Question ID 8956c389

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: 8956c389

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: 8956c389 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 1ba97e3e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: 1ba97e3e

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: 1ba97e3e 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 0.48350, or 168, customers are located in theater A. If the probability of selecting a customer in theater B is 0.24, then 0.24350, 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: Hard

Question ID c2de18fb

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: c2de18fb

	Site A	Site B	Total
Tulip	35	15	50
Daffodil	31	21	52
Total	66	36	102

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: c2de18fb 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 cb3bf491

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: cb3bf491

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: cb3bf491 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 1a983a4f

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: 1a983a4f

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: 1a983a4f 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: Hard

Question ID ffbe483a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: ffbe483a

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: ffbe483a 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: Hard

Question ID cbd3836a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: cbd3836a

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: cbd3836a 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: Hard

Question ID a472687e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: a472687e

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: a472687e 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 0.44275, or 121, attendees who are assigned to group A and 0.24275, 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: Hard

Question ID 12df88a4

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: 12df88a4

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: 12df88a4 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: Hard

Question ID 9b7ed2d0

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Probability and conditional probability	

ID: 9b7ed2d0

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: 9b7ed2d0 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 68, 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 59, 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