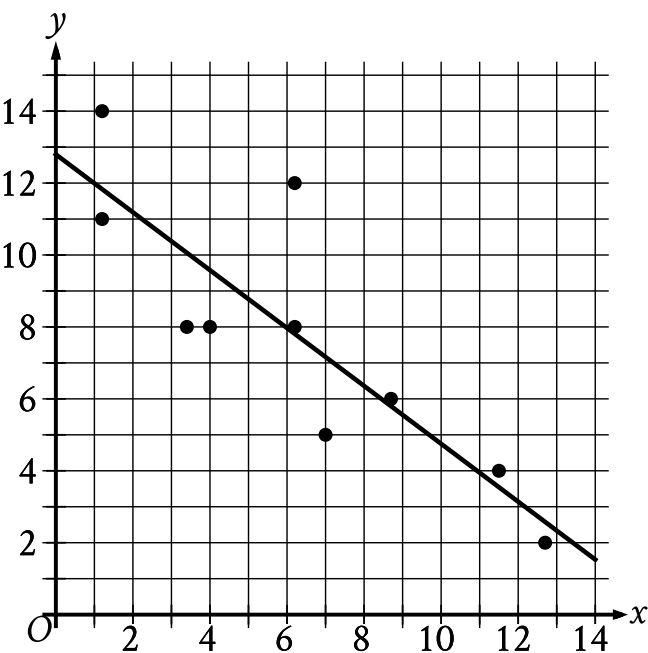


Question ID 14c3d4f9

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 14c3d4f9

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: 14c3d4f9 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.

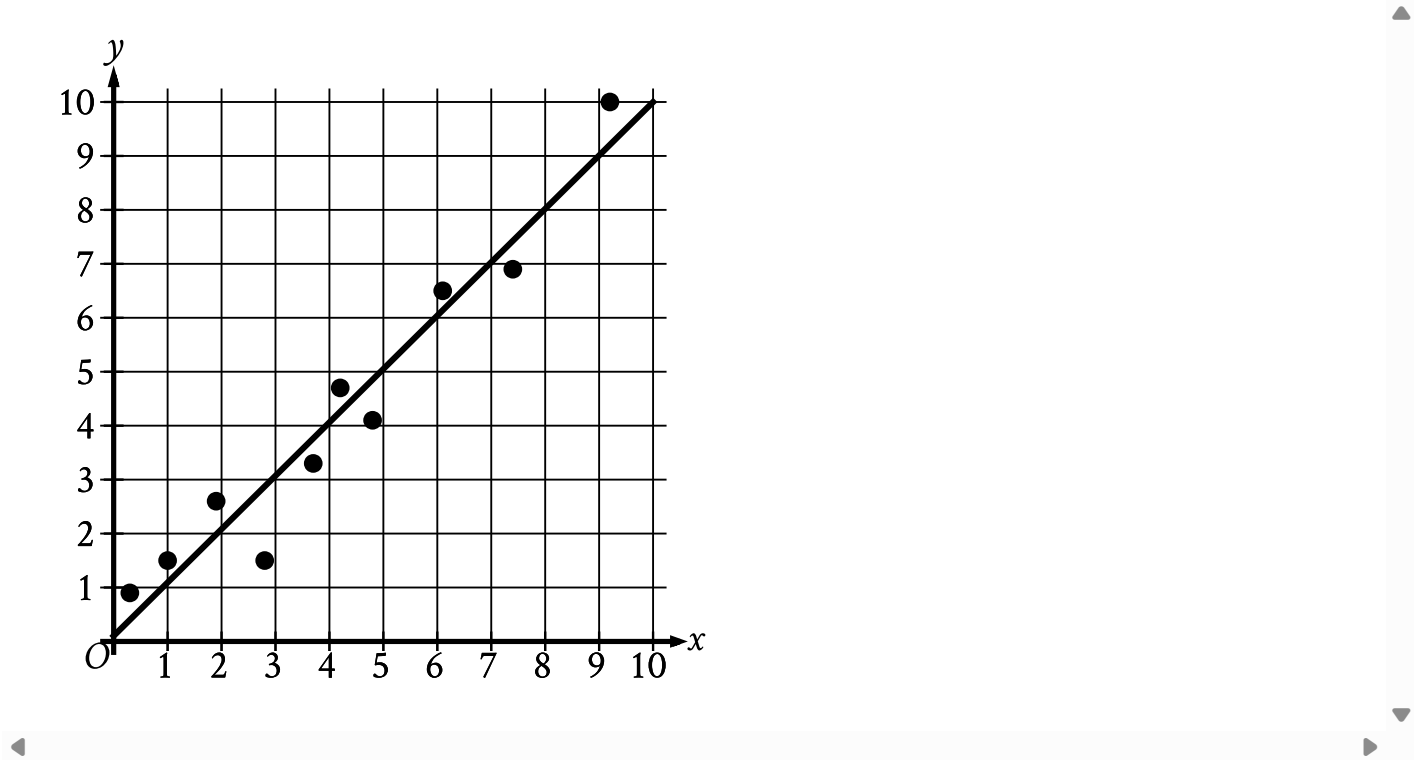
Question Difficulty: Hard

Question ID 54380bb2

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 54380bb2

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: 54380bb2 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.

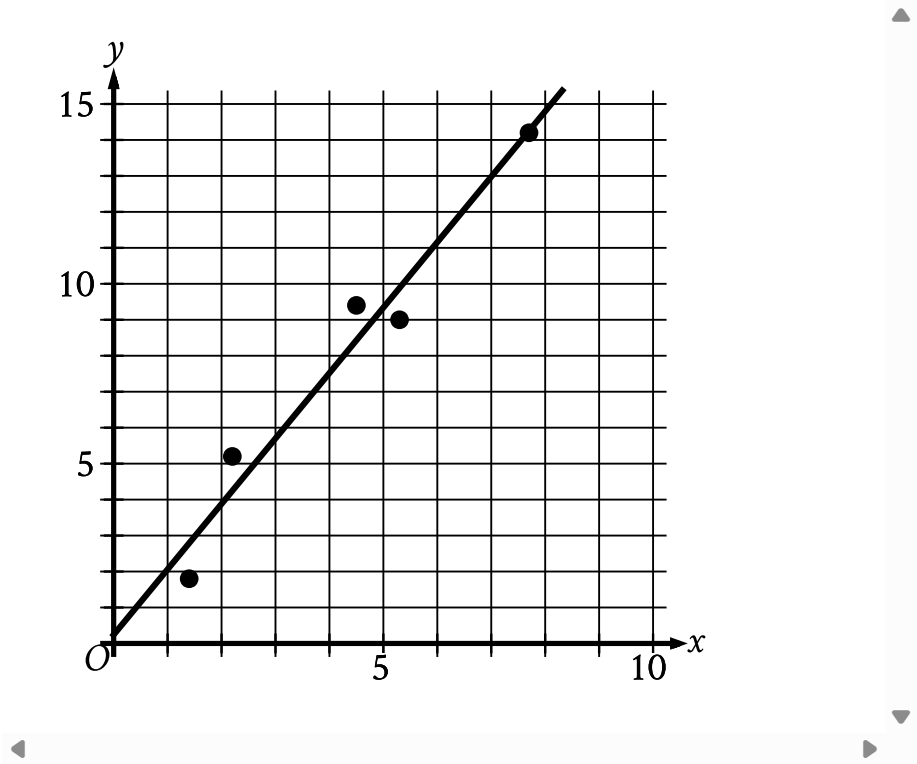
Question Difficulty: Hard

Question ID bd2e4f46

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: bd2e4f46

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: bd2e4f46 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.

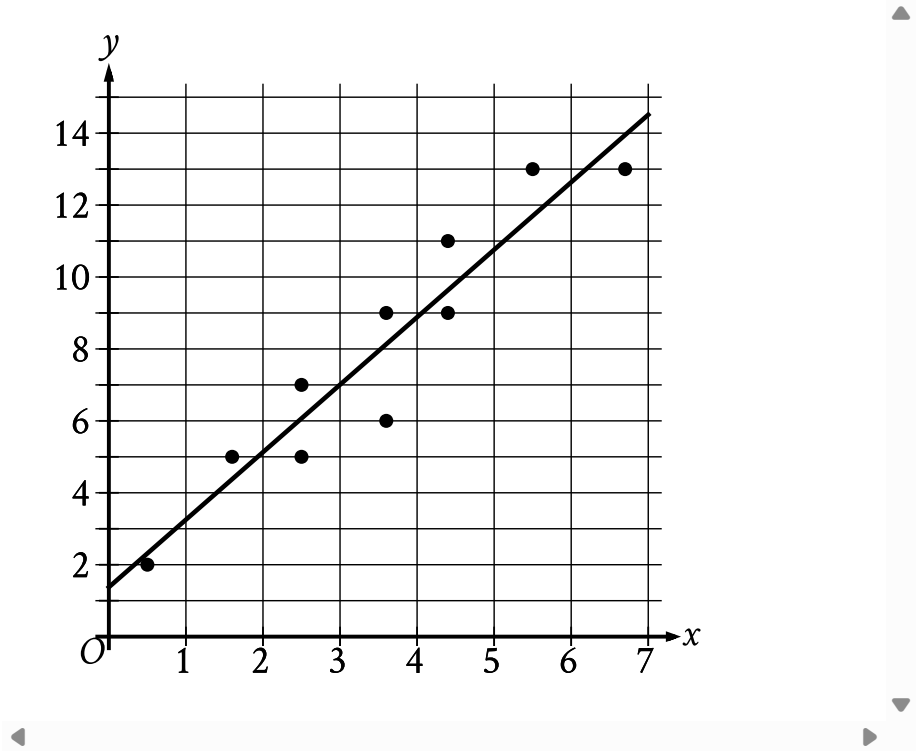
Question Difficulty: Hard

Question ID 0346405a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 0346405a

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
- B. $\frac{1}{2}$
- C. 1
- D. 2

ID: 0346405a Answer

Correct Answer: D

Rationale

Choice D is correct. A line in the xy -plane that passes through the 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 $(1, 3.3)$ and $(7, 14.5)$. It follows that the slope of this best fit line is approximately $\frac{14.5 - 3.3}{7 - 1}$, which is equivalent to $\frac{11.2}{6}$, or approximately 1.87. Therefore, of the given choices, 2 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 B is incorrect and may result from conceptual or calculation errors.

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

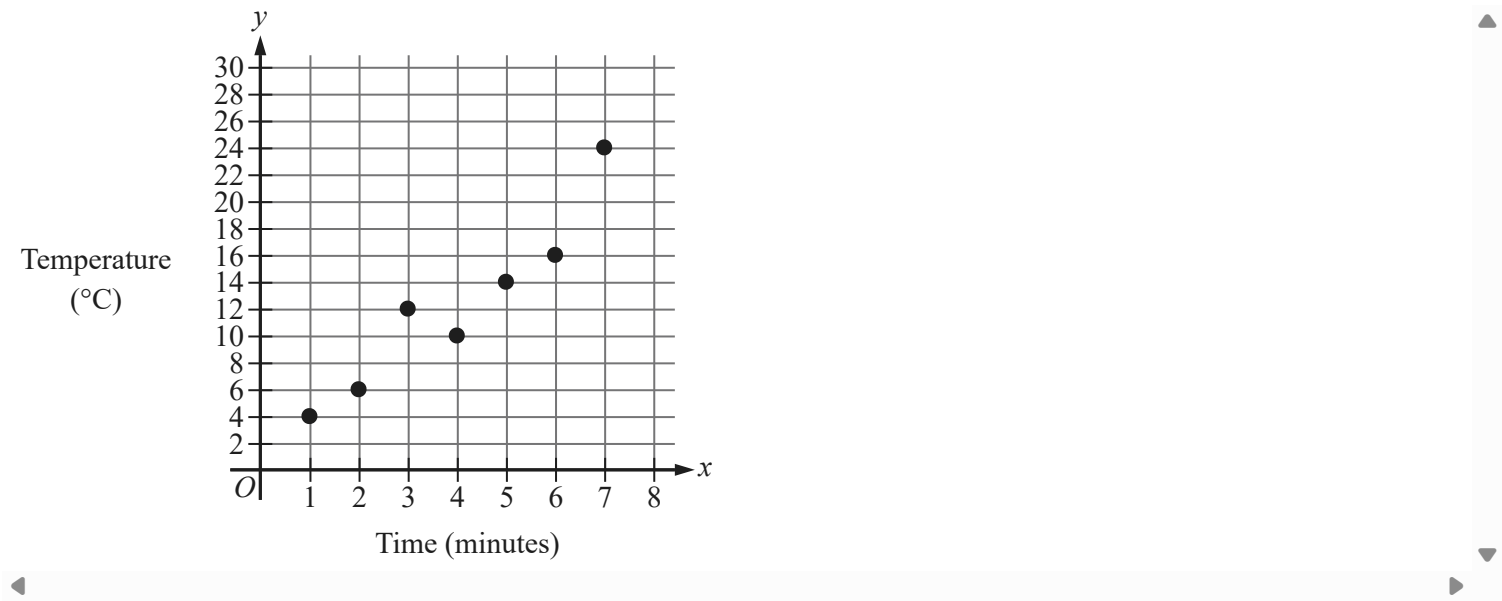
Question Difficulty: Hard

Question ID 171007e3

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 171007e3

During a study, the temperature, **in degrees Celsius ($^{\circ}\text{C}$)**, of the air in a chamber was recorded to the nearest integer at certain times. The scatterplot shows the recorded temperature **y , in $^{\circ}\text{C}$** , of the air in the chamber **x minutes** after the start of the study.



What was the average rate of change, **in $^{\circ}\text{C}$ per minute**, of the recorded temperature of the air in the chamber from **$x = 5$ to $x = 7$** ?

ID: 171007e3 Answer

Correct Answer: 5

Rationale

The correct answer is **5**. For the graph shown, **x** represents time, in minutes, and **y** represents temperature, in degrees Celsius ($^{\circ}\text{C}$). Therefore, the average rate of change, in $^{\circ}\text{C}$ per minute, of the recorded temperature of the air in the chamber between two x -values is the difference in the corresponding y -values divided by the difference in the x -values. The graph shows that at **$x = 5$** , the corresponding y -value is **14**. The graph also shows that at **$x = 7$** , the corresponding y -value is **24**. It follows that the average rate of change, in $^{\circ}\text{C}$ per minute, from **$x = 5$ to $x = 7$** is $\frac{24-14}{7-5}$, which is equivalent to $\frac{10}{2}$, or **5**.

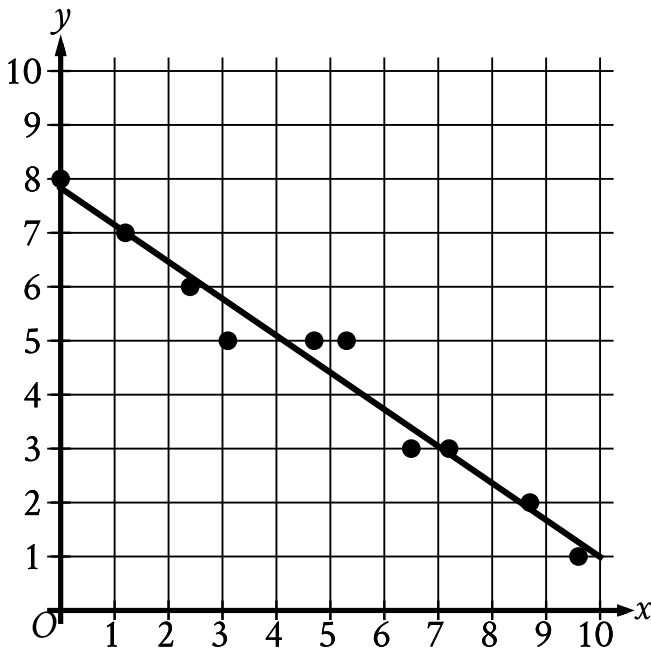
Question Difficulty: Hard

Question ID 8dbc9c80

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 8dbc9c80

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: 8dbc9c80 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.

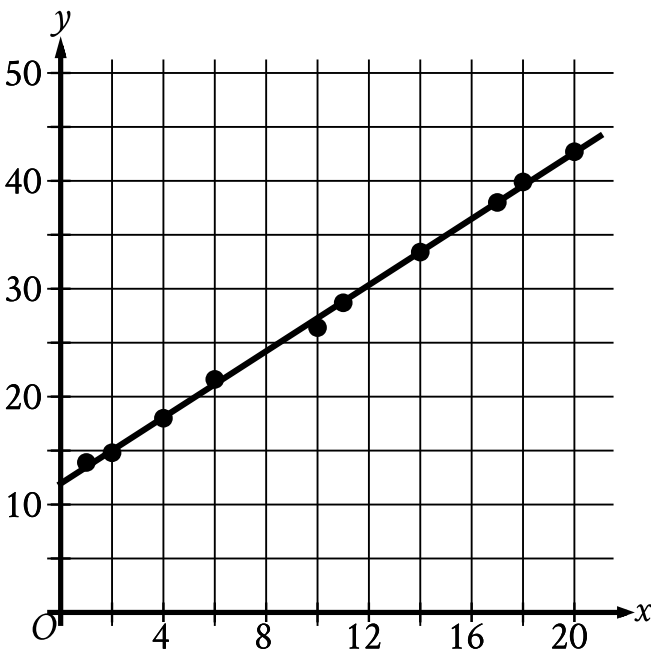
Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

Question ID d978eef4

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: d978eef4



The scatterplot shows the relationship between two variables, x and y , for data set E. A line of best fit is shown. Data set F is created by multiplying the y -coordinate of each data point from data set E by **3.9**. Which of the following could be an equation of a line of best fit for data set F?

- A. $y = 46.8 + 5.9x$
- B. $y = 46.8 + 1.5x$
- C. $y = 12 + 5.9x$
- D. $y = 12 + 1.5x$

ID: d978eef4 Answer

Correct Answer: A

Rationale

Choice A is correct. An equation of a line of best fit for data set F can be written in the form $y = a + bx$, where a is the y -coordinate of the y -intercept of the line of best fit and b is the slope. The line of best fit shown for data set E has a y -intercept at approximately $(0, 12)$. It's given that data set F is created by multiplying the y -coordinate of each data point from data set E by **3.9**. It follows that a line of best fit for data set F has a y -intercept at approximately $(0, 12(3.9))$, or $(0, 46.8)$. Therefore, the value of a is approximately **46.8**. The slope of a line that passes through points (x_1, y_1) and (x_2, y_2) can be calculated as $\frac{y_2 - y_1}{x_2 - x_1}$. Since the line of best fit shown for data set E passes approximately through the point $(12, 30)$, it follows that a line of best fit for data set F passes approximately through the point $(12, 30(3.9))$, or

(12, 117). Substituting (0, 46.8) and (12, 117) for (x_1, y_1) and (x_2, y_2) , respectively, in $\frac{y_2 - y_1}{x_2 - x_1}$ yields $\frac{117 - 46.8}{12 - 0}$, which is equivalent to $\frac{70.2}{12}$, or 5.85. Therefore, the value of b is approximately 5.85, or approximately 5.9. Thus, $y = 46.8 + 5.9x$ could be an equation of a line of best fit for data set F.

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. This could be an equation of a line of best fit for data set E, not data set F.

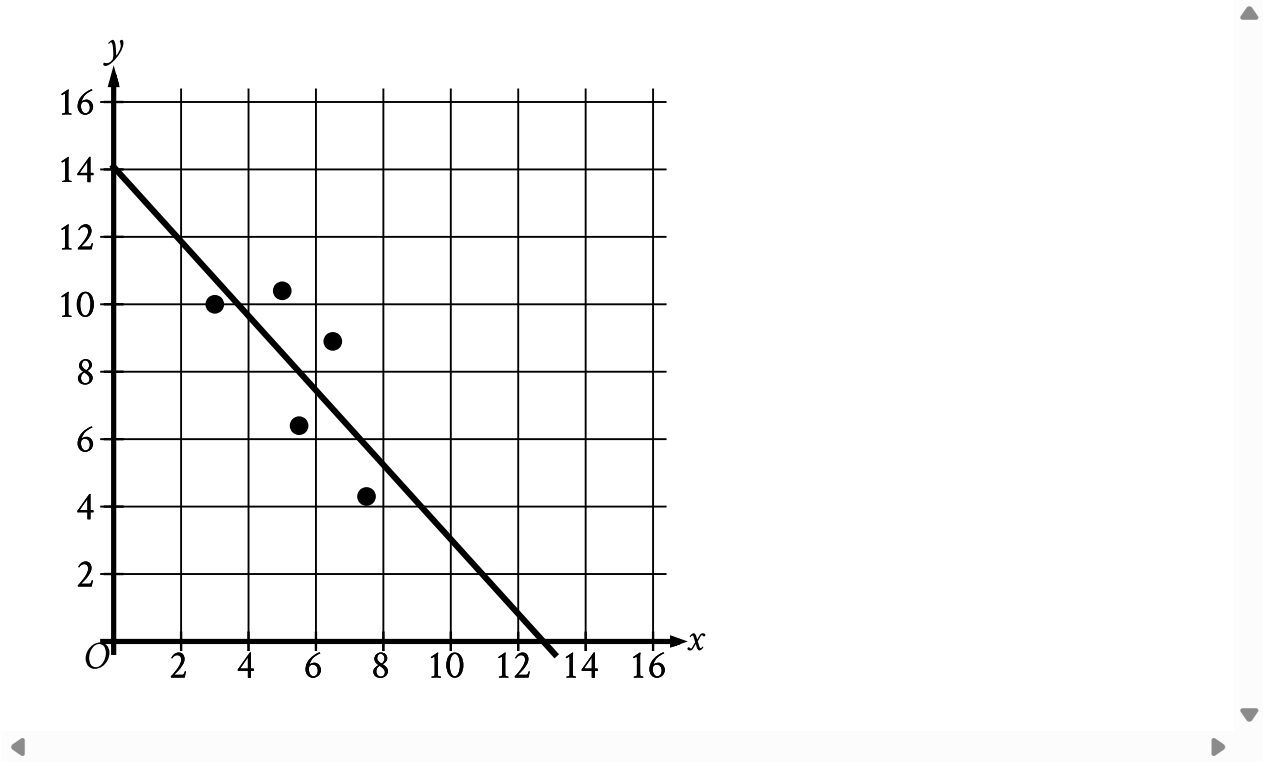
Question Difficulty: Hard

Question ID cbf73e2a

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: cbf73e2a

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 this line of best fit?

- A. **−3.3**
- B. **−1.1**
- C. **1.1**
- D. **3.3**

ID: cbf73e2a Answer

Correct Answer: B

Rationale

Choice B 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 $(0, 14)$ and $(13, 0)$. It follows that the slope of this line of best fit is approximately $\frac{0 - 14}{13 - 0}$, or $-\frac{14}{13}$. Of the given choices, **−1.1** is closest to $-\frac{14}{13}$.

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

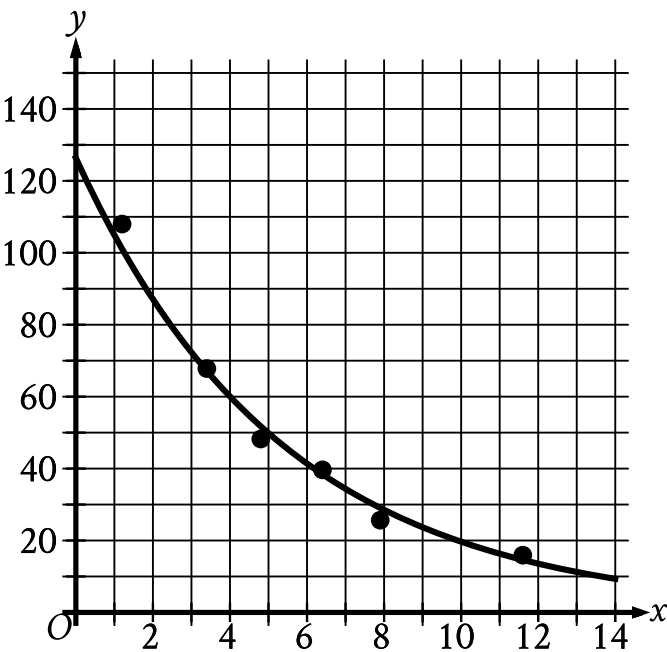
Choice C is incorrect and may result from conceptual or calculation errors.

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

Question ID 5d546c0e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 5d546c0e



The scatterplot shows the relationship between two variables, x and y . An equation for the exponential model shown can be written as $y = a(b)^x$, where a and b are positive constants. Which of the following is closest to the value of b ?

- A. 0.83
- B. 1.83
- C. 18.36
- D. 126.35

ID: 5d546c0e Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that an equation for the exponential model shown can be written as $y = a(b)^x$, where a and b are positive constants. For an exponential model written in this form, if the value of b is greater than 0 but less than 1, the model is decreasing. If the value of b is greater than 1, the model is increasing. The exponential model shown is decreasing. Therefore, the value of b is greater than 0 but less than 1. Of the given choices, only 0.83 is a value greater than 0 but less than 1. Thus, 0.83 is closest to the value of 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.

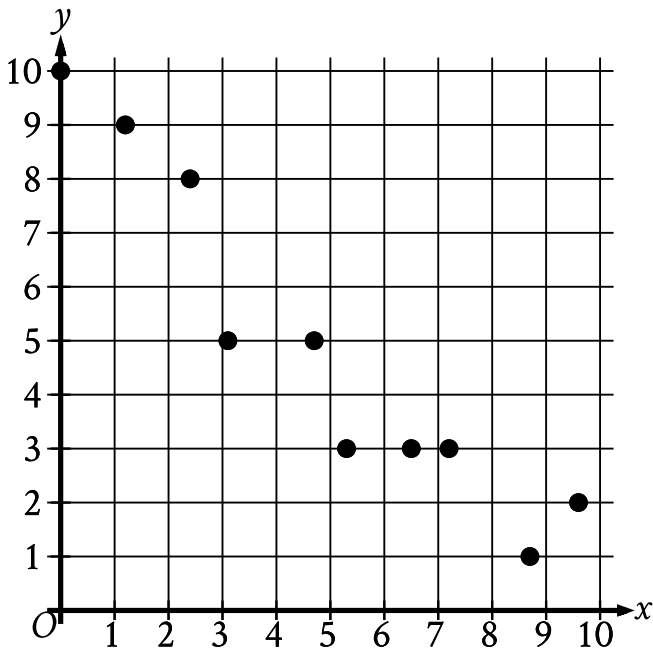
Question Difficulty: Hard

Question ID fab4c69e

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: fab4c69e

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: fab4c69e 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**.

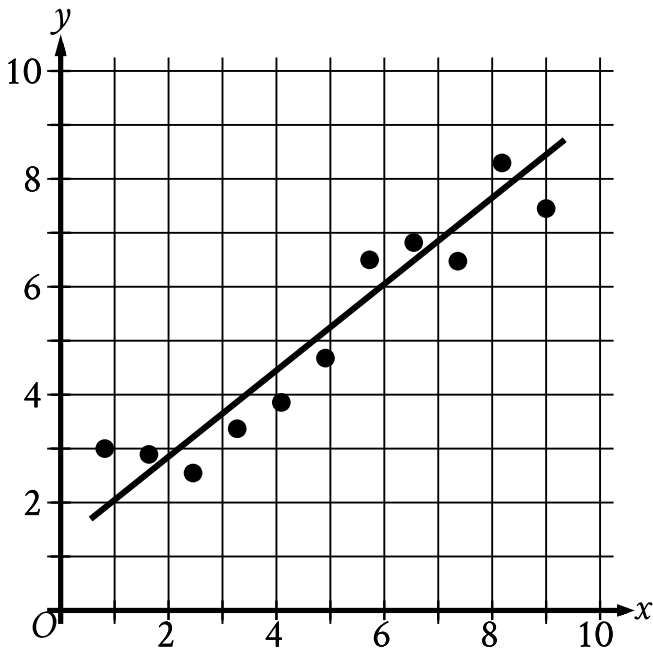
Choice C is incorrect. The graph of this equation has a positive slope, not a negative slope.

Question Difficulty: Hard

Question ID f4026706

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: f4026706



The scatterplot shows the relationship between two variables, x and y . A line of best fit is also shown. For how many of the 11 data points does the line of best fit predict a greater y -value than the actual y -value?

ID: f4026706 Answer

Correct Answer: 6

Rationale

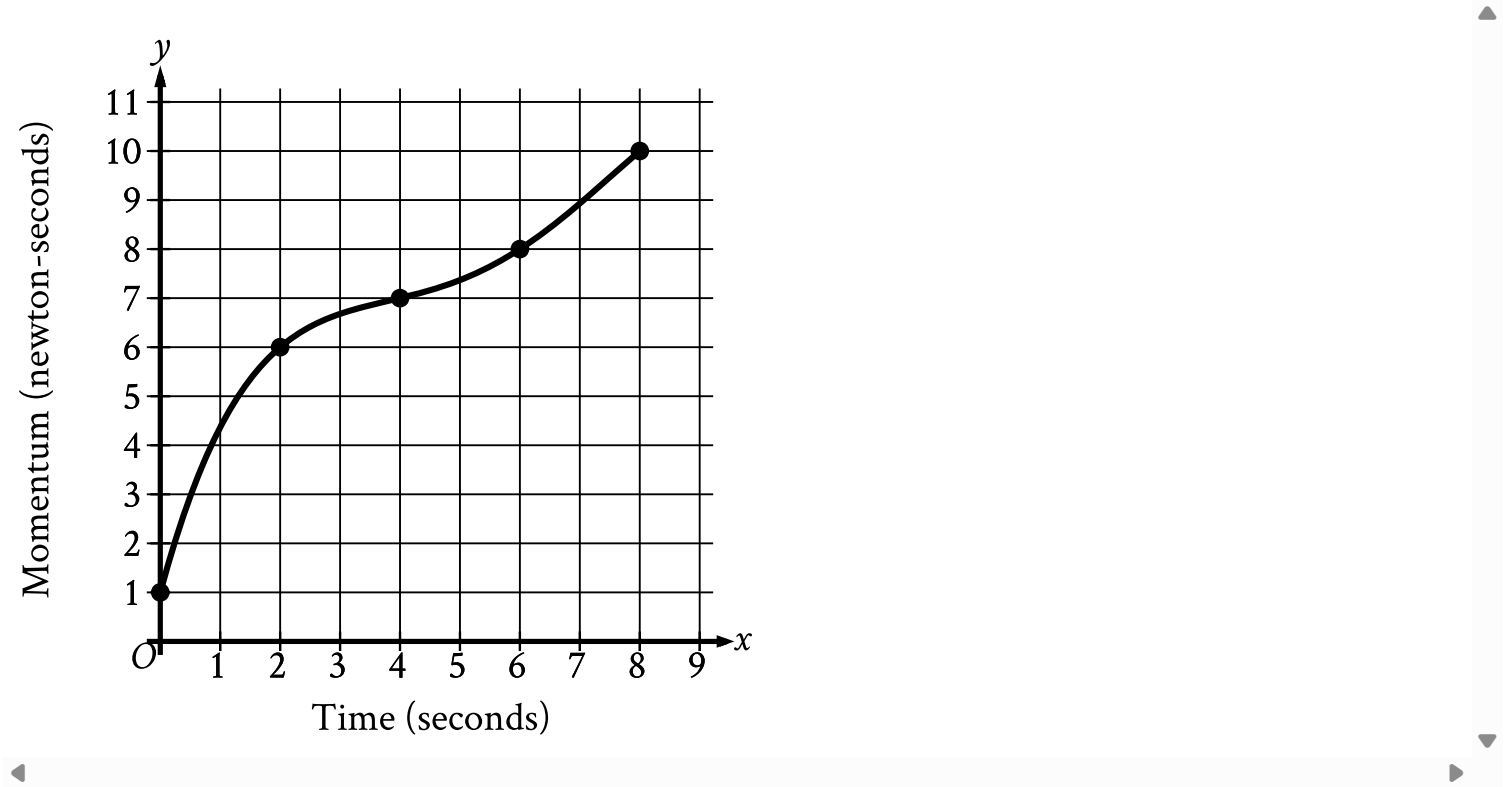
The correct answer is **6**. The line of best fit predicts a greater y -value than the actual y -value for any data point that's located below the line of best fit. For the scatterplot shown, **6** of the data points are below the line of best fit. Therefore, the line of best fit predicts a greater y -value than the actual y -value for **6** of the data points.

Question Difficulty: Hard

Question ID b8f73cba

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: b8f73cba



The graph shows the momentum y , in newton-seconds, of an object x seconds after the object started moving, for $0 \leq x \leq 8$. What is the average rate of change, in newton-seconds per second, in the momentum of the object from $x = 2$ to $x = 6$?

ID: b8f73cba Answer

Correct Answer: 0.5, 1/2

Rationale

The correct answer is $\frac{1}{2}$. For the graph shown, x represents time, in seconds, and y represents momentum, in newton-seconds. Therefore, the average rate of change, in newton-seconds per second, in the momentum of the object between two x -values is the difference in the corresponding y -values divided by the difference in the x -values. The graph shows that at $x = 2$, the corresponding y -value is 6. The graph also shows that at $x = 6$, the corresponding y -value is 8. It follows that the average rate of change, in newton-seconds per second, from $x = 2$ to $x = 6$ is $\frac{8-6}{6-2}$, which is equivalent to $\frac{2}{4}$, or $\frac{1}{2}$. Note that 1/2 and .5 are examples of ways to enter a correct answer.

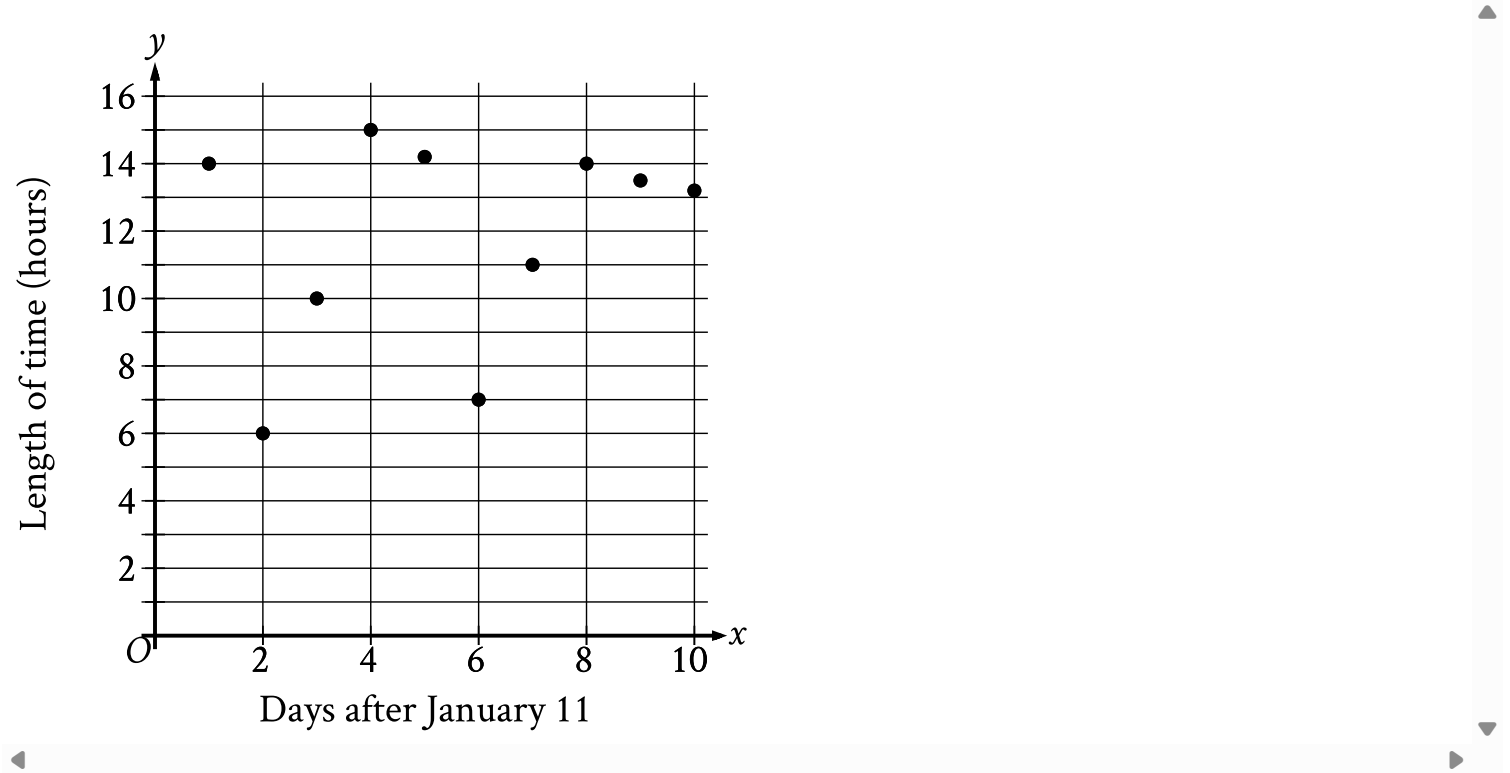
Question Difficulty: Hard

Question ID defbe7d4

Assessment	Test	Domain	Skill	Difficulty
PSAT 8/9	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: defbe7d4

The scatterplot shows the relationship between the length of time y , in hours, a certain bird spent in flight and the number of days after January 11, x .



What is the average rate of change, in hours per day, of the length of time the bird spent in flight on January 13 to the length of time the bird spent in flight on January 15?

ID: defbe7d4 Answer

Correct Answer: 4.5, 9/2

Rationale

The correct answer is $\frac{9}{2}$. It's given that the scatterplot shows the relationship between the length of time y , in hours, a certain bird spent in flight and the number of days after January 11, x . Since January 13 is 2 days after January 11, it follows that January 13 corresponds to an x -value of 2 in the scatterplot. In the scatterplot, when $x = 2$, the corresponding value of y is 6. In other words, on January 13, the bird spent 6 hours in flight. Since January 15 is 4 days after January 11, it follows that January 15 corresponds to an x -value of 4 in the scatterplot. In the scatterplot, when $x = 4$, the corresponding value of y is 15. In other words, on January 15, the bird spent 15 hours in flight. Therefore, the average rate of change, in hours per day, of the length of time the bird spent in flight on January 13 to the length of time the bird spent in flight on January 15 is the difference in the length of time, in hours, the bird spent in flight divided by the difference in the number of days after January 11, or $\frac{15-6}{4-2}$, which is equivalent to $\frac{9}{2}$. Note that 9/2 and 4.5 are examples of ways to enter a correct answer.

Question Difficulty: Hard