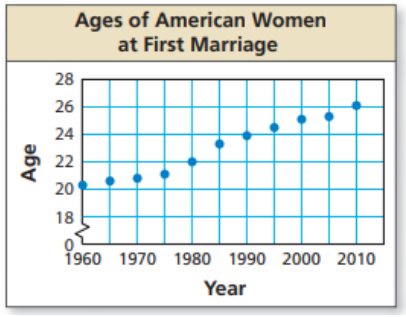
Algebra 1: 4.5 Analyzing Lines of Fit DAY TWO

Learning Outcomes:

- I will use technology to find lines of fit.
- I will use the equation for the line of fit to make predictions about unknown values.

Nov 1-10:12 AM

Finding a Line of Best Fit

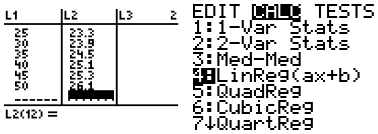


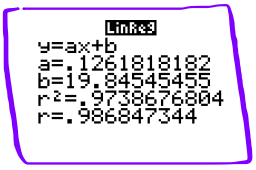
The scatter plot shows the median ages of American women at their first marriage for selected years from 1960 through 2010. You have approximated a line of fit graphically. To find the line of *best* fit, you can use your graphing calculator that has a *linear regression* feature.

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

In the year 1985, the median age of women at their first marriage is 23.3 years old.

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





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)=

c) Write an equation of the line of best fit.

$y = 0.126x + 19.845$

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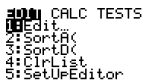
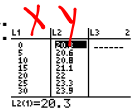
4.5 Analyzing Lines of Fit DAY TWO with work

Calculator steps:

☆ Enter data on on graphing calculator:



STAT, EDIT



Type data into L1 (x's) and L2 (y's)

☆ To see the data on a scatterplot:

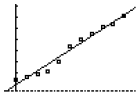
you must turn a stat plot on: 2nd, y=

(turn plot ON)

you must set the window (you are

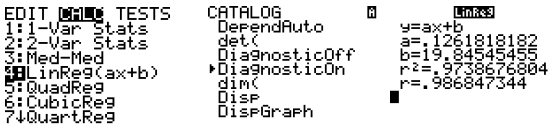
telling the calculator how to

number the x and y axes) Zoom: 9

Graph 

☆ To have calculator find the equation for the line of best fit: STAT - CALC - 4) linear regression - enter

Enter equation in y = (when you graph now, you should see the scatter plot along with the line of best fit)



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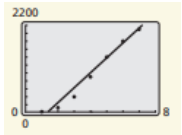
Example 1:

The table shows the total numbers y of people who reported an earthquake x minutes after it ended.

Minutes, x	People, y
1	10
2	100
3	400
4	900
5	1400
6	1800
7	2100

a) Using a graphing calculator to find the equation of the line of best fit. Then plot the data and graph the equation on the same graph.

$y = 381x - 566$



b) Identify and interpret the correlation coefficient.

$r = 0.989$, strong positive correlation

c) Interpret the slope and y-intercept of the line of best fit. The slope of 381 means the number of people who reported an earthquake increased by about 281 each minute after the earthquake ended. The y-intercept of -566 has no meaning in this scenario because the number of people cannot be negative.

d) Predict the number of people to report an earthquake 15 minutes after it ended. $f(15) = 381(15) - 566 = 5149$

e) How do you know if this prediction is reliable? extrapolation

Dec 16-2:23 PM

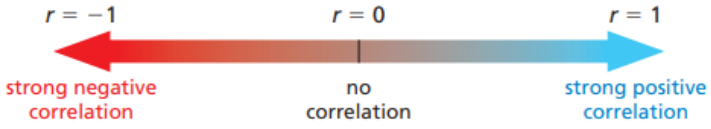
4.5 Analyzing Lines of Fit DAY TWO with work

STUDY TIP

You know how to use two points to find an equation of a line of fit. When finding an equation of the line of best fit, every point in the data set is used.

Finding Lines of Best Fit

Graphing calculators use a method called **linear regression** to find a precise line of fit called a **line of best fit**. This line best models a set of data. A calculator often gives a value r, called the **correlation coefficient**. This value tells whether the correlation is positive or negative and how closely the equation models the data. Values of r range from -1 to 1. When r is close to 1 or -1, there is a strong correlation between the variables. As r, gets closer to 0, the correlation becomes weaker.



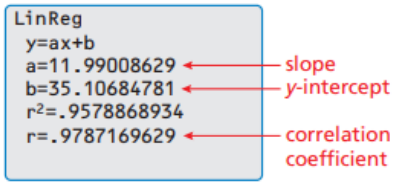
Correlation coefficient:

Stat - Calc - 4) LinReg - Calculate

- scroll down to find "r" value

2nd 0 Catalog - Diagnostics ON

- will put r on your calculator



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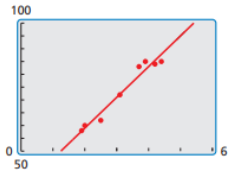
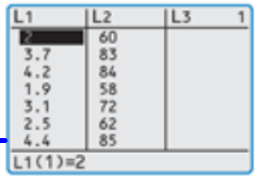
Using a graph or its equation to *approximate* a value between two known values is called **interpolation**. Using a graph or its equation to *predict* a value outside the range of known values is called **extrapolation**. In general, the farther removed a value is from the known values, the less confidence you can have in the accuracy of the prediction.

Step 3 Enter the equation $y = 12.0x + 35$ into the calculator. Then plot the data and graph the equation in the same viewing window.



Predicting within the data is interpolation



(2.5, _____)

(_____, 80 min)

Predicting outside the data is extrapolation

(_____, 90 min)

(6, _____)

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4.5 Day Two Assignment

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