SCATTER PLOT

Determine whether each graph shows a *positive correlation*, a *negative correlation*, or *no correlation*. If there is a positive or negative correlation, describe its meaning in the situation.
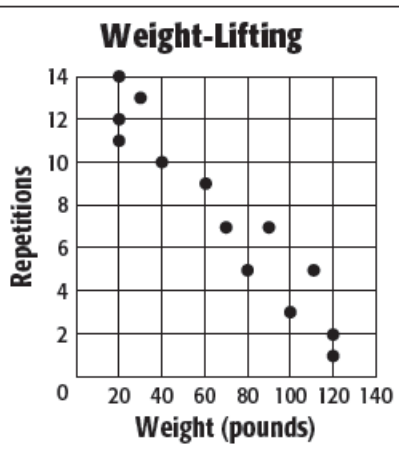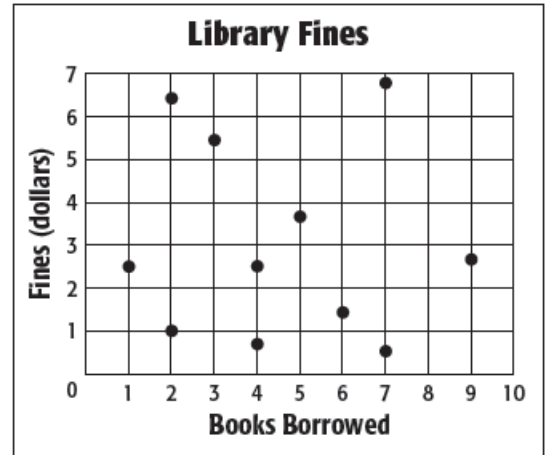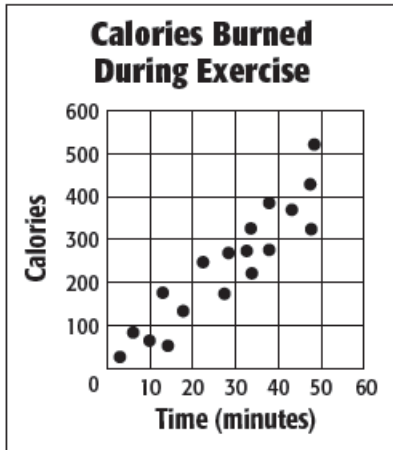
Calories Burned During Exercise

Y-axis: Calories (0, 100, 200, 300, 400, 500, 600)
X-axis: Time (minutes) (0, 10, 20, 30, 40, 50, 60)

Library Fines

Y-axis: Fines (dollars) (0, 1, 2, 3, 4, 5, 6, 7)
X-axis: Books Borrowed (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)

Weight-Lifting

Y-axis: Repetitions (0, 2, 4, 6, 8, 10, 12, 14)
X-axis: Weight (pounds) (20, 40, 60, 80, 100, 120, 140)

Car Dealership Revenue

Y-axis: Revenue (hundreds of thousands) (0, 2, 4, 6, 8, 10, 12, 14)
X-axis: Year ('99, '00, '01, '02, '03, '04, '05, '06, '07, '08)

SCATTER PLOT WORD PROBLEM

BASEBALL The scatter plot shows the average price of a major-league baseball ticket from 1997 to 2006.

a. Determine what relationship, if any, exists in the data. Explain.

b. Use the points (1998, 13.60) and (2003, 19.00) to write the slope-intercept form of an equation for the line of fit shown in the scatter plot.

c. Predict the price of a ticket in 2009.

Baseball Ticket Prices
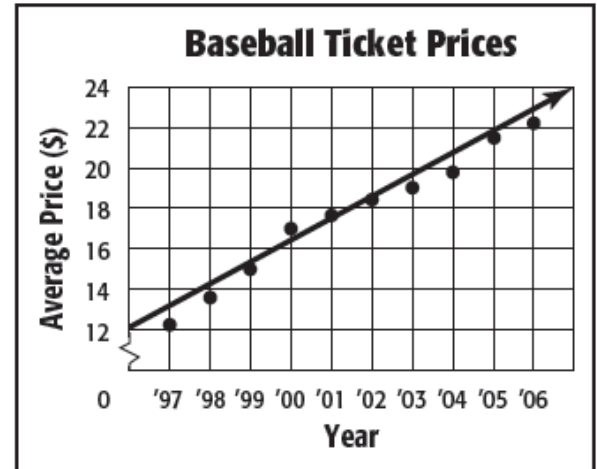
Source: Team Marketing Report, Chicago

SCATTER PLOT WORD PROBLEM

DISEASE The table shows the number of cases of Foodborne Botulism in the United States for the years 2001 to 2005.

a. Draw a scatter plot and determine what relationship, if any, exists in the data.

b. Draw a line of fit for the scatter plot.

c. Write the slope-intercept form of an equation for the line of fit.

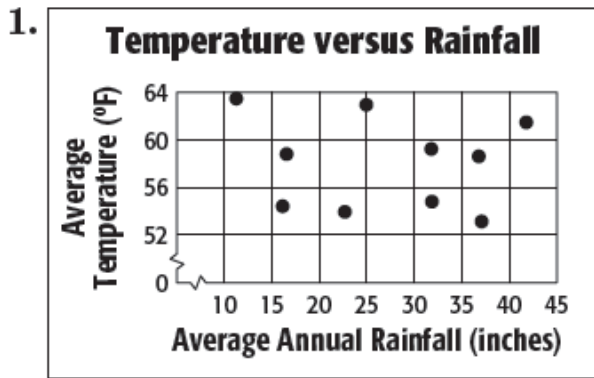| U.S. Foodborne Botulism Cases					
Year	2001	2002	2003	2004	2005
Cases	39	28	20	16	18

**Source:** Centers for Disease Control

U.S. Foodborne Botulism Cases
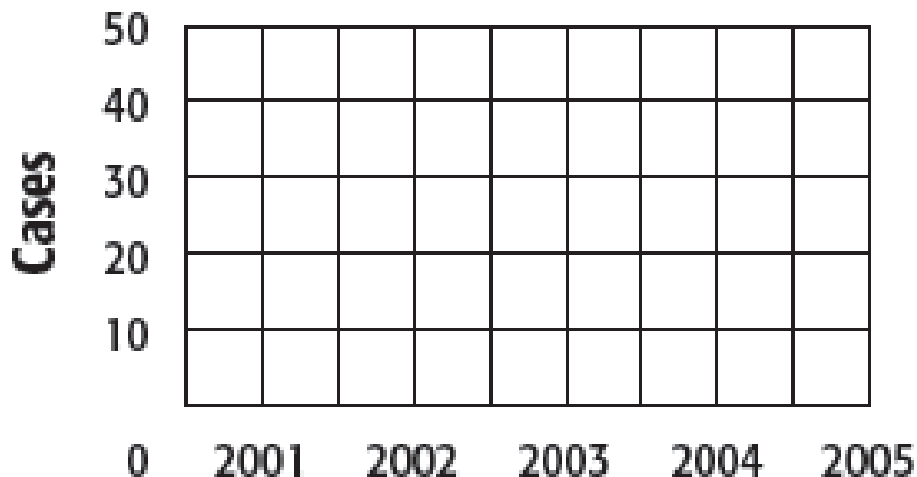
Determine whether each graph shows a *positive correlation*, a *negative correlation*, or *no correlation*. If there is a positive or negative correlation, describe its meaning in the situation.

1.

Temperature versus Rainfall

Source: National Oceanic and Atmospheric Administration

2.

State Elevations
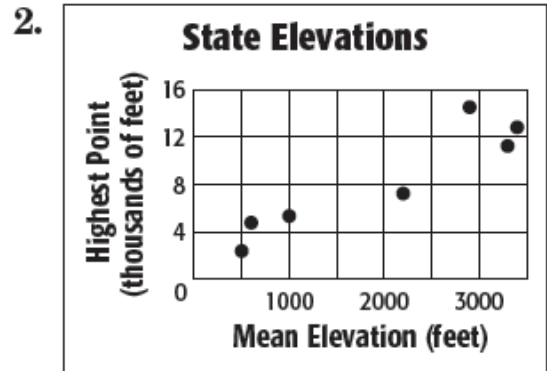
Source: U.S. Geological Survey

WORD PROBLEM PRACTICE

4. ZOOS The table shows the average and maximum longevity of various animals in captivity.

a. Draw a scatter plot and determine what relationship, if any, exists in the data.

Longevity (years)							
Avg.	12	25	15	8	35	40	41	20
Max.	47	50	40	20	70	77	61	54

Source: Walker's Mammals of the World

b. Draw a line of fit for the scatter plot.

c. Write the slope-intercept form of an equation for the line of fit.

d. Predict the maximum longevity for an animal with an average longevity of 33 years.

Animal Longevity (Years)
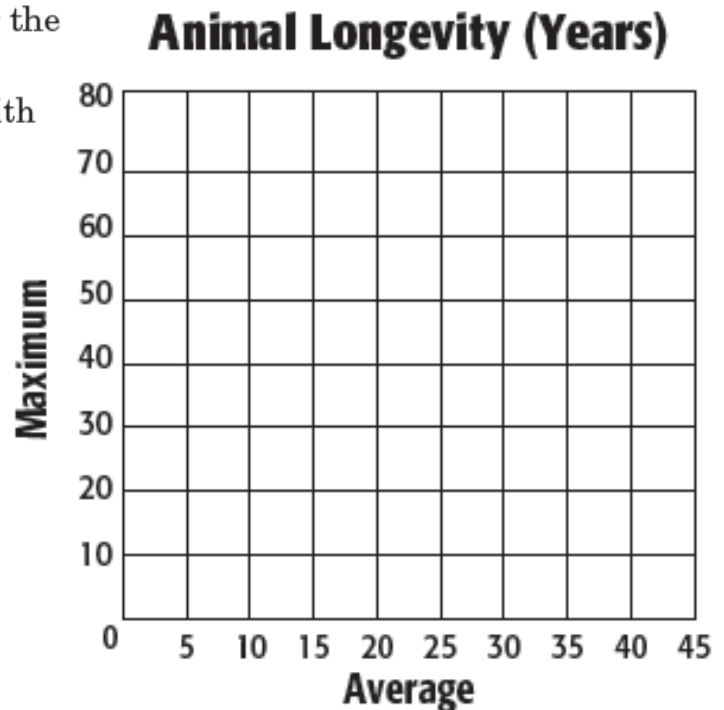
HOUSING The median price of an existing home was $160,000 in 2000 and $240,000 in 2007. If x represents the number of years since 2000, use these data points to determine a line of best fit for the trends in the price of existing homes. Write the equation in slope-intercept form.

4. **BASEBALL** The table shows the average length in minutes of professional baseball games in selected years.

Average Length of Major League Baseball Games							
Year	'92	'94	'96	'98	'00	'02	'04
Time (min)	170	174	171	168	178	172	167

Source: Elias Sports Bureau

a. Draw a scatter plot and determine what relationship, if any, exists in the data.
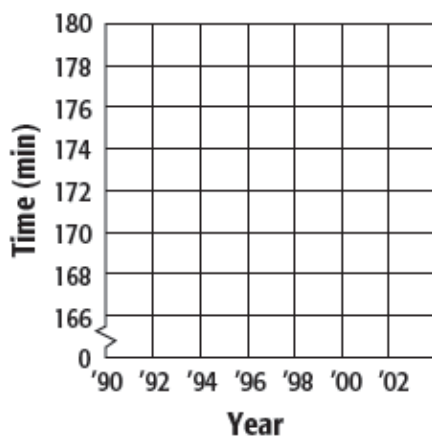
b. Explain what the scatter plot shows.

c. Draw a line of fit for the scatter plot.

# Chapter 3

INVERSE LINEAR FUNCTIONS

Example   **Find and graph the inverse of the relation represented by line a.**

The graph of the relation passes through $(-2, -10)$, $(-1, -7)$, $(0, -4)$, $(1, -1)$, $(2, 2)$, $(3, 5)$, and $(4, 8)$.

To find the inverse, exchange the coordinates of the ordered pairs.

The graph of the inverse passes through the points $(-10, -2)$, $(-7, -1)$, $(-4, 0)$, $(-1, 1)$, $(2, 2)$, $(5, 3)$, and $(8, 4)$. Graph these points and then draw the line that passes through them.
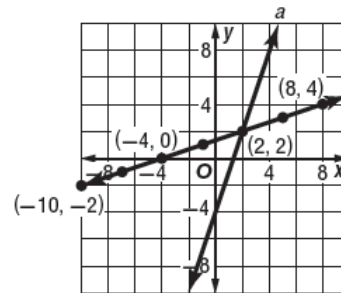
Exercises

Find the inverse of each relation.

1. $\{(4, 7), (6, 2), (9, -1), (11, 3)\}$

2. $\{(-5, -9), (-4, -6), (-2, -4), (0, -3)\}$

3.

x	y
−8	−15
−2	−11
1	−8
5	1
11	8

4.

x	y
−8	3
−2	9
2	13
6	18
8	19

5.

x	y
−6	14
−5	11
−4	8
−3	5
−2	2

INVERSE LINEAR EQUATION

Example   Find the inverse of $f(x) = \frac{3}{4}x + 6$.

Step 1	$f(x) = \frac{3}{4}x + 6$	Original equation
	$y = \frac{3}{4}x + 6$	Replace $f(x)$ with y.
Step 2	$x = \frac{3}{4}y + 6$	Interchange y and x.
Step 3	$x - 6 = \frac{3}{4}y$	Subtract 6 from each side.
	$\frac{4}{3}(x - 6) = y$	Multiply each side by $\frac{4}{3}$.
Step 4	$\frac{4}{3}(x - 6) = f^{-1}(x)$	Replace y with $f^{-1}(x)$.

The inverse of $f(x) = \frac{3}{4}x + 6$ is $f^{-1}(x) = \frac{4}{3}(x - 6)$ or $f^{-1}(x) = \frac{4}{3}x - 8$.

$f(x) = 4x - 3$

$$f(x) = -3x + 7$$

$$f(x) = \frac{3}{2}x - 8$$

$f(x) = -15 - \frac{2}{5}x$

$f(x) = 16 - \frac{1}{3}x$

$f(x) = 8x - 5$

$f(x) = \dfrac{3}{4}x + 9$