Question ID 954943a4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 65c49824

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 0ea56bb2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 $5{,}880(1.025)=6{,}027$.

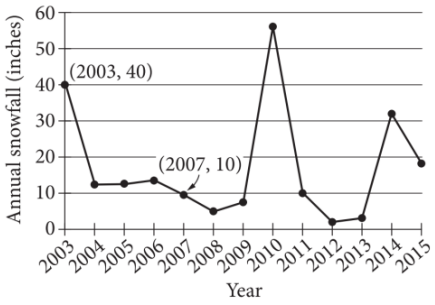
Choice A is incorrect and is the result of adding half of the value of the increase from 2012 to 2013 to the 2013 result. Choice C is incorrect and is the result adding twice the value of the increase from 2012 to 2013 to the 2013 result. Choice D is incorrect and is the result of interpreting the percent increase from 2013 to 2014 as double the percent increase from 2012 to 2013.

Question Difficulty: Hard

Question ID 0231050d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 67c0200a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 $a = 1 - 0.70b$, 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 $c = 1 + 0.80a$, or $c = 1.80a$. Since $a = 0.30b$, substituting $0.30b$ for a in the equation $c = 1.80a$ yields $c = 1.800.30b$, 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 40e7a1a9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 55818046

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

ID: 55818046

According to the 2010 Census, the adult population aged 18 years or greater of the United States in 2010 was 234,564,071. In 2010, a survey was conducted among a randomly chosen sample of adults aged 18 years or greater in the United States about their preference to live in a warm climate or a cool climate. The table below displays a summary of the survey results.

Climate Preferences

	Warm	Cool	No preference	Total
18–35 years old	295	168	45	508
36–50 years old	246	123	41	410
51–65 years old	238	117	48	403
Greater than 65 years old	137	78	64	279
Total	916	486	198	1,600

Which of the following is closest to the difference between the percentage of adults aged 18–50 years who responded “warm” and the percentage of adults aged 51 years or greater who responded “warm”?

A. 4%

B. 5%

C. 10%

D. 18%

ID: 55818046 Answer

Correct Answer: A

Rationale

Choice A is correct. The percentage of adults aged 18–50 who responded “warm” is $\frac{295+246}{508+410}=\frac{541}{918}$, or about 58.9%. The percentage of adults aged 51 years or greater who responded “warm” is $\frac{238+137}{403+279}=\frac{375}{682}$, or about 55.0%. The difference between 58.9% and 55.0% is 3.9%. Of the answer choices, 4% is closest to this number.

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

Question Difficulty: Hard

Question ID 20845d36

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 $a = 1 - 0.70b$, 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 $c = 1 + 0.60a$, or $c = 1.60a$. Since $a = 0.30b$, substituting $0.30b$ for a in the equation $c = 1.60a$ yields $c = 1.600.30b$, 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 2e92cc21

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 $b = 0.147$, which yields $b = 4.7$. Substituting 4.7 for b in the equation $a = 2.1b$ yields $a = 2.14.7$, which is equivalent to $a = 9.87$. Therefore, the value of a is 9.87.

Question Difficulty: Hard

Question ID 8c5dbd3e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 $z = 0.4550$, which yields $z = 22.5$. Substituting 22.5 for z in the equation $w = 2.1z$ yields $w = 2.122.5$, 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 040f2a84

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 $\$ 11.701 - \frac{80}{100}$, or $\$ 11.701 - 0.8$, 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 8213b1b3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 0.00001140, or 0.0014. Note that .0014 and 0.001 are examples of ways to enter a correct answer.

Question Difficulty: Hard

Question ID 34f8cd89

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 25faa756

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Percentages	■■■

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 $a = 1 + 0.60b$, 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 $c = 1 - 0.45a$, or $c = 0.55a$. Since $a = 1.60b$, substituting $1.60b$ for a in the equation $c = 0.55a$ yields $c = 0.551.60b$, 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	■■■

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 $2.67x$ - $2.67x0.16$, 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 1.2428100%, 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