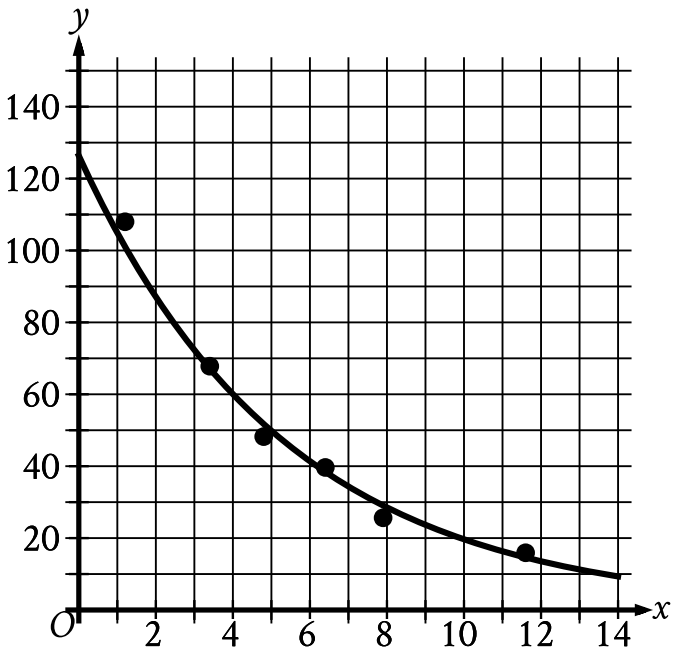
Question ID 3ee345a1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 3ee345a1



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: 3ee345a1 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 0a975aa5

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 0a975aa5

For $x > 0$, the function f is defined as follows:

$f(x)$ equals 201% of x

Which of the following could describe this function?

A. Decreasing exponential

B. Decreasing linear

C. Increasing exponential

D. Increasing linear

ID: 0a975aa5 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that for $x > 0$, $f(x)$ is equal to 201% of x. This is equivalent to $f(x) = \frac{201}{100}x$, or $f(x) = 2.01x$, for $x > 0$. This function indicates that as x increases, $f(x)$ also increases, which means f is an increasing function. Furthermore, $f(x)$ increases at a constant rate of 2.01 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 and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

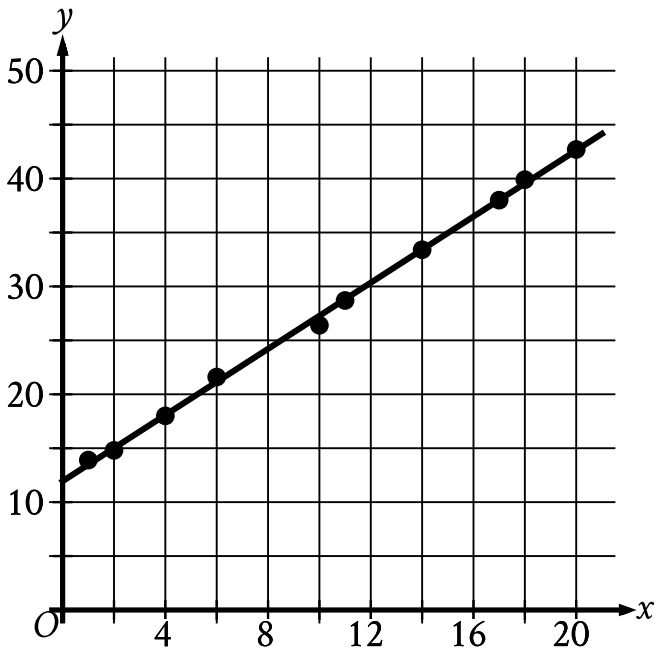
Choice C is incorrect. This could describe the function $f(x) = (2.01)^x$, where $f(x)$ is equal to 201% of $f(x - 1)$, not x, for $x > 0$.

Question Difficulty: Hard

Question ID dc8ef67e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: dc8ef67e



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: dc8ef67e 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.

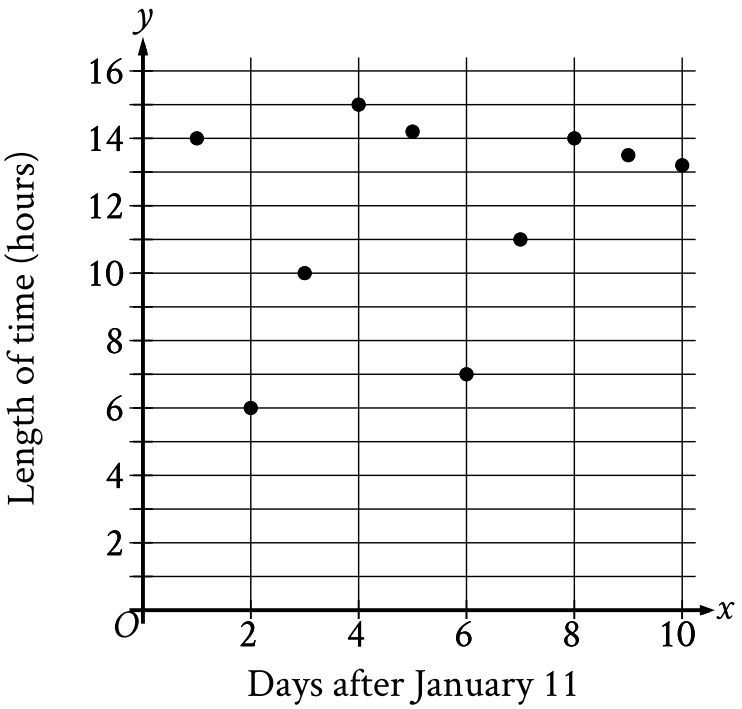
Question Difficulty: Hard

Question ID 6a61db85

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Problem-Solving and Data Analysis	Two-variable data: Models and scatterplots	Hard

ID: 6a61db85

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: 6a61db85 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