

Question ID 2c76bcce

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Inference from sample statistics and margin of error	

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 022e9894

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

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 $1,250 \times \frac{72}{100}$, 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 $900 \times \frac{36}{100}$, or 324. Therefore, 324 people attended all three information sessions.

Question Difficulty:
Medium

Question ID c9fb15ad

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	

ID: c9fb15ad

Species of tree	Growth factor
Red maple	4.5
River birch	3.5
Cottonwood	2.0
Black walnut	4.5
White birch	5.0
American elm	4.0
Pin oak	3.0
Shagbark hickory	7.5

One method of calculating the approximate age, in years, of a tree of a particular species is to multiply the diameter of the tree, in inches, by a constant called the growth factor for that species. The table above gives the growth factors for eight species of trees. If a white birch tree and a pin oak tree each now have a diameter of 1 foot, which of the following will be closest to the difference, in inches, of their diameters 10 years from now? (1 foot = 12 inches)

- A. 1.0
- B. 1.2
- C. 1.3
- D. 1.4

ID: c9fb15ad Answer

Correct Answer:
C

Rationale

Choice C is correct. According to the given information, multiplying a tree species' growth factor by the tree's diameter is a method to approximate the age of the tree. A white birch with a diameter of 12 inches (or 1 foot) has a given growth factor of 5 and is approximately 60 years old. A pin oak with a diameter of 12 inches (or 1 foot) has a given growth factor of 3 and is approximately 36 years old. The diameters of the two trees 10 years from now can be found by dividing each tree's age in 10 years, 70 years, and 46 years, by its respective growth factor. This yields 14 inches and $15\frac{1}{3}$ inches. The difference between $15\frac{1}{3}$ and 14 is $1\frac{1}{3}$, or approximately 1.3 inches.

Alternate approach: Since a white birch has a growth factor of 5, the age increases at a rate of 5 years per inch or, equivalently, the diameter increases at a rate of $\frac{1}{5}$ of an inch per year. Likewise, the pin oak has a growth factor of 3, so its diameter increases at a rate of $\frac{1}{3}$ of an inch per year. Thus, the pin oak grows $\frac{2}{15}$ of an inch per year more than the white birch. In 10 years it will grow $\left(\frac{2}{15}\right)10 = \frac{4}{3}$ of an inch more, which is approximately 1.3 inches.

Choices A, B, and D are incorrect and a result of incorrectly calculating the diameters of the two trees in 10 years.

Question Difficulty:

Hard

Question ID 1d945139

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	

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.

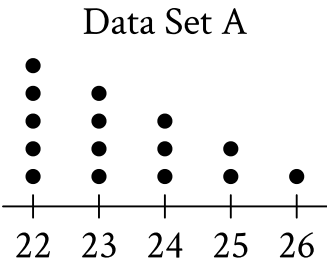
Choice C is incorrect and may result from conceptual errors.

Question Difficulty:
Medium

Question ID 578e26ae

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	

ID: 578e26ae



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 014c47ab

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

ID: 014c47ab

	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: 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 6fca0144

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Evaluating statistical claims: Observational studies and experiments	■ ■ ■

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 89f20d9e

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

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.

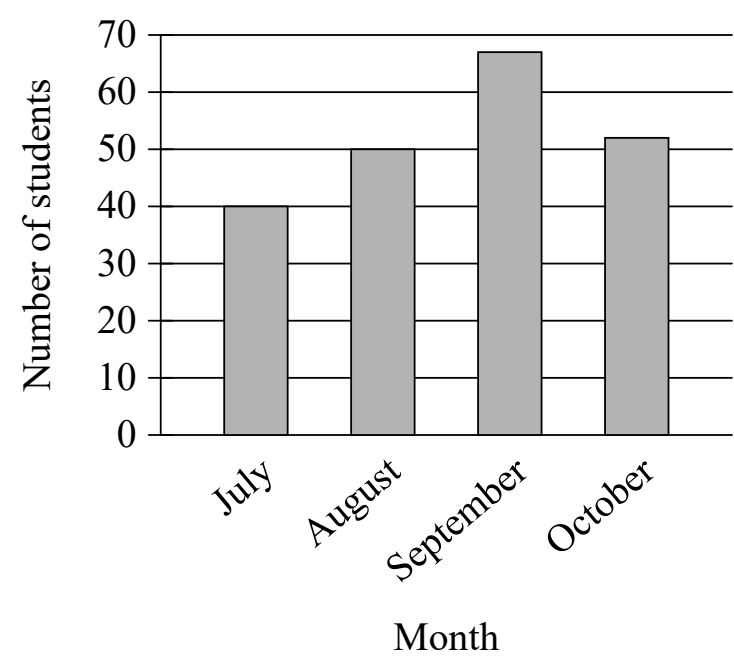
Question Difficulty:
Hard

Question ID a067c926

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	

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 7f84b136

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

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 $690 = \frac{p}{100}375$, 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 623dbebb

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

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

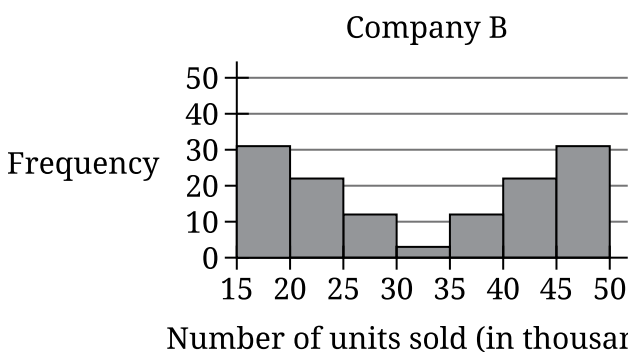
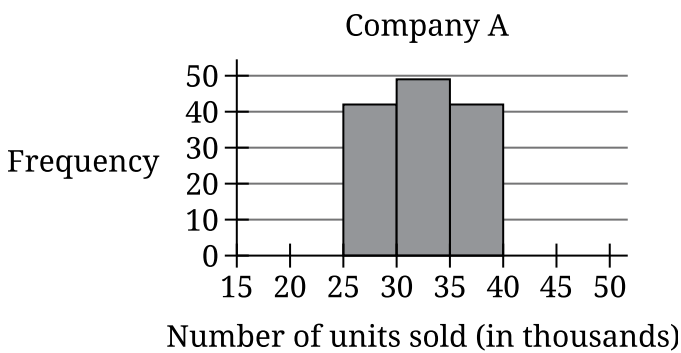
The correct answer is 4.05. It's given that the purchase price for certain books is 5.00 dollars each. It's also given that each book is marked for sale at a consumer price that is 270% of the purchase price. Since the consumer price is 270% of the purchase price of 5.00 dollars, it follows that the 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 25fc031a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	One-variable data: Distributions and measures of center and spread	

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 11b06e35

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	

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 0.60^3 , 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 $0.216 \text{ cubic meters} \times \frac{813 \text{ kilograms}}{1 \text{ cubic meter}}$, 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 dae79de4

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

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
Total	35	100	135

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 61f61789

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Ratios, rates, proportional relationships, and units	

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 34e18ce4

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

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 $350 \times \frac{4}{100}$, 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