

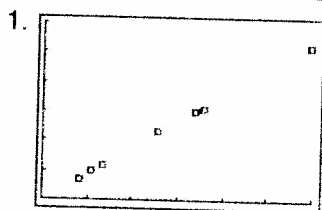
Graphing Calculator Investigation

Assess

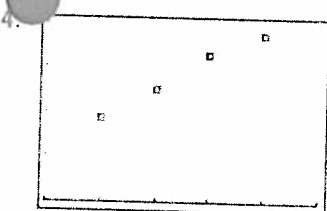
Refer students to the calculator display shown in Step 1 on p. 87, and ask the following questions.

- What is the regression equation for the income data?
 $y = 1304.19x - 2,560,335.07$
- What does the value of r tell you about the regression equation? The value of r is very close to 1, so the data points are very close to the graph of that equation.

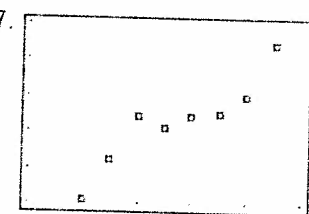
Answers



[10, 30] scl: 5 by [0, 60] scl: 10



[1990, 2005] scl: 5 by [0, 40] scl: 10



[1990, 2000] scl: 2 by [13,000, 18,000] scl: 1000

1. The prediction may not be accurate because different parts of the data could be represented by lines with different slopes. The sales could drop, as they did in 1995, or they could level out, as they did in 1996 and 1997.

5. correlation coefficient, 0.61660092, is closer to 1. The new regression line fits the data better.

Exercises

GOVERNMENT For Exercises 1–3, use the table below that shows the population and the number of representatives in Congress for selected states.

State	CA	NY	TX	FL	NC	IN	AL
Population (millions)	29.8	18.0	17.0	12.9	6.6	5.5	4.0
Representatives	52	31	30	23	12	10	7

Source: *The World Almanac*

1. Make a scatter plot of the data. See margin.
2. Find a regression equation for the data. $y = 1.73x + 0.39$
3. Predict the number of representatives for Oregon, which has a population of about 2.8 million. 5

BASEBALL For Exercises 4–6, use the table at the right that shows the total attendance for minor league baseball in some recent years.

Year	Attendance (millions)
1985	18.4
1990	25.2
1995	33.1
2000	37.6

Source: National Association of Professional Baseball Leagues

4. Make a scatter plot of the data. See margin.
5. Find a regression equation for the data. $y = 1.31x - 2581.6$
6. Predict the attendance in 2010. 51,500,000

TRANSPORTATION For Exercises 7–11, use the table below that shows the retail sales of motor vehicles in the United States for the period 1992–1999.

Motor Vehicle Sales								
Year	1992	1993	1994	1995	1996	1997	1998	1999
Vehicles (thousands)	13,118	14,199	15,413	15,118	15,456	15,498	15,963	17,414

Source: American Automobile Manufacturers Association

9. about 470,000 vehicles more per year

7. Make a scatter plot of the data. See margin.
8. Find a regression equation for the data. $y = 470.06x - 922,731.40$
9. According to the regression equation, what was the average rate of change of vehicle sales during the period?
10. Predict the sales in 2010. about 22,089,000
11. How accurate do you think your prediction is? Explain. See margin.

RECREATION For Exercises 12–15, use the table at the right that shows the amount of money spent on skin diving and scuba equipment in some recent years. 14. about \$440,000,000

Skin Diving and Scuba Equipment	
Year	Sales (\$ millions)
1993	315
1994	322
1995	328
1996	340
1997	332
1998	345
1999	363

Source: National Sporting Goods Association

12. Find a regression equation for the data. $y = 6.93x - 13,494.43$
13. Delete the outlier (1997, 332) from the data set. Then find a new regression equation for the data. $y = 7.36x - 14,354.33$
14. Use the new regression equation to predict the sales in 2010.
15. Compare the new correlation coefficient to the old value and state whether the regression line fits the data better. See margin.

Review for Quiz- Scatter Plots and Linear Regression

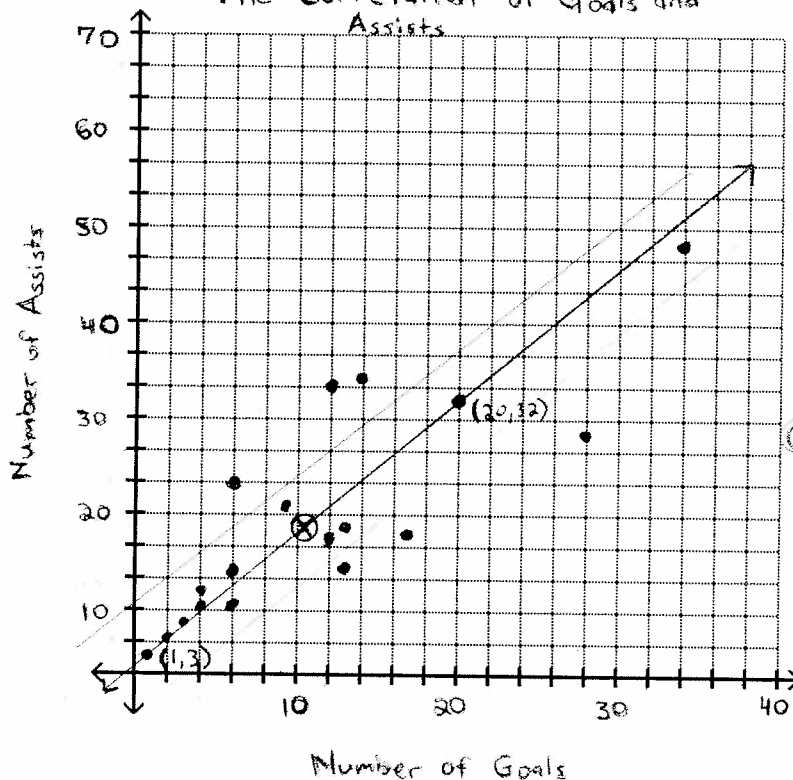
Name KEY Date Thurs, 01/22/11 Per 5,6,8

1) **ATHLETICS** The table below shows the number of goals and assists that selected players of the Philadelphia Flyers scored in a season. Please do the following:

- Make a scatter plot of the data presented.
- Identify the correlation of the scatter plot and describe the relationship that exists between goals and assists, if there is one.
- ~~Use the scatter plot to predict the number of assists you would expect a player who scored 11 goals to have.~~ ^{How many} ^{would you}
- Sketch a line of fit through the points $(1, 3)$ and $(20, 32)$ on the scatter plot and write the prediction equation for this line of fit.
- Use the prediction equation to predict the number of assists a player who scored 30 goals would have.

Goals	Assists	Goals	Assists
34	47	3	9
28	27	2	6
12	33	20	32
13	18	14	34
12	17	17	17
1	3	9	21
13	14	6	23
4	11	6	14
6	11	4	12

The Correlation of Goals and Assists



$$m = \frac{32 - 3}{20 - 1} = \frac{29}{19} \approx 1.53$$

$y = mx + b$
 use $(1, 3)$:
 $3 = 1.53(1) + b$
 $b = 1.47$
 $y = 1.53x + 1.47$

$y = y_1 = m(x - x_1)$
 use $(20, 32)$:
 $y - 32 = 1.53(x - 20)$
 $y = 1.53x - 30.6 + 32$
 $y = 1.53x + 1.40$

Review for Quiz - Scatter Plots and Linear Regression Thurs, 09/22/11

a. See scatter plot.

b. Positive correlation; the number of assists increase with the number of goals.

c. Approximately between 17 and 20 (answers may vary)

d. See scatter plot for line of fit.

Using the points (1, 3) and (20, 32) we have:

$$m = \frac{32-3}{20-1} = \frac{29}{19} \approx 1.53$$

$$y = mx + b$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ 3 & = & \frac{29}{19}(1) + b \end{array}$$

$$3 - \frac{29}{19} = b$$

$$\frac{57}{19} - \frac{29}{19} = \frac{28}{19} = b$$

$$* y = mx + b$$

$$\boxed{y = \frac{29}{19}x + \frac{28}{19} \quad [y = 1.53x + 1.47]}$$

e. Find y if $x = 30$: $y = \frac{29}{19}(30) + \frac{28}{19}$

$$y = \frac{870}{19} + \frac{28}{19}$$

$$y = \frac{898}{19}$$

$$y \approx 47.26 \approx \boxed{47 \text{ assists}}$$