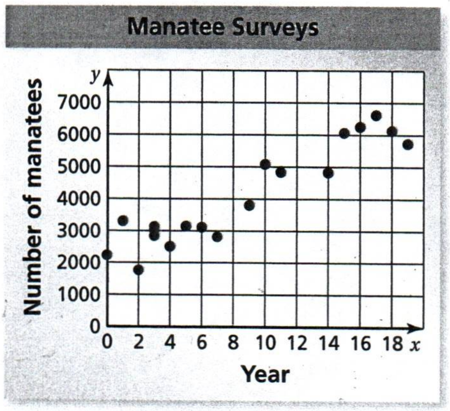
5.2 Lesson

used to estimate data

Key Vocabulary
line of fit, *p. 360*

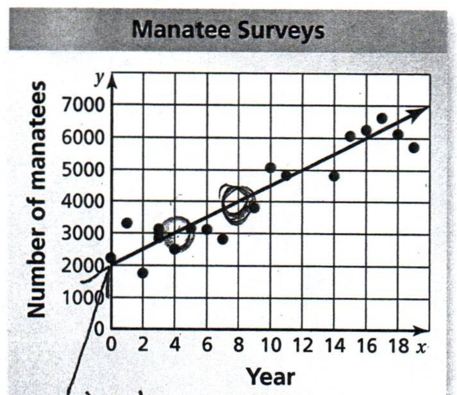
A **line of fit** is a line drawn on a scatter plot close to most of the data points. It can be used to estimate data on a graph.

Example 1 Finding a Line of Fit



The scatter plot shows the numbers of manatees counted off the coast of Florida in aerial surveys from 2000 to 2019, where $x = 0$ represents the year 2000. Draw a line of fit. Then write an equation of the line.

The scatter plot shows a positive linear relationship. Draw a line that is close to the data points. Try to have as many points above the line as below it.



y int

try to have the same # of dots on each side of the line

$\frac{\text{rise}}{\text{run}}$ $\frac{1000}{4}$

$m=250$

A line of fit does not need to pass through any of the data points.

The line appears to pass through the points (4, 3000) and (10, 4500). Use the points to find the slope of the line.

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{1500}{6} = 250$$

Use the slope $m = 250$ and the point (4, 3000) to find the y-intercept.

$y = mx + b$	Write the slope-intercept form.
$3000 = 250(4) + b$	Substitute 3000 for y, 250 for m, and 4 for x.
$2000 = b$	Solve for b.

▶ So, an equation of the line of fit is $y = 250x + 2000$.

equation of line of fit $y = 250x + 2000$

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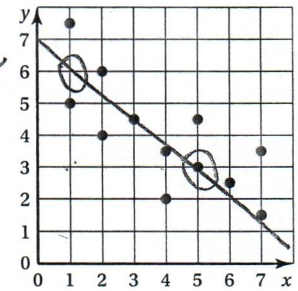
Try It

FINDING A LINE OF FIT Draw a line of fit. Then write an equation of the line.

1.

negative



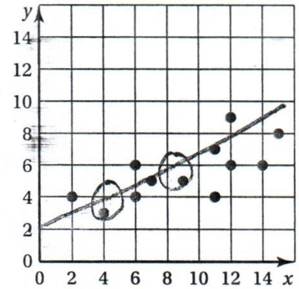
$m = \frac{-3}{4}$

$b = 7$

$y = \frac{-3}{4}x + 7$

2.

positive



$m = \frac{1}{2}$

$b = 2$

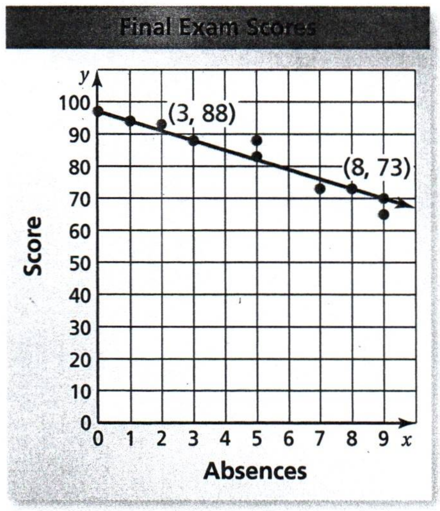
$y = \frac{1}{2}x + 2$

*your answer might be slightly different

Example 2 Interpreting a Line of Fit

Absences, x	Final Exam Score, y
0	97
3	88
2	93
5	83
7	73
9	70
5	88
1	94
9	65
8	73

The table shows the number of absences in a school year and the final exam scores for several students. (a) Make a scatter plot of the data and draw a line of fit. (b) Write an equation of the line of fit. (c) Interpret the slope and the *y*-intercept of the line of fit.



a. Plot the points in a coordinate plane. The scatter plot shows a negative linear relationship. Draw a line that is close to the data points.

b. The line passes through (3, 88) and (8, 73).

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{-15}{5} = -3$$

You can use the slope -3 and the point (3, 88) to determine that the *y*-intercept is 97.

So, an equation of the line of fit is $y = -3x + 97$.

c. The slope is -3 and the *y*-intercept is 97. So, a student with 0 absences is expected to earn a 97 on the exam, and the score decreases by about 3 points per absence.

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