
- B. 1.83
- C. 18.36
- D. 126.35

ID: fb866265 Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that an equation for the exponential model shown can be written as  $y = a(b)^x$ , where  $a$  and  $b$  are positive constants. For an exponential model written in this form, if the value of  $b$  is greater than 0 but less than 1, the model is decreasing. If the value of  $b$  is greater than 1, the model is increasing. The exponential model shown is decreasing. Therefore, the value of  $b$  is greater than 0 but less than 1. Of the given choices, only 0.83 is a value greater than 0 but less than 1. Thus, 0.83 is closest to the value of  $b$ .

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Hard

# Question ID bd90f87e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 25%; background-color: #0056b3;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div> <div style="width: 75%; background-color: #e0e0e0;"></div>

ID: bd90f87e

A table of the US minimum wage for 6 different years is shown below.

Year	US minimum wage (dollars per hour)
1960	1.00
1970	1.60
1980	3.10
1990	3.80
2000	5.15
2010	7.25

What was the percent increase of the minimum wage from 1960 to 1970?

- A. 30%
- B. 60%
- C. 62.5%
- D. 120%

ID: bd90f87e Answer

**Correct Answer:**

B

**Rationale**

Choice B is correct. According to the table, the minimum wage in 1960 was \$1.00 per hour, and in 1970 it was \$1.60 per hour. The

$$\text{percentage change is therefore } 100 \left( \frac{1.60 - 1.00}{1.00} \right) = 60\%.$$

Choice A is incorrect and may result from averaging the two wages before calculating the percentage change. Choice C is incorrect. This is the 1960 wage expressed as a percentage of the 1970 wage, not the percentage change between the two. Choice D is incorrect and may result from a calculation error.

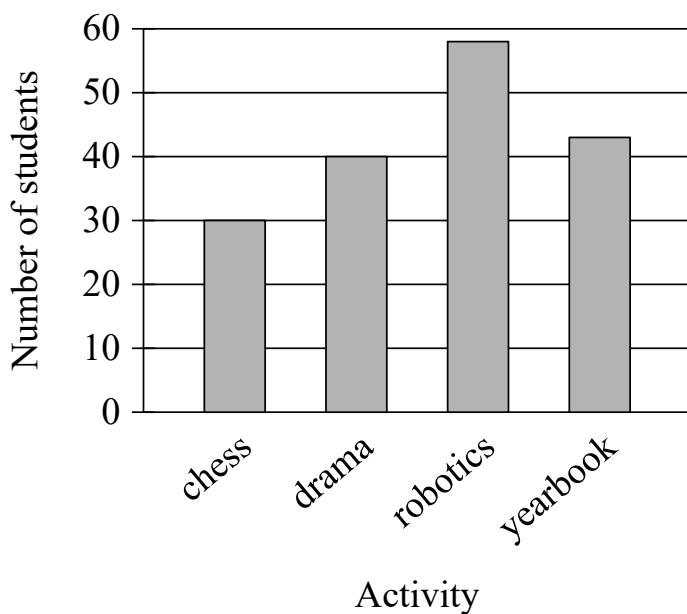
**Question Difficulty:**  
Easy

# Question ID 15d87c0f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 15d87c0f

The bar graph shows the distribution of the number of students in each of four extracurricular activities at a high school.



How many more students are in drama than in chess?

- A. 10
- B. 30
- C. 40
- D. 70

ID: 15d87c0f Answer

Correct Answer:

A

Rationale

Choice A is correct. It's given that the bar graph shows the distribution of the number of students in each of four extracurricular activities at a high school. The bar representing drama has a height of 40; therefore, there are 40 students in drama. The bar representing chess has a height of 30; therefore, there are 30 students in chess. Thus, there are  $40 - 30$ , or 10 more students in drama than in chess.

Choice B is incorrect. This is the number of students in chess.

Choice C is incorrect. This is the number of students in drama.

Choice D is incorrect. This is the sum of the number of students in drama and in chess.

**Question Difficulty:**

Easy

# Question ID 312ba47c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

**ID: 312ba47c**

In a box of pens, the ratio of black pens to red pens is **8 to 1**. There are **40** black pens in the box. How many red pens are in the box?

- A. **5**
- B. **8**
- C. **40**
- D. **320**

**ID: 312ba47c Answer**

**Correct Answer:**

A

**Rationale**

Choice A is correct. It's given that the ratio of black pens to red pens is **8 to 1**. Therefore, there are  $\frac{1}{8}$  as many red pens as black pens in the box. It's also given that there are **40** black pens in the box. Therefore, the number of red pens is  $\frac{1}{8}$  of the **40** black pens. Thus, the number of red pens is  $40\left(\frac{1}{8}\right)$ , or **5**.

Choice B is incorrect. This is the number of black pens in the box for every red pen.

Choice C is incorrect. This is the number of black pens in the box.

Choice D is incorrect. This is the number of red pens in the box if the ratio of black pens to red pens is **1 to 8**.

**Question Difficulty:**

Easy

## Question ID 0ea56bb2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 75%; background-color: #005a9f; height: 10px;"></div>

ID: 0ea56bb2

Year	Subscriptions sold
2012	5,600
2013	5,880

The manager of an online news service received the report above on the number of subscriptions sold by the service. The manager estimated that the percent increase from 2012 to 2013 would be double the percent increase from 2013 to 2014. How many subscriptions did the manager expect would be sold in 2014?

- A. 6,020
- B. 6,027
- C. 6,440
- D. 6,468

ID: 0ea56bb2 Answer

Correct Answer:

B

Rationale

Choice B is correct. The percent increase from 2012 to 2013 was  $\frac{5,880 - 5,600}{5,600} = 0.05$ , or 5%. Since the percent increase from 2012 to 2013 was estimated to be double the percent increase from 2013 to 2014, the percent increase from 2013 to 2014 was expected to be 2.5%.

Therefore, the number of subscriptions sold in 2014 is expected to be the number of subscriptions sold in 2013 multiplied by  $(1 + 0.025)$ , or  $5,880(1.025) = 6,027$ .

Choice A is incorrect and is the result of adding half of the value of the increase from 2012 to 2013 to the 2013 result. Choice C is incorrect and is the result adding twice the value of the increase from 2012 to 2013 to the 2013 result. Choice D is incorrect and is the result of interpreting the percent increase from 2013 to 2014 as double the percent increase from 2012 to 2013.

Question Difficulty:

Hard

# Question ID 90eed2e5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	<div style="width: 25%; background-color: #002B36; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div> <div style="width: 75%; background-color: #D9D9D9; height: 10px;"></div>

ID: 90eed2e5

A city has 50 city council members. A reporter polled a random sample of 20 city council members and found that 6 of those polled supported a specific bill. Based on the sample, which of the following is the best estimate of the number of city council members in the city who support the bill?

- A. 6
- B. 9
- C. 15
- D. 30

ID: 90eed2e5 Answer

## Rationale

Choice C is correct. Because a random sample of the city council was polled, the proportion of the sample who supported the bill is expected to be approximately equal to the proportion of the total city council who supports the bill. Since 6 of the 20 polled, or 30%, supported the bill, it can be estimated that  $50 \times 0.3$ , or 15, city council members support the bill.

Choice A is incorrect. This is the number of city council members in the sample who supported the bill. Choice B is incorrect and may result from a computational error. Choice D is incorrect. This is the number of city council members in the sample of city council members who were not polled.

## Question Difficulty:

Easy

# Question ID 8e528129

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 25%; background-color: #005599; height: 10px;"></div> <div style="width: 50%; background-color: #CCCCCC; height: 10px;"></div>

ID: 8e528129

Pure beeswax has a density of 0.555 ounce per cubic inch. An online company sells pure beeswax at a price of \$8.00 per ounce. What is the selling price, in dollars per cubic inch, for pure beeswax purchased from this company?

ID: 8e528129 Answer

## Rationale

The correct answer is 4.44. The selling price, in dollars per cubic inch, is found by multiplying the density, in ounces per cubic inch, by the unit price, in dollars per ounce:  $\left(\frac{0.555 \text{ ounce}}{1 \text{ cubic inch}}\right)\left(\frac{\$8.00}{1 \text{ ounce}}\right) = \frac{\$4.44}{1 \text{ cubic inch}}$ . Thus, the selling price, in dollars per cubic inch, is 4.44.

## Question Difficulty:

Medium

# Question ID 15617f62

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 15617f62

The population density of Worthington is **290** people per square mile. Worthington has a population of **92,800** people. What is the area, in square miles, of Worthington?

- A. **102,400**
- B. **93,090**
- C. **320**
- D. **32**

ID: 15617f62 Answer

**Correct Answer:**

C

**Rationale**

Choice C is correct. It's given that the population density of Worthington is **290** people per square mile and Worthington has a population of **92,800** people. Therefore, the area of Worthington is  $92,800 \text{ people} \left( \frac{1 \text{ square mile}}{290 \text{ people}} \right)$ , which is equivalent to  $\frac{92,800 \text{ square miles}}{290}$ , or **320** square miles.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy

# Question ID 8736334b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	<div style="width: 25%; background-color: #003366; height: 10px;"></div> <div style="width: 75%; background-color: #cccccc; height: 10px;"></div>

ID: 8736334b

Data set A: 72,73,73,76,76

Data set B: 61,64,74,85,x

Data set A and data set B each contain 5 numbers. If the mean of data set A is equal to the mean of data set B, what is the value of x ?

- A. 77
- B. 85
- C. 86
- D. 95

ID: 8736334b Answer

Correct Answer:

C

Rationale

Choice C is correct. The mean of a data set is found by dividing the sum of the values in the data set by the number of values in

the data set. Therefore, the mean of data set A is  $\frac{72+73+73+76+76}{5}$ , which simplifies to 74. The mean of data set B is represented by the equation  $\frac{61+64+74+85+x}{5}$ , or  $\frac{284+x}{5}$ . It's given that the mean of data set A is equal to the mean of data set B. Therefore, the equation  $74 = \frac{284+x}{5}$  can be used to solve for x. Multiplying both sides of this equation by 5 yields  $370 = 284 + x$ . Subtracting 284 from both sides of this equation yields  $86 = x$ .

Choices A, B, and D are incorrect and may result from calculation errors.

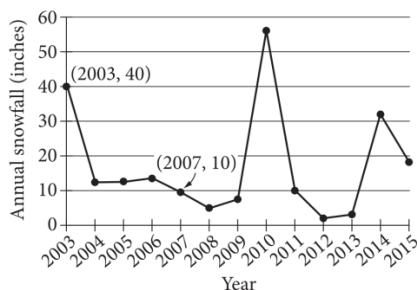
Question Difficulty:

Easy

# Question ID 0231050d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	<div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div> <div style="width: 100px; height: 10px; background-color: #0056b3;"></div>

ID: 0231050d



The line graph shows the total amount of snow, in inches, recorded each year in Washington, DC, from 2003 to 2015. If  $p\%$  is the percent decrease in the annual snowfall from 2003 to 2007, what is the value of  $p$ ?

ID: 0231050d Answer

## Rationale

The correct answer is 75. The percent decrease between two values is found by dividing the difference between the two values by the original value and multiplying by 100. The line graph shows that the annual snowfall in 2003 was 40 inches, and the annual snowfall in 2007 was 10 inches. Therefore, the percent decrease in the annual snowfall from 2003 to 2007 is  $\left(\frac{40-10}{40}\right)(100)$ , or 75. It's given that this is equivalent to  $p\%$ , so the value of  $p$  is 75.

## Question Difficulty:

Hard

# Question ID be35c117

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	<div style="width: 25%; background-color: #0056b3; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div> <div style="width: 75%; background-color: #e0e0e0; height: 10px;"></div>

**ID: be35c117**

A wind turbine completes **900** revolutions in **50** minutes. At this rate, how many revolutions per minute does this turbine complete?

- A. **18**
- B. **850**
- C. **950**
- D. **1,400**

**ID: be35c117 Answer**

**Correct Answer:**

A

**Rationale**

Choice A is correct. Dividing the number of revolutions by the number of minutes gives the number of revolutions the turbine completes per minute. It's given that the wind turbine completes **900** revolutions in **50** minutes. Therefore, at this rate, this turbine completes  $\frac{900}{50}$ , or **18**, revolutions per minute.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

**Question Difficulty:**

Easy