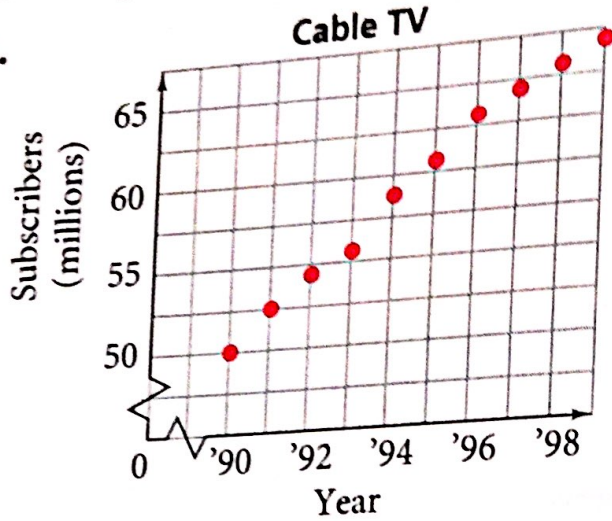


Practice by Example

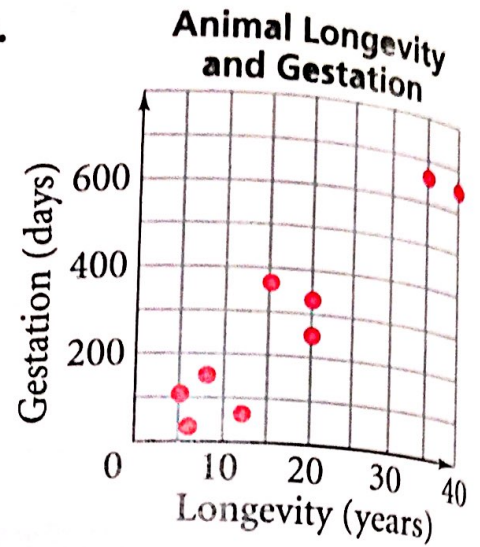
Example 1  
(page 318)

Find an equation of a reasonable trend line for each scatter plot.

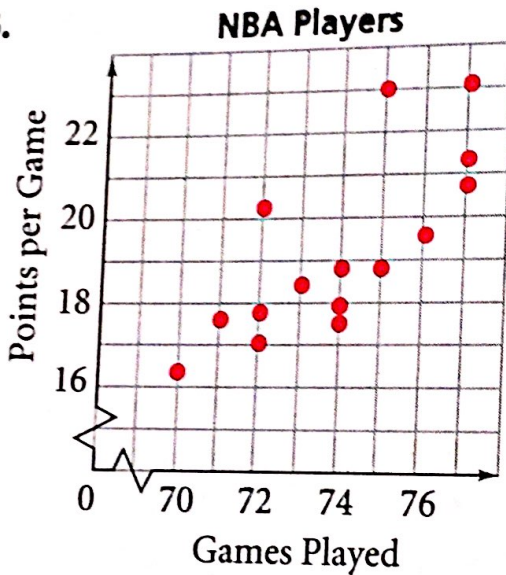
1.



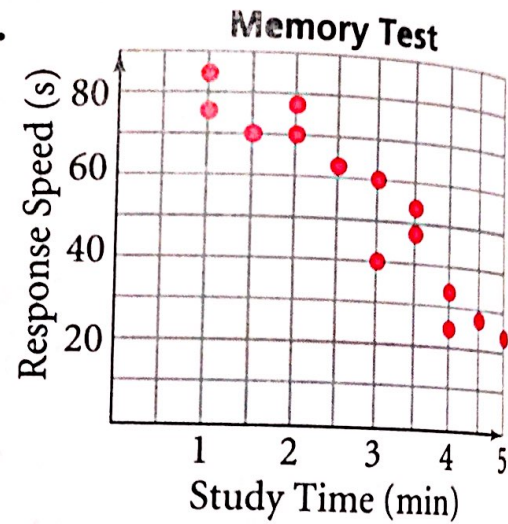
2.



3.



4.



5. Graph the data in the table below for the attendance and revenue at theme parks. Find an equation for the trend line of the data.

**Attendance and Revenue at U.S. Theme Parks**

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999
Attendance (millions)	260	267	275	267	280	290	300	300	309
Revenue (billions of dollars)	6.1	6.5	6.8	7.0	7.4	7.9	8.4	8.7	9.1

SOURCE: International Association of Amusement Parks and Attractions.  
Go to [www.PHSchool.com](http://www.PHSchool.com) for a data update.  
Web Code: aeg-2041



**Example 2**  
(page 319)



**Graphing Calculator** Use a graphing calculator to find the equation of the line of best fit for the data. Find the value of the correlation coefficient  $r$ .

6. Graph the data for the average July temperature and the annual precipitation of the cities in the table below. Find an equation for the line of best fit of the data. Estimate the average rainfall for a city with average July temperature of  $75^\circ\text{F}$ .

**Precipitation and Temperature in Selected Eastern Cities**

City	Average July Temperature ( $^\circ\text{F}$ )	Average Annual Precipitation (in.)
New York	76.4	42.82
Baltimore	76.8	41.84
Atlanta	78.6	48.61
Jacksonville	81.3	52.76
Washington, D.C.	78.9	39.00
Boston	73.5	43.81
Miami	82.5	57.55

SOURCE: Time Almanac

7. **Average Temperatures in Northern Latitudes**

Latitude ( $^\circ\text{N}$ )	0	10	20	30	40	50	60	70	80
Temp. ( $^\circ\text{F}$ )	79.2	80.1	77.5	68.7	57.4	42.4	30.0	12.7	1.0

8. **Retail Department Store Sales (billions of dollars)**

Year	1980	1985	1990	1994	1995	1996	1997	1998
Sales	86	126	166	217	231	245	261	279

SOURCE: Statistical Abstract of the United States.  
Go to [www.PHSchool.com](http://www.PHSchool.com) for an update.  
Web Code: aeg-2041

9. **Olympic 500-Meter Men's Gold Medal Speed Skating Times**

Year	1980	1984	1988	1992	1994	1998
Time (seconds)	422	432	404	420	395	382

SOURCE: International Skating Union

10. **Average Male Lung Power**

Respiration (breaths/min)	50	30	25	20	18	16	14
Heart Rate (beats/min)	200	150	140	130	120	110	100

SOURCE: Encyclopedia Britannica

11. **Wind Chill Temperature for 15 mi/h Wind**

Air Temp. ( $^\circ\text{F}$ )	35	30	25	20	15	10	5	0
Wind-Chill Temp. ( $^\circ\text{F}$ )	16	9	2	-5	-11	-18	-25	-31

**Real-World Connection**

The 500-meter men's speed skating race has been an Olympic event since 1924.





**B Apply Your Skills**

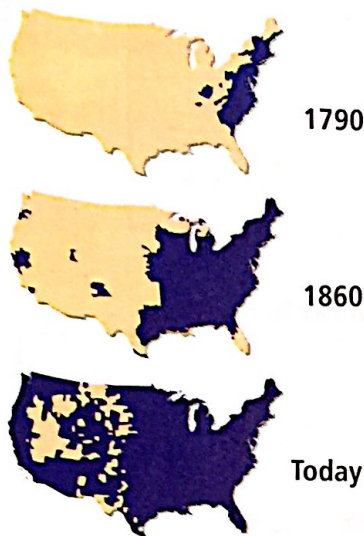
12. **Geometry** Students measured the diameters and circumferences of the tops of a variety of cylinders. Below is the data that they collected.

**Cylinder Tops**

Diameter (cm)	3	3	5	6	8	8	9.5	10	10	12
Circumference (cm)	9.3	9.5	16	18.8	25	25.6	29.5	31.5	30.9	39.3

- a. Graph the data.  
 b. Find the equation of a trend line.  
 c. What does the slope of the equation mean?  
 d. Find the diameter of a cylinder with a circumference of 45 cm.

**Population Growth**



■ More than 2 persons per square mile

13. **Population** Use the data at the right.  
 a. Graph the data for the male and female populations of the United States.  
 b. Find the equation of a trend line.  
 c. Use your equation to predict the number of females if the number of males were to increase to 138,476,000.  
 d. **Critical Thinking** Would it be reasonable to predict the population in 2025 from these data? Explain.
14. a. **Open-Ended** Make a table of data for a linear function. Use a graphing calculator to find the equation of the line of best fit.  
 b. What is the correlation coefficient for your linear data?

**Estimated Population of the United States (thousands)**

Year	Male	Female
1991	122,956	129,197
1992	124,424	130,606
1993	125,788	131,995
1994	127,049	133,278
1995	128,294	134,510
1996	129,504	135,724
1997	130,783	137,001
1998	132,030	138,218
1999	133,277	139,414
2000	138,054	143,368

SOURCE: U.S. Census Bureau. Go to [www.PHSchool.com](http://www.PHSchool.com) for a data update. Web Code: aeg-2041

15. **Writing** What kind of trend line do you think data for the following comparison would be likely to show? Explain.  
*temperature and the number of students absent from school*



16. **Graphing Calculator** A school collected data on math and science grades of nine randomly selected students.

Student	1	2	3	4	5	6	7	8	9
Math	76	89	84	79	94	71	79	91	84
Science	82	94	89	89	94	84	68	89	84

- a. Use a graphing calculator to find the equation of the line of best fit for the data.  
 b. **Critical Thinking** Should the equation for the line of best fit be used to predict grades? Explain.
17. **Graphing Calculator** Use a graphing calculator to find the equation of the line of best fit for the data below. Predict sales of greeting cards in the year 2010.

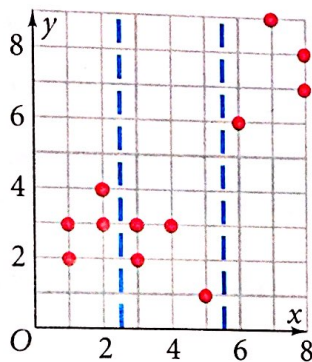
**Greeting Card Sales**

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Sales (billions)	\$4.2	\$4.6	\$5.0	\$5.3	\$5.6	\$5.9	\$6.3	\$6.8	\$7.3	\$7.5

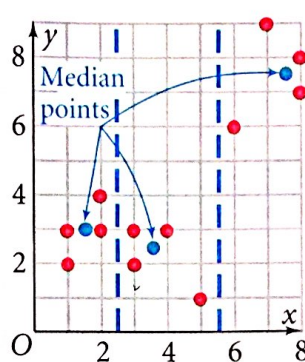
SOURCE: Greeting Card Association



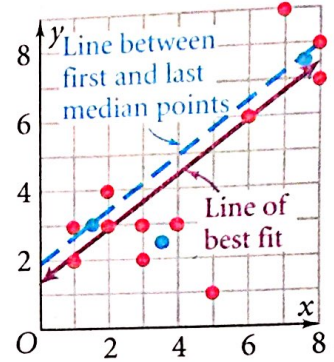
18. **a. Data Collection** Find two sets of data that you could display in a scatter plot, such as the number of boys and girls in each class in your school, or the population and the number of airports in some states. Then graph the data.
- b.** Find the equation of a trend line.
- c.** Use the equation to predict another value that could be on your scatter plot.
- d.** What is the correlation coefficient?
19. Another way you can find a line of best fit is the *median-median method*. The graph below shows how this method works. The points in red indicate the original data.



Divide the data into three groups of equal size.



Find and plot the median point, ( $x$ -median,  $y$ -median).



Find the line parallel to the line between the first and last median points and  $\frac{1}{3}$  of the way to the middle median point.

- a.** Estimate two coordinates on the purple line in the graph at the right above. Find the equation of the line of best fit.



- b. Graphing Calculator** You can use a graphing calculator to find the line of best fit with the median-median method. Below are the coordinates of the points graphed in red. Use the EDIT feature of the **STAT** screen on your graphing calculator. Use the Med-Med feature to find a line of best fit.

(1, 2), (1, 3), (2, 3), (2, 4), (3, 2), (3, 3), (4, 3), (5, 1), (6, 6), (7, 9), (8, 8), (8, 7)

### **C** Challenge

20. **a.** Make a scatter plot of the data below. Then find the equation of the line of best fit.

**Car Stopping Distances**

Speed (mi/h)	10	15	20	25	30	35	40	45
Stopping Distances (ft)	27	44	63	85	109	136	164	196

- b.** Use your equation to predict the stopping distance at 90 mi/h.
- c. Critical Thinking** The actual stopping distance at 90 mi/h is close to 584 ft. Why do you think this is not close to your prediction?