

1.3 Reteach

Key Idea

Writing an Equation of a Line

Given slope m and y -intercept b

Use slope-intercept form:

$$y = mx + b$$

Given slope m and a point (x_1, y_1)

Use point-slope form:

$$y - y_1 = m(x - x_1)$$

Given points (x_1, y_1) and (x_2, y_2)

First use the slope formula to find m . Then use point-slope form with either given point.

EXAMPLE Writing a Linear Equation from a Graph

The graph shows the height of a tree. Write an equation of the line and interpret the slope. After how many years will the tree be 18 feet tall?

SOLUTION

From the graph, you can see that the slope is $m = \frac{12}{8} = 1.5$ and the y -intercept is $b = 0$. Use slope-intercept form to write an equation of the line.

$$y = mx + b$$

Slope-intercept form

$$= 1.5x + 0$$

Substitute 1.5 for m and 0 for b .

The equation is $y = 1.5x$. The slope indicates that the tree grows 1.5 feet per year.

Use the equation to find how long it takes the tree to be 18 feet tall.

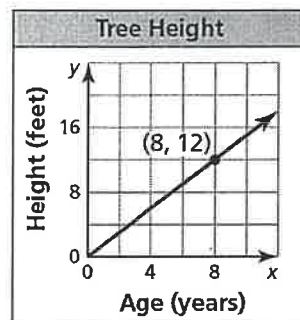
$$18 = 1.5x$$

Substitute 18 for y .

$$12 = x$$

Divide each side by 1.5.

► After 12 years, the tree will be 18 feet tall.



Key Idea

Finding a Line of Fit

Step 1 Make a scatter plot of the data.

Step 2 Draw the line that most closely appears to follow the trend given by the data points. There should be about as many points above the line as below it.

Step 3 Choose two points on the line and estimate the coordinates of each point. These points do not have to be original data points.

Step 4 Write an equation of the line that passes through the two points from Step 3. This equation is a model for the data.



Puzzle Time

① $(0,0)(2,8)$
 $\frac{8-0}{2-0} = \frac{8}{2} = 4$
 $y-0 = 4(x-0)$
 $y = 4x$

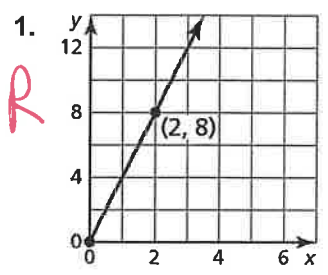
② $(0,2)(3,3)$
 $\frac{3-2}{3-0} = \frac{1}{3}$
 $y-2 = \frac{1}{3}(x-0)$
 $y-2 = \frac{1}{3}x$
 $y = \frac{1}{3}x + 2$

③ $(5,16)(15,12)$
 $\frac{16-12}{5-15} = \frac{4}{-10} = -\frac{2}{5}$
 $y-16 = -\frac{2}{5}(x-5)$
 $y-16 = -\frac{2}{5}x + 2$
 $y = -\frac{2}{5}x + 18$

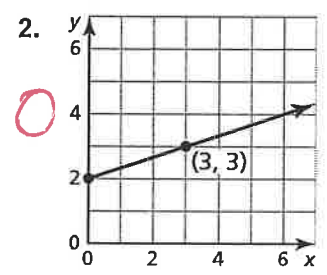
What Do You Call It When A Chicken Stumbles As It Crosses The Street?

Write the letter next to each answer in the box containing the exercise number.

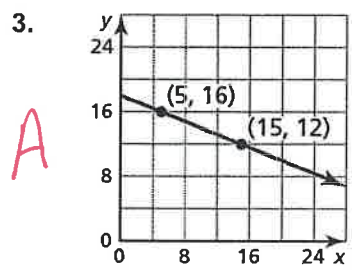
Use the graph to write an equation of the line.



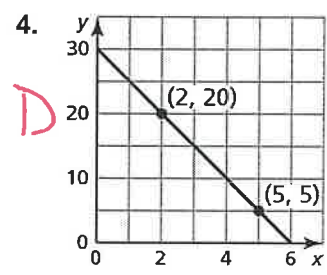
R



O



A



D

- Answers**

 - ~~O~~ $y = \frac{1}{3}x + 2$
 - ~~A~~ $y = -\frac{2}{5}x + 18$
 - ~~P~~ $y = \frac{1}{2}x + 3$
 - ~~R~~ $y = -\frac{4}{5}x + 8$
 - ~~D~~ $y = -5x + 30$
 - ~~T~~ $y = -\frac{2}{3}x + 5\frac{1}{3}$
 - ~~R~~ $y = 4x$
 - ~~I~~ $y = \frac{1}{2}x + 2\frac{1}{2}$

④ $(2,20)(5,5)$
 $\frac{20-5}{2-5} = \frac{15}{-3} = -5$
 $y-20 = -5(x-2)$
 $y-20 = -5x + 10$
 $y = -5x + 30$

The data in the table show a linear relationship. Write an equation of a line of fit.

5.

x	y
-7	10
-4	8
-1	6
2	4

T

6.

x	y
5	4
2.5	6
0	8
-2.5	10

R

7.

x	y
-13	-4
-17	-6
-21	-8
-25	-10

I

8.

x	y
-6	0
-4	1
-2	2
0	3

P

$(-1,6)(2,4)$
 $\frac{6-4}{-1-2} = \frac{2}{-3} = -\frac{2}{3}$
 $y-4 = -\frac{2}{3}(x-2)$
 $y-4 = -\frac{2}{3}x + \frac{4}{3}$
 $y = -\frac{2}{3}x + \frac{16}{3}$

$(5,4)(0,8)$
 $\frac{4-8}{5-0} = -\frac{4}{5} = -\frac{4}{5}$
 $y-8 = -\frac{4}{5}(x-0)$
 $y-8 = -\frac{4}{5}x$
 $y = -\frac{4}{5}x + 8$

$(-13,-4)(-17,-6)$
 $\frac{-4-(-6)}{-13-(-17)} = \frac{2}{4} = \frac{1}{2}$
 $y+4 = \frac{1}{2}(x+13)$
 $y+4 = \frac{1}{2}x + \frac{13}{2}$
 $y = \frac{1}{2}x + \frac{5}{2}$

$(-6,0)(-4,1)$
 $\frac{0-1}{-6-(-4)} = \frac{-1}{-2} = \frac{1}{2}$
 $y-0 = \frac{1}{2}(x+6)$
 $y = \frac{1}{2}x + 3$

