Linear Regression: Finding the equation of the "line of best fit".

Using Technology to make a scatter plot and find the equation of the trend line.

1. Graphing Calculator
2. Spreadsheet software
3. Online Regression software

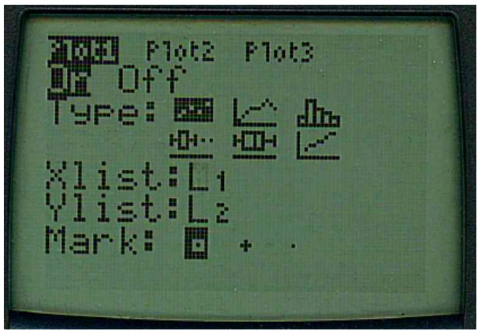
Graphing Calculator.

Age (yrs)	Length(cm)
1	15
3	21
4	28
9	52
11	75
12	83

1. Press STAT
2. EDIT
3. Enter x in L_1 and Y in L_2

To make a scatter plot on the graph:

1. Press 2nd then Y=
2. Turn on a Scatter Plot
3. Make sure your screen looks like this
4. Press Zoom then choose Option 9:



Have the calculator find the equation of the "line of best fit"

1. Press STAT
2. Arrow to the right once.CALC
3. Choose Option 4: LinReg(ax+b)
4. Since you put X in L_1 and Y in L_2 just press enter.

LineReg

Equation of the trendline rounded to the nearest thousandth:
y = 6.193x + 4.380

y=ax+b
a=6.193037975
b=4.379746835
r^2=.9722264813
r=.986015457

r=Correlation Coefficient.

This is a measure of how well a trendline fits the data.

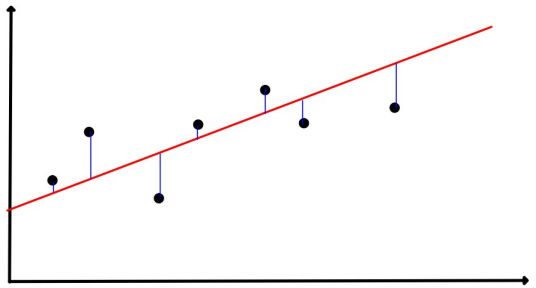
r > 0 means a Positive Correlation (pos slope)

r < 0 means a Negative Correlation (neg slope)

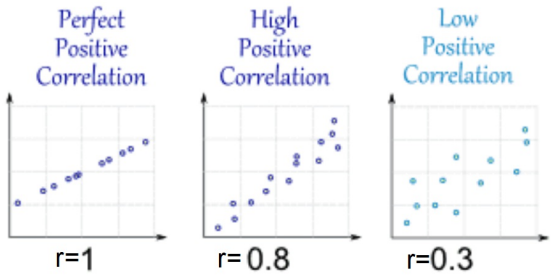
r = 0 means No Correlation

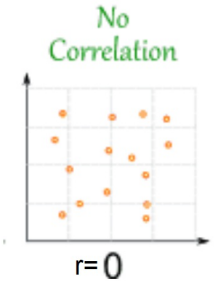
The closer |r| is to 1 the stonger the correlation.

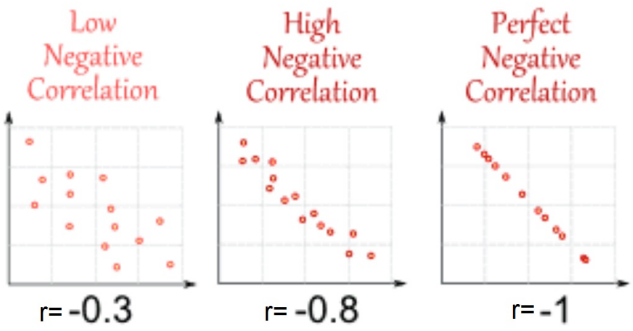
Least Squares Regression:
Minimizes the square of the distances from each point to the line.



Examples of graphs with certain r-values







Chirps/Second	Temperature (° F)
20.0	88.6
16.0	71.6
19.8	93.3
18.4	84.3
17.1	80.6
15.5	75.2
14.7	69.7
15.7	71.6
15.4	69.4
16.3	83.3

Use the graphing calculator to make a scatter plot and find the correlation coefficient.

y= 4.15x + 8.70

r= 0.92

1. Is a linear function a good fit for the data?
   Yes, r is close to one and the line is close to many of the points on the scatter plot.
2. Find temperature if there is 23 chirps/second
   Replace x with 23 and find y. y = 104.15 °F
3. Find the # of chirps/sec if the Temp is 60 °F
   Replace y with 60 and solve for x. x = 12.36

You can use Excel to make a scatter plot and find the equation of the line of best fit.

You can also find a link to an online regression website on my blog.

You earned $62 for 8 hours of work. How much would you earn for 6 hours of work?

$\frac{\$62}{8\,hr} = \frac{x}{6\,hr}$ $x = \$46.50$

Is this situation linear? Yes

What point does this situation pass through? The origin: 0 hours means 0 dollars

A line that passes through the origin is called Direct Variation

All Direct Variation situations can be solved using a proportion