Question Bank
Math

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Probability (key)

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■□□

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. $\dfrac{30}{40}$

B. $\dfrac{22}{40}$

C. $\dfrac{18}{40}$

D. $\dfrac{10}{40}$

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 $\dfrac{10}{40}$.

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).

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■□□

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. $\dfrac{15}{50}$

B. $\dfrac{15}{40}$

C. $\dfrac{35}{50}$

D. $\dfrac{50}{135}$

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 $\dfrac{50}{135}$.

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■□□

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. $\dfrac{10}{140}$

B. $\dfrac{65}{140}$

C. $\dfrac{75}{140}$

D. $\dfrac{65}{75}$

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, $\dfrac{65}{140}$ 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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■☐☐

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 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 b680e76d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■□□

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

Assessment	Test	Domain	Skill	Difficulty
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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	10
metamorphic	33
sedimentary	27

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 e5b5fbdd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■☐☐

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. $\dfrac{1}{8}$

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

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

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 $\dfrac{4}{8}$, which is equivalent to $\dfrac{1}{2}$.

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■□□

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
Total	415	384	799

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. $\dfrac{1}{799}$

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

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

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

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 $\dfrac{415}{799}$.

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■□□

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■☐☐

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. $\dfrac{n}{12}$

B. $\dfrac{n}{n+12}$

C. $\dfrac{12}{n}$

D. $\dfrac{12}{n+12}$

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 $\dfrac{n}{n+12}$.

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■☐☐

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■ ☐ ☐

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 b1b5300b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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. $\dfrac{1}{7}$

B. $\dfrac{2}{7}$

C. $\dfrac{1}{3}$

D. $\dfrac{4}{7}$

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 $\dfrac{2}{14} = \dfrac{1}{7}$.

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 ID e1ad3d41

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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. $\dfrac{12}{48}$

B. $\dfrac{12}{28}$

C. $\dfrac{16}{32}$

D. $\dfrac{12}{16}$

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 $\dfrac{12}{16}$.

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 0301c5dc

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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. $\dfrac{5}{37}$

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

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

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

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 $\dfrac{5}{37}$.

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.

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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 <u>neither</u> blue <u>nor</u> 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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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. $\dfrac{4}{21}$

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

C. $\dfrac{2}{3}$

D. $\dfrac{3}{4}$

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 $\dfrac{16}{64} = \dfrac{1}{4}$.

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

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Assessment	Test	Domain	Skill	Difficulty
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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

Assessment	Test	Domain	Skill	Difficulty
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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. $\dfrac{1}{5}$

B. $\dfrac{1}{10}$

C. $\dfrac{1}{12}$

D. $\dfrac{1}{50}$

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, $\dfrac{6,000}{60,000}$, or $\dfrac{1}{10}$, were registered in the first 5 days.

Choice A is incorrect. The fraction $\dfrac{1}{5}$ 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 $\dfrac{1}{50}$ represents the fraction of the first 60,000 accounts that were registered in 1 day.

Question Difficulty: Medium

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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. $\dfrac{10}{43}$

B. $\dfrac{10}{34}$

C. $\dfrac{10}{24}$

D. $\dfrac{25}{34}$

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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 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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■☐

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■□

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.

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■ ■ ■

ID: e29586d5

Number of Contestants by Score and Day

	5 out of 5	4 out of 5	3 out of 5	2 out of 5	1 out of 5	0 out of 5	Total
Day 1	2	3	4	6	2	3	20
Day 2	2	3	5	5	4	1	20
Day 3	3	3	4	5	3	2	20
Total	7	9	13	16	9	6	60

The same 20 contestants, on each of 3 days, answered 5 questions in order to win a prize. Each contestant received 1 point for each correct answer. The number of contestants receiving a given score on each day is shown in the table above.

No contestant received the same score on two different days. If a contestant is selected at random, what is the probability that the selected contestant received a score of 5 on Day 2 or Day 3, given that the contestant received a score of 5 on one of the three days?

ID: e29586d5 Answer

Rationale

The correct answer is $\frac{5}{7}$. It is given that no contestant received the same score on two different days, so each of the contestants who received a score of 5 is represented in the "5 out of 5" column of the table exactly once. Therefore, the probability of selecting a contestant who received a score of 5 on Day 2 or Day 3, given that the contestant received a score of 5 on one of the three days, is found by dividing the total number of contestants who received a score of 5 on Day 2 or Day 3 $(2+3=5)$ by the total number of contestants who received a score of 5, which is given in the table as 7. So the probability is $\frac{5}{7}$. Note that 5/7, .7142, .7143, and 0.714 are examples of ways to enter a correct answer.

Question Difficulty: Hard

Question ID d4413871

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■ ■ ■

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 $\dfrac{1}{9}$. What is the value of x ?

ID: d4413871 Answer

Rationale

The correct answer is 8. In this group, $\dfrac{1}{9}$ 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, $\dfrac{2}{(7+2+1+x)}=\dfrac{1}{9}$. Combining like terms on the left-hand side of the equation yields $\dfrac{2}{(10+x)}=\dfrac{1}{9}$. Multiplying both sides of this equation by 9 yields $\dfrac{18}{(10+x)}=1$, 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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■ ■ ■

	Phone	Email
Dinner dance	55%	80%
Football game	20%	10%
Picnic	20%	5%
Pool party	5%	5%
Total	100%	100%

An alumni association survey asked each high school graduate to select the one activity he or she preferred for the association's next event. Some of the people responded by phone, and the others responded by email. The table above shows the distribution of preferred activity, in percent, for each response type used. For the survey, the number of email responses was twice the number of phone responses. If a person who preferred a picnic is selected at random, what is the probability that the person responded by email?

Rationale

The correct answer is $\frac{1}{3}$. It's given that the number of email responses is twice the number of phone responses. Therefore, if the number of phone responses is p, then the number of email responses is $2p$. The table shows that 20% of people who responded by phone preferred a picnic. It follows that the expression $0.20p$ represents the number of these people. The table also shows that 5% of the people who responded by email preferred a picnic. The expression $0.05(2p)$, or $0.1p$, represents the number of these people. Therefore, a total of $0.20p + 0.1p$, or $0.3p$ people preferred a picnic. Thus, the probability of selecting at random a person who responded by email from the people who preferred a picnic is $\frac{0.1p}{0.3p}$, or $\frac{1}{3}$. Note that 1/3, .3333, and 0.333 are examples of ways to enter a correct answer.

Question ID 585de39a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■ ■ ■

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■■

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

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■ ■ ■

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, $\frac{6}{45} = 0.1333...$, 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 ecd09c38

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Probability and conditional probability	■■■

ID: ecd09c38

Employees working for a customer service line at an electric company recorded all the calls last Monday and noted whether the caller asked for repairs and whether the caller asked about a bill. The results are summarized in the table below.

	Asked for repairs	Did not ask for repairs	Total
Asked about a bill	48	623	671
Did not ask about a bill	130	90	220
Total	178	713	891

If a caller last Monday who asked about his or her bill is selected at random, which of the following is closest to the probability that the customer also asked for repairs?

A. 0.05

B. 0.07

C. 0.20

D. 0.27

ID: ecd09c38 Answer

Correct Answer: B

Rationale

Choice B is correct. According to the table, a total of 671 customers asked about a bill. Of these, 48 also asked for repairs. Therefore, if a customer who asked about a bill is selected at random, the probability that the customer also asked for repairs is $\frac{48}{671} \approx 0.07$.

Choice A is incorrect. This is the probability that a customer selected at random from all customers who called on Monday both asked for repairs and asked about a bill. Choice C is incorrect. This is the probability that a customer selected at random from all customers who called on Monday asked for repairs, regardless of whether or not the customer asked about a bill. Choice D is incorrect. This is the probability that a customer selected at random from those who asked for repairs also asked about a bill.