Plot the points from the table in a coordinate plane. Write the equation of the line in slope-intercept form.

1.

x	−3	−2	−1	0	1
y	−19	−13	−7	−1	5

2.

x	2	3	4	5	6
y	12	18	24	30	36

Solve the equation. Determine whether the equation has *one solution*, *no solution*, or *infinitely many solutions*.

1. $4t - 3 = 13 + 4t$

2. $3h = 6h + 6$

3. $14y - 5 = 7(2y - 2)$

4. $2(5g - 5) = 3(5g - 10)$

5. $3(6 - 4m) = 2(9 - 6m)$

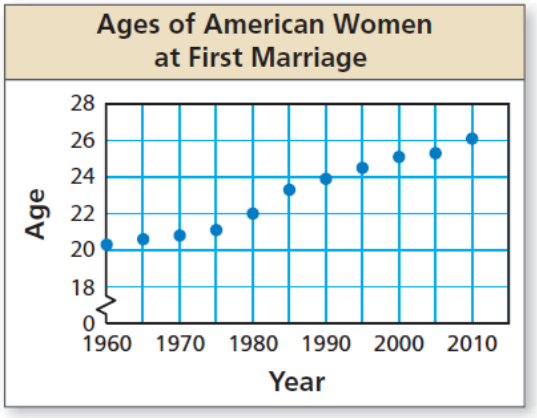
6. $3(t - 5) = \frac{2}{5}(25 + 10t)$

Essential Question

How can you *analytically* find a line of best fit for a scatter plot?

Work with a partner.

The scatter plot shows the median ages of American women at their first marriage for selected years from 1960 through 2010. In Exploration 2 in Section 4.4, you approximated a line of fit graphically. To find the line of *best* fit, you can use a computer, spreadsheet, or graphing calculator that has a *linear regression* feature.



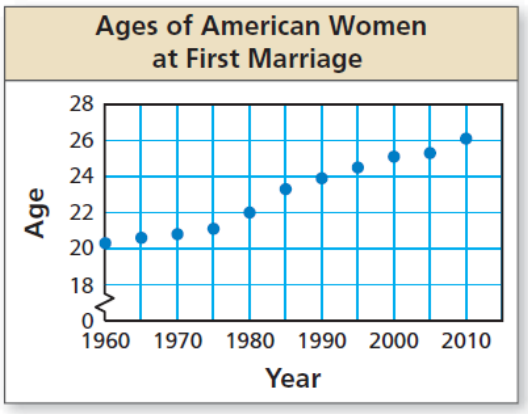
a. The data from the scatter plot is shown in the table. Note that 0, 5, 10, and so on represent the numbers of years since 1960. What does the ordered pair (25, 23.3) represent?

L1	L2	L3
0	20.3	
5	20.6	
10	20.8	
15	21.1	
20	22	
25	23.3	
30	23.9	
35	24.5	
40	25.1	
45	25.3	
50	26.1	

L1(55)=

Work with a partner.

The scatter plot shows the median ages of American women at their first marriage for selected years from 1960 through 2010. In Exploration 2 in Section 4.4, you approximated a line of fit graphically. To find the line of *best* fit, you can use a computer, spreadsheet, or graphing calculator that has a *linear regression* feature.



b. Use the *linear regression* feature to find an equation of the line of best fit. You should obtain results such as those shown.

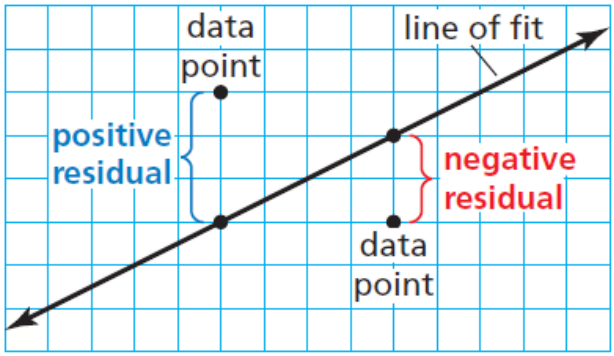
```
LinReg
 y=ax+b
 a=.1261818182
 b=19.84545455
 r²=.9738676804
 r=.986847344
```

c. Write an equation of the line of best fit. Compare your result with the equation you obtained in Exploration 2 in Section 4.4.

Core Concept

Residuals

A **residual** is the difference of the y-value of a data point and the corresponding y-value found using the line of fit. A residual can be positive, negative, or zero.



A scatter plot of the residuals shows how well a model fits a data set. If the model is a good fit, then the absolute values of the residuals are relatively small, and the residual points will be more or less evenly dispersed about the horizontal axis. If the model is not a good fit, then the residual points will form some type of pattern that suggests the data are not linear. Wildly scattered residual points suggest that the data might have no correlation.

In Example 3 in Section 4.4, the equation $y = -2x + 20$ models the data in the table shown. Is the model a good fit?

Week, *x*	1	2	3	4	5	6	7	8
Sales (millions), *y*	$19	$15	$13	$11	$10	$8	$7	$5

The table shows the ages x and salaries y (in thousands of dollars) of eight employees at a company. The equation $y = 0.2x + 38$ models the data. Is the model a good fit?

Age, *x*	35	37	41	43	45	47	55	55
Salary, *y*	42	44	47	50	52	51	49	45

1. The table shows the attendances y (in thousands) at an amusement park from 2005 to 2014, where $x = 0$ represents the year 2005. The equation $y = -9.8x + 850$ models the data. Is the model a good fit?

Year, *x*	0	1	2	3	4	5	6	7	8	9
Attendance, *y*	850	845	828	798	800	792	785	781	775	760

The table shows the durations x (in minutes) of several eruptions of the geyser Old Faithful and the times y (in minutes) until the next eruption. (a) Use a graphing calculator to find an equation of the line of best fit. Then plot the data and graph the equation in the same viewing window. (b) Identify and interpret the correlation coefficient. (c) Interpret the slope and y-intercept of the line of best fit.

Duration, *x*	2.0	3.7	4.2	1.9	3.1	2.5	4.4	3.9
Time, *y*	60	83	84	58	72	62	85	85

2. Use the data in Monitoring Progress Question 1. (a) Use a graphing calculator to find an equation of the line of best fit. Then plot the data and graph the equation in the same viewing window. (b) Identify and interpret the correlation coefficient. (c) Interpret the slope and *y*-intercept of the line of best fit.

Refer to Example 3. Use the equation of the line of best fit.

a. Approximate the duration before a time of 77 minutes.

b. Predict the time after an eruption lasting 5.0 minutes.

3. Refer to Monitoring Progress Question 2. Use the equation of the line of best fit to predict the attendance at the amusement park in 2017.

Tell whether a correlation is likely in the situation. If so, tell whether there is a causal relationship. Explain your reasoning.

a. time spent exercising and the number of calories burned

b. the number of banks and the population of a city

4. Is there a correlation between time spent playing video games and grade point average? If so, is there a causal relationship? Explain your reasoning.

Exit Ticket: Find the line of best fit for the data in the *Motivate*. Use the line to estimate the cumulative snowfall in week 5.