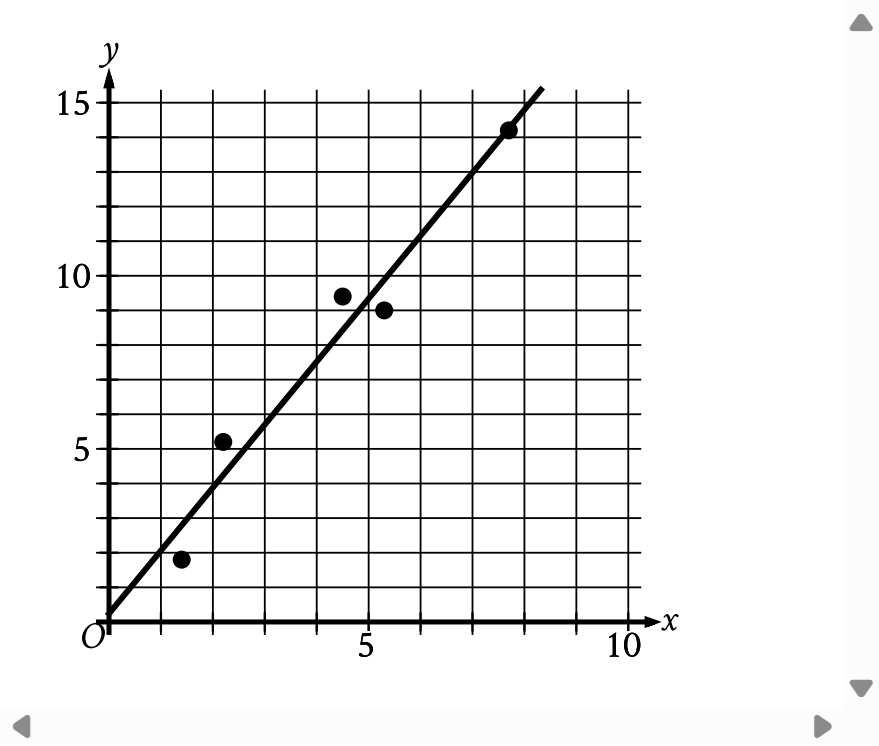


Question ID 150b63a5

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 150b63a5

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



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

- A. 0.2
- B. 0.7
- C. 1.8
- D. 2.6

ID: 150b63a5 Answer

Correct Answer: C

Rationale

Choice C is correct. A line in the xy -plane that passes through points x_1, y_1 and x_2, y_2 has a slope of $\frac{y_2 - y_1}{x_2 - x_1}$. The line of best fit shown passes approximately through the points 0, 0.2 and 5, 9.3. It follows that the slope of this line is approximately $\frac{9.3 - 0.2}{5 - 0}$, which is equivalent to $\frac{9.1}{5}$, or 1.82. Therefore, of the given choices, 1.8 is closest to the slope of the line of best fit shown.

Choice A is incorrect. This value is closest to the y -coordinate of the y -intercept of the line of best fit shown.

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

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

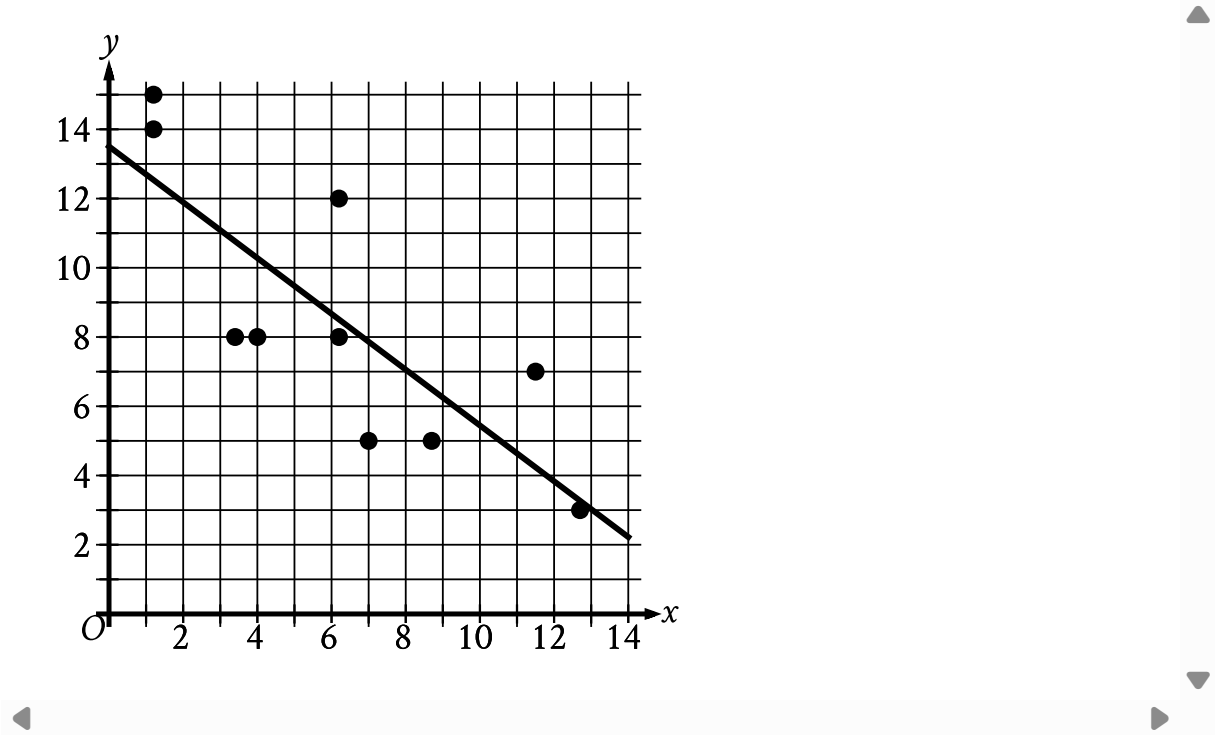
Question Difficulty: Medium

Question ID 839d25cc

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 839d25cc

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



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

- A. $y = 13.5 + 0.8x$
- B. $y = 13.5 - 0.8x$
- C. $y = -13.5 + 0.8x$
- D. $y = -13.5 - 0.8x$

ID: 839d25cc Answer

Correct Answer: B

Rationale

Choice B is correct. The line of best fit shown intersects the y -axis at a positive y -value and has a negative slope. The graph of an equation of the form $y = a + bx$, where a and b are constants, intersects the y -axis at a y -value of a and has a slope of b . Of the given choices, only choice B represents a line that intersects the y -axis at a positive y -value, 13.5, and has a negative slope, -0.8.

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

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

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

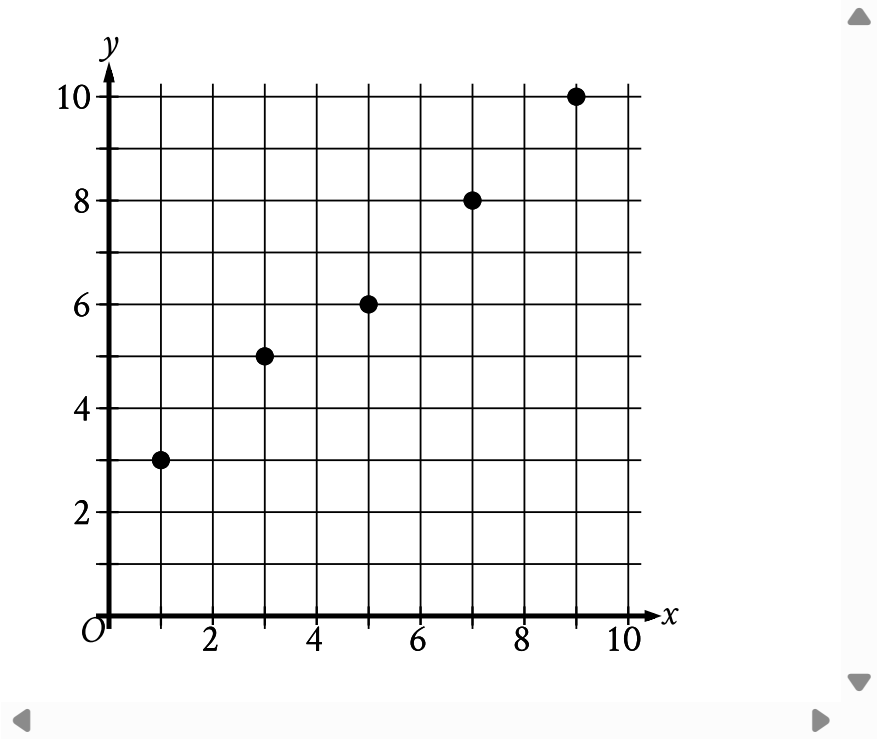
Question Difficulty: Medium

Question ID 68a0f740

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 68a0f740

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



Which equation is the most appropriate linear model for this relationship?

- A. $y = -0.9x - 2.2$
- B. $y = -0.9x + 2.2$
- C. $y = -0.9x$
- D. $y = 0.9x + 2.2$

ID: 68a0f740 Answer

Correct Answer: D

Rationale

Choice D is correct. A linear model can be written in the form $y = mx + b$, where m is the slope of the graph of the model in the xy -plane and $(0, b)$ is the y -intercept. The graph of an appropriate linear model for this relationship passes near the points $(1, 3)$ and $(9, 10)$ in the xy -plane. Two points on a line, x_1, y_1 and x_2, y_2 , can be used to find the slope of the line using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting the points $(1, 3)$ and $(9, 10)$ for x_1, y_1 and x_2, y_2 , respectively, in the slope formula yields $m = \frac{10 - 3}{9 - 1}$, or $m = 0.875$. Therefore, the value of m for an appropriate linear model is approximately 0.875. Substituting 0.875 for m in $y = mx + b$ yields $y = 0.875x + b$. Since an appropriate linear model passes near the point $(1, 3)$, the approximate value of b can be found by substituting 1 for x and 3 for y in the equation $y = 0.875x + b$, which yields $3 = (0.875)(1) + b$, or

$3 = 0.875 + b$. Subtracting 0.875 from both sides of this equation yields $2.125 = b$. Therefore, the value of b for an appropriate linear model is approximately 2.125. Thus, of the given choices, $y = 0.9x + 2.2$ is the most appropriate linear model for this relationship.

Alternate approach: A linear model can be written in the form $y = mx + b$, where m is the slope of the graph of the model in the xy -plane and $(0, b)$ is the y -intercept. The scatterplot shows that as the x -values of the data points increase, the y -values of the data points increase, which means the graph of an appropriate linear model has a positive slope. Of the given choices, $y = 0.9x + 2.2$ is the only linear model whose graph has a positive slope.

Choice A is incorrect. The graph of this model has a negative slope, not a positive slope.

Choice B is incorrect. The graph of this model has a negative slope, not a positive slope.

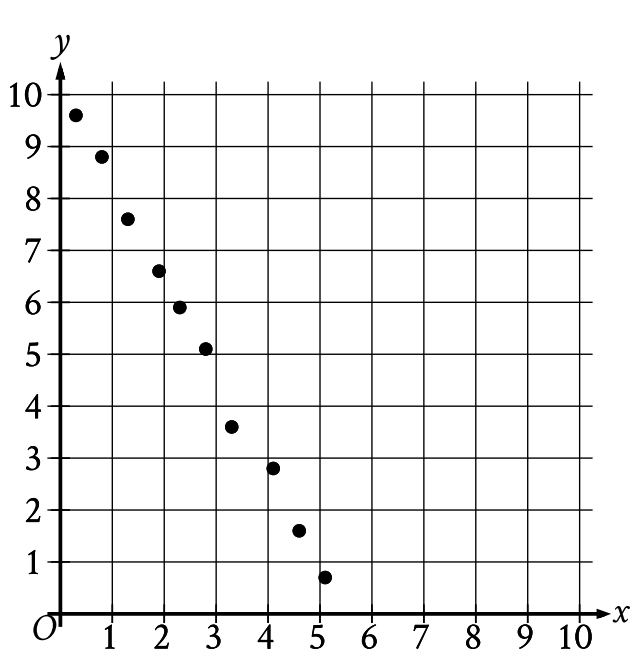
Choice C is incorrect. The graph of this model has a negative slope, not a positive slope.

Question Difficulty: Medium

Question ID 2e6e5ee3

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 2e6e5ee3



Which of the following equations is the most appropriate linear model for the data shown in the scatterplot?

- A. $y = -1.9x - 10.1$
- B. $y = -1.9x + 10.1$
- C. $y = 1.9x - 10.1$
- D. $y = 1.9x + 10.1$

ID: 2e6e5ee3 Answer

Correct Answer: B

Rationale

Choice B is correct. The equation representing a linear model can be written in the form $y = a + bx$, or $y = bx + a$, where b is the slope of the graph of the model and a is the y -intercept of the graph of the model. The scatterplot shows that as the x -values of the data points increase, the y -values of the data points decrease, which means the graph of an appropriate linear model has a negative slope. Therefore, $b < 0$. The scatterplot also shows that the data points are close to the y -axis at a positive value of y . Therefore, the y -intercept of the graph of an appropriate linear model has a positive y -coordinate, which means $a > 0$. Of the given choices, only choice B, $y = -1.9x + 10.1$, has a negative value for b , the slope, and a positive value for a , the y -coordinate of the y -intercept.

Choice A is incorrect. The graph of this model has a y -intercept with a negative y -coordinate, not a positive y -coordinate.

Choice C is incorrect. The graph of this model has a positive slope, not a negative slope, and a y -intercept with a negative y -coordinate, not a positive y -coordinate.

Choice D is incorrect. The graph of this model has a positive slope, not a negative slope.

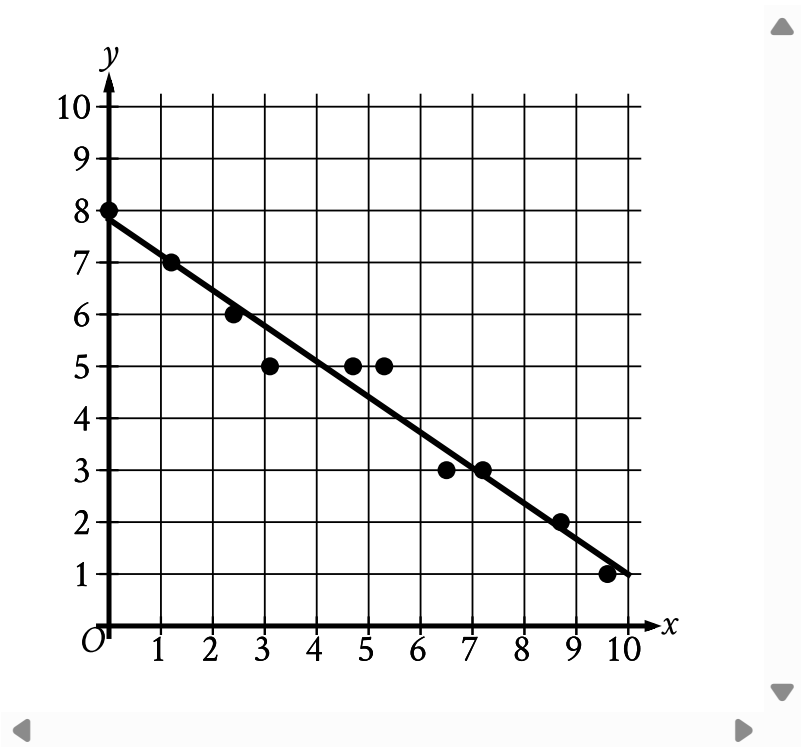
Question Difficulty: Medium

Question ID 9d2afaa0

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 9d2afaa0

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



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

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

ID: 9d2afaa0 Answer

Correct Answer: C

Rationale

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

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

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

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

Question Difficulty: Medium

Question ID 25a06893

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 25a06893

The table shows selected values from function f .

x	$f(x)$
-1	16
0	17
1	18
2	19

Which of the following is the best description of function f ?

- A. Decreasing linear
- B. Increasing linear
- C. Decreasing exponential
- D. Increasing exponential

ID: 25a06893 Answer

Correct Answer: B

Rationale

Choice B is correct. The given values show that as x increases, fx also increases, which means that f is an increasing function. Furthermore, fx increases at a constant rate of 1 for each increase of x by 1. A function with a constant rate of change is linear. Thus, the function f can be described as an increasing linear function.

Choice A is incorrect. For a decreasing linear function, as x increases, fx decreases rather than increases.

Choice C is incorrect. For a decreasing exponential function, for each increase of x by 1, fx decreases by a fixed percentage rather than increases at a constant rate.

Choice D is incorrect. For an increasing exponential function, for each increase of x by 1, fx increases by a fixed percentage rather than at a constant rate.

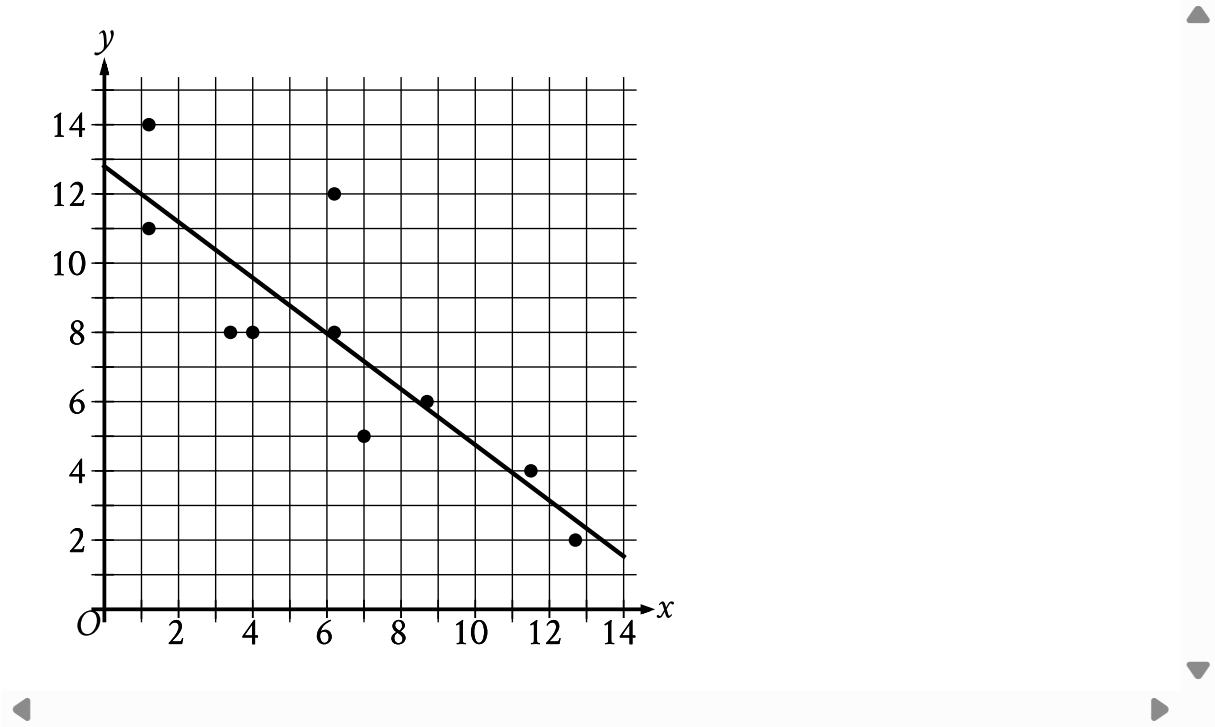
Question Difficulty: Medium

Question ID d50aa895

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: d50aa895

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



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

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

ID: d50aa895 Answer

Correct Answer: B

Rationale

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

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

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

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

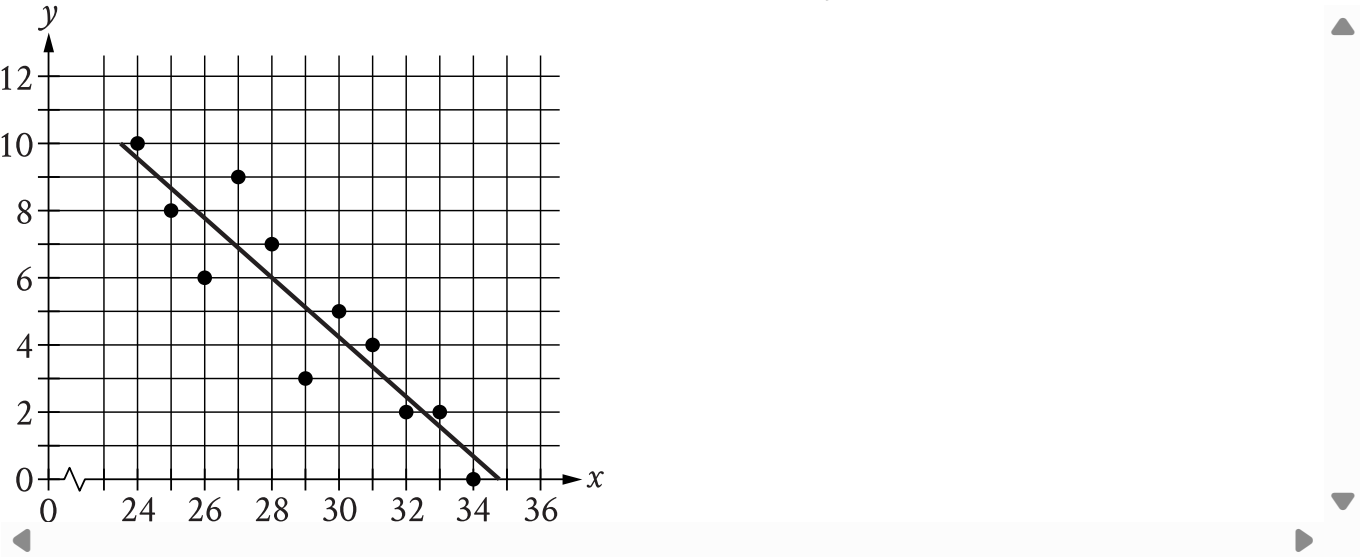
Question Difficulty: Medium

Question ID 2b2e51a9

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 2b2e51a9

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



At $x = 32$, which of the following is closest to the y -value predicted by the line of best fit?

- A. 0.4
- B. 1.5
- C. 2.4
- D. 3.3

ID: 2b2e51a9 Answer

Correct Answer: C

Rationale

Choice C is correct. At $x = 32$, the line of best fit has a y -value between 2 and 3. The only choice with a value between 2 and 3 is choice C.

Choice A is incorrect. This is the difference between the y -value predicted by the line of best fit and the actual y -value at $x = 32$ rather than the y -value predicted by the line of best fit at $x = 32$.

Choice B is incorrect. This is the y -value predicted by the line of best fit at $x = 31$ rather than at $x = 32$.

Choice D is incorrect. This is the y -value predicted by the line of best fit at $x = 33$ rather than at $x = 32$.

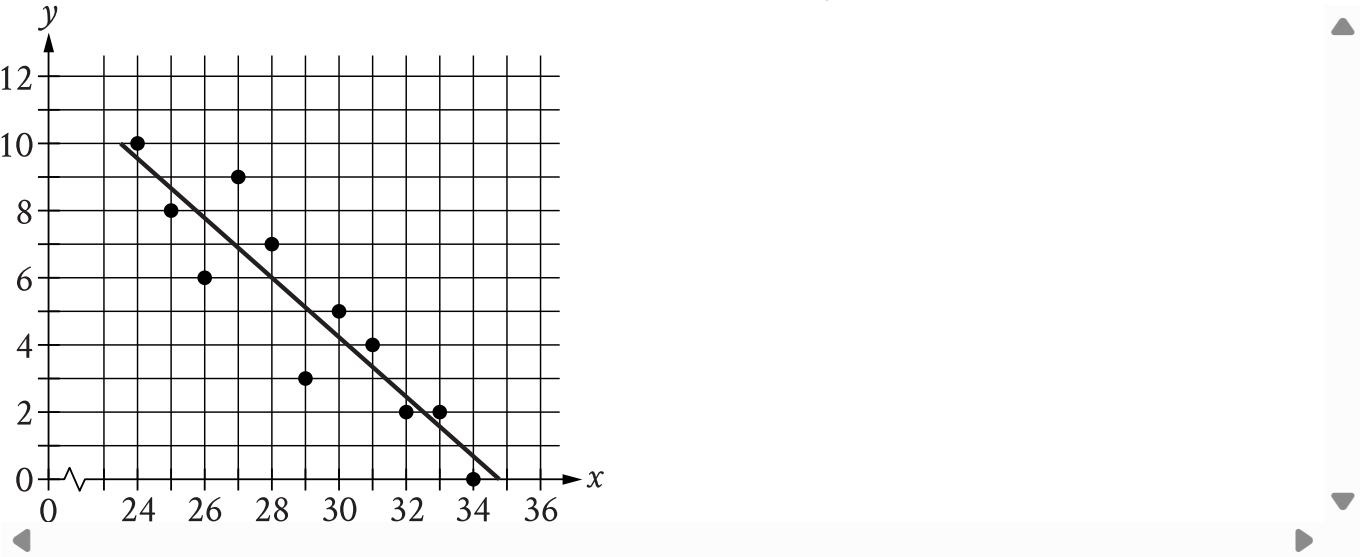
Question Difficulty: Medium

Question ID 304e91b7

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 304e91b7

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



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

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

ID: 304e91b7 Answer

Correct Answer: C

Rationale

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

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID 36e94dbb

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: 36e94dbb

An airplane descends from an altitude of **9,500** feet to **5,000** feet at a constant rate of **400** feet per minute. What type of function best models the relationship between the descending airplane's altitude and time?

- A. Decreasing exponential
- B. Decreasing linear
- C. Increasing exponential
- D. Increasing linear

ID: 36e94dbb Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the airplane descends at a constant rate of 400 feet per minute. Since the altitude decreases by a constant amount during each fixed time period, the relationship between the airplane's altitude and time is linear. Since the airplane descends from an altitude of 9,500 feet to 5,000 feet, the airplane's altitude is decreasing with time. Thus, the relationship is best modeled by a decreasing linear function.

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

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

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

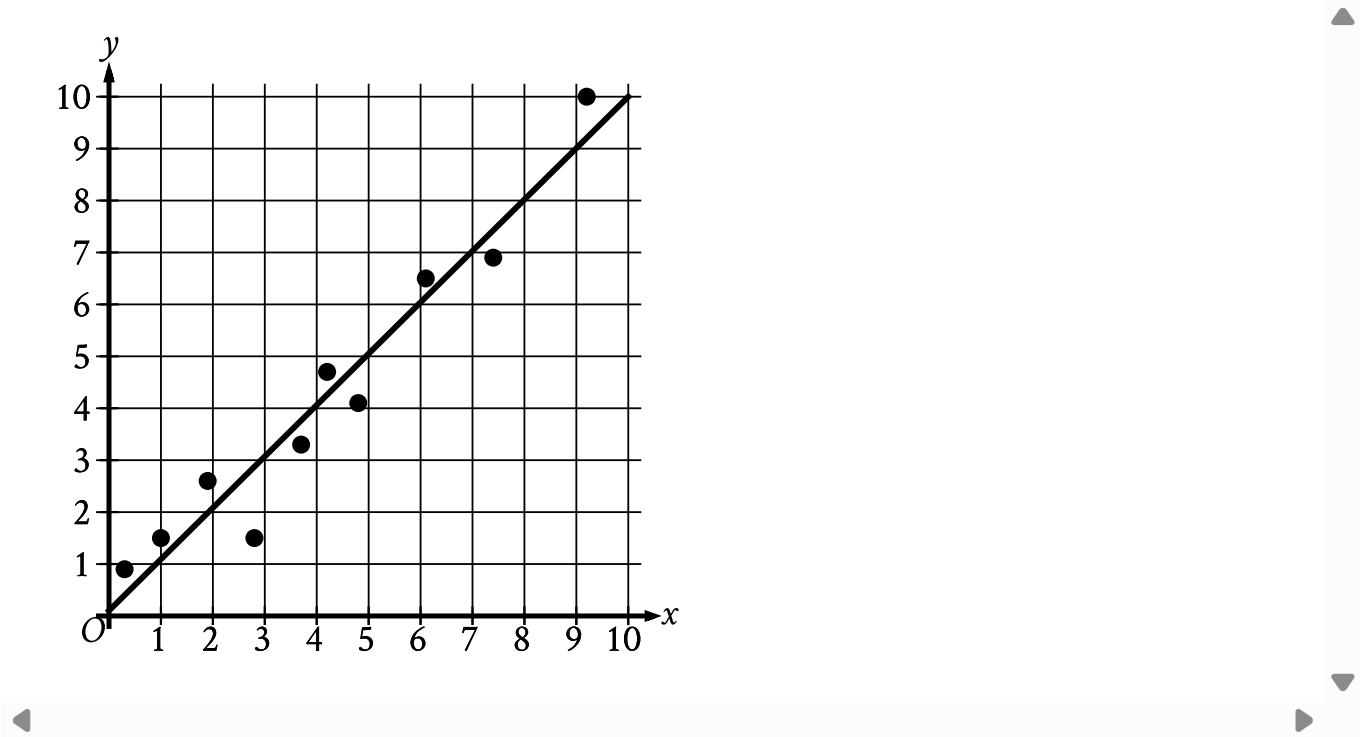
Question Difficulty: Medium

Question ID ea939862

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: ea939862

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



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

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

ID: ea939862 Answer

Correct Answer: C

Rationale

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

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

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

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

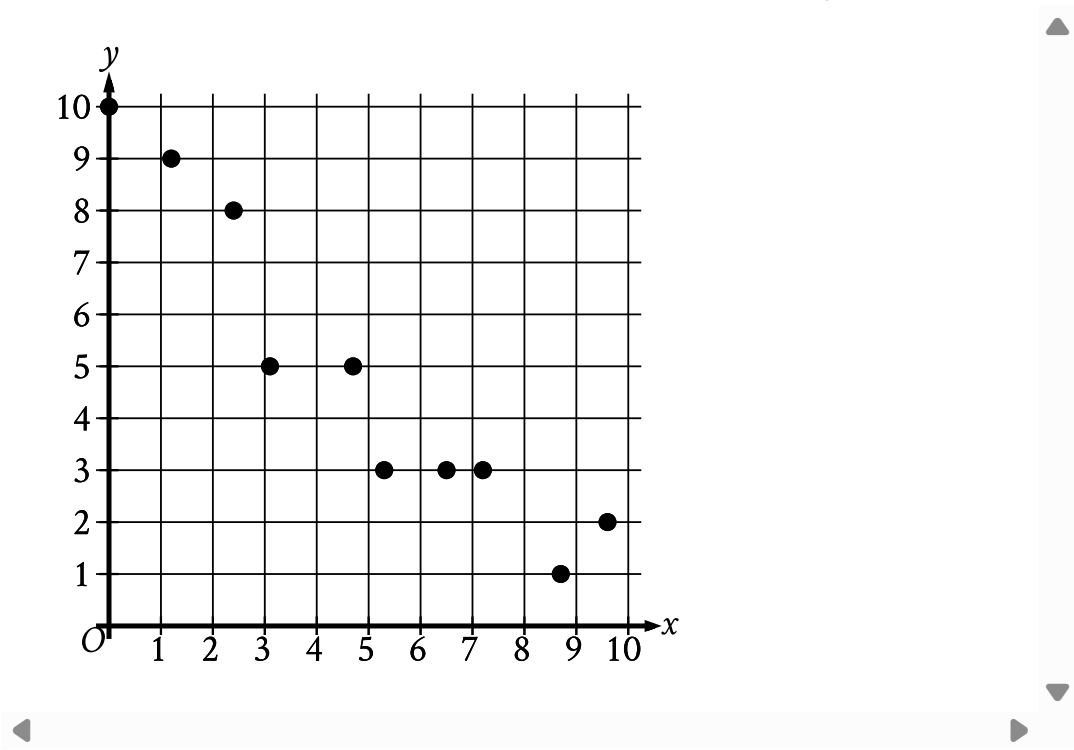
Question Difficulty: Medium

Question ID f10a805e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	<div><div></div><div></div><div></div></div>

ID: f10a805e

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



Which of the following equations is the most appropriate linear model for the data shown?

- A. $y = 0.9 + 9.4x$
- B. $y = 0.9 - 9.4x$
- C. $y = 9.4 + 0.9x$
- D. $y = 9.4 - 0.9x$

ID: f10a805e Answer

Correct Answer: D

Rationale

Choice D is correct. The data points suggest that as the variable x increases, the variable y decreases, which implies that an appropriate linear model for the data has a negative slope. The data points also show that when x is close to 0, y is greater than 9. Therefore, the y -intercept of the graph of an appropriate linear model has a y -coordinate greater than 9. The graph of an equation of the form $y = a + bx$, where a and b are constants, has a y -intercept with a y -coordinate of a and has a slope of b . Of the given choices, only choice D represents a graph that has a negative slope, -0.9 , and a y -intercept with a y -coordinate greater than 9, 9.4 .

Choice A is incorrect. The graph of this equation has a positive slope, not a negative slope, and a y -intercept with a y -coordinate less than 1, not greater than 9.

Choice B is incorrect. The graph of this equation has a y -intercept with a y -coordinate less than 1, not greater than 9.

Choice C is incorrect. The graph of this equation has a positive slope, not a negative slope.

Question Difficulty: Medium