

5.6

Fit a Line to Data

- Goal** • Make scatter plots and write equations to model data.

Your Notes

VOCABULARY

Scatter plot

Correlation

Line of fit

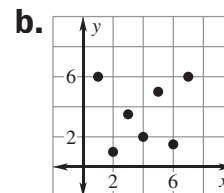
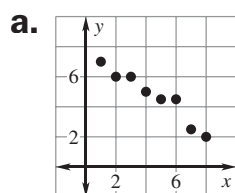
CORRELATION

- If y tends to increase as x increases, the paired data are said to have a _____ correlation.
- If y tends to decrease as x increases, the paired data are said to have a _____ correlation.
- If x and y have no apparent relationship, the paired data are said to have _____ correlation.

Example 1

Describe the correlation of data

Describe the correlation of data graphed in the scatter plot.



Solution

a. _____
correlation

b. _____
correlation

Example 2 Make a scatter plot

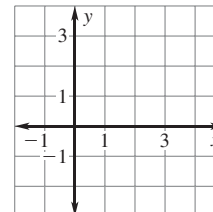
a. Make a scatter plot of the data in the table.

x	1	1.5	2	2	3	3.5	4
y	3	1	1	-0.5	-1	-0.5	-2

b. Describe the correlation of the data.

Solution

a. Treat the data as ordered pairs. Plot the ordered pairs as _____ in a coordinate plane.



b. The scatter plot shows a _____ correlation.

USING A LINE OF FIT TO MODEL DATA

Step 1 Make a _____ of the data.

Step 2 Decide whether the data can be modeled by a _____.

Step 3 Draw a line that appears to _____ the data closely. There should be approximately as many points _____ the line as _____ it.

Step 4 Write an equation using _____ points on the line. The points do not have to represent actual data pairs, but they must lie on the line of fit.

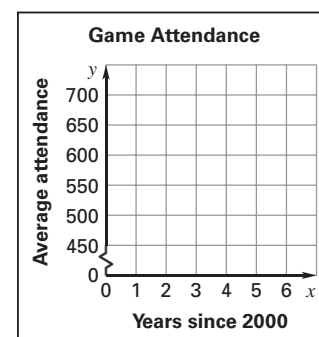
Example 3 Write an equation to model data

Game Attendance The table shows the average attendance at a school's varsity basketball games for various years. Write an equation that models the average attendance at varsity basketball games as a function of the number of years since 2000.

Year	2000	2001	2002	2003	2004	2005	2006
Avg. Game Attendance	488	497	525	567	583	621	688

Solution

Step 1 Make a _____ of the data. Let x represent the number of years since 2000. Let y represent average game attendance.



Step 2 Decide whether the data can be modeled by a line. Because the scatter plot shows a _____ correlation, you can fit a line to the data.

Step 3 Draw a line that appears to fit the points in the scatter plot _____.

Step 4 Write an equation using two points on the line. Use (1, 493) and (5, 621).

Find the _____ of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\boxed{} - \boxed{}}{\boxed{} - \boxed{}}$$

$$= \frac{\boxed{}}{\boxed{}}$$

$$= \boxed{}$$

Your Notes

Find the y-intercept of the line. Use the point (5, 621).

$$y = mx + b$$

Write slope-intercept form.

$$\underline{\hspace{2cm}} = \underline{\hspace{1cm}}(\underline{\hspace{1cm}}) + b$$

Substitute $\underline{\hspace{1cm}}$ for m , $\underline{\hspace{1cm}}$ for x , and $\underline{\hspace{1cm}}$ for y .

$$\underline{\hspace{2cm}} = b$$

Solve for b .

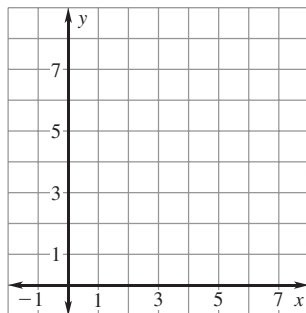
An equation of the line of fit is $\underline{\hspace{4cm}}$.

The average attendance y of varsity basketball games can be modeled by the function $\underline{\hspace{4cm}}$ where x is the number of years since 2000.

✓ Checkpoint Complete the following exercises.

1. Make a scatter plot of the data in the table. Describe the correlation of the data.

x	1	2	2	3	4	5
y	5	5	6	7	8	8



2. Use the data in the table to write an equation that models y as a function of x .

x	1	2	3	4	5	6
y	65	76	82	86	92	97

Homework