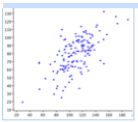
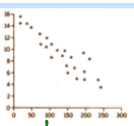
7-2 – **Fitting a Line to Data and Predicting**

Last class period we learned about correlation and scatterplots.

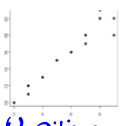
Example: Label each graph with its correlation. (positive, negative, no corr.)



No



Negative



Positive

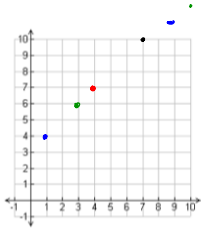
When we notice that there is either a positive correlation or a negative correlation we can draw a Trend line or Line of Best Fit.

This line allows us to make more accurate predictions about the behavior of data.

We can decide when a mathematical model can be used to represent real-life Data.

We do this by Creating a scatter plot of the data.

X	Y
1	4
3	6
4	7
7	10
9	12
10	13



On the graph, are the points almost in a straight line?

If the points look like they're almost in a straight line on the graph, then the data can be modeled with a Linear equation.

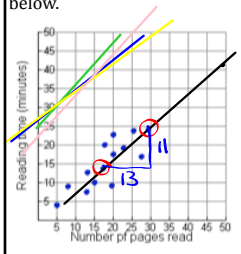
We can do this by drawing a line on a graph. (Trend line or line of Best fit)

Everyone's Trend lines will not be exactly the Same.

You make your Best estimate on a line that reflects your data.

The most important key is your line must always pass through **at least** 2 points.

Example 1: Kearstyn recorded the time she has spent reading and the number of pages she has read. The data is displayed in the scatterplot below.



1. Draw a trend line

2. Find the slope between the 2 points

Method 1: 2 pts

$13 < \begin{matrix}(30,25)\\(17,14)\end{matrix} > 11$ $\quad \frac{11}{13}$

method 2: use the graph

$\frac{11}{13}$

3. Use point-slope form to find the equation of the line.

$y - y_1 = m(x - x_1)$ $\quad m = \text{slope}$

$m = \frac{11}{13}$ $\quad y - 25 = \frac{11}{13}(x - 30)$ $\quad (x_1, y_1) = \text{point}$

$(x_1, y_1) = (30, 25)$

$y - 25 = \frac{11}{13}(x - 30)$

$y - 25 = .85x - 25.38$

$+25 \qquad +25$

$\boxed{y = .85x - .38}$

When the points on a scatter plot can be approximated by a line with positive slope, x and y have a positive correlation.

When the points can be approximated by a line with negative slope, x and y have a negative correlation.

When points CANNOT be approximated by a straight line, there is NO correlation.

Predicting Values based on your Best Fit Lines

Once you have created an Equation that models your data, you can use the equation to make predictions on further occurrences of the event you are modeling.

To make a prediction you will substitute into your equation.

Make sure if you are substituting the Independant value you substitute for the X and if you are substituting the dependant value you substitute for the y.

4. From your trend line above predict the amount of time it would take Kearstyn to read 50 pages

$y = .85x - .38$

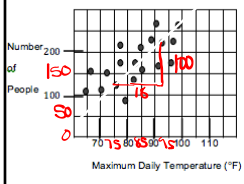
$y = .85(50) - .38$

$y = 42.12$ minutes

Pages: x

time reading: y

Example 2: A pool recorded the maximum temperature during a summer day and the number of people who came to the pool. The data is below:



1. Draw a trend line

2. Find the slope between the 2 points.

$\frac{100}{16} = \frac{50}{9}$

3. Use point-slope form to find the equation of the line

$(76, 125)$ $y - 125 = \frac{50}{9}(x - 76)$

$y - 125 = 5.6x - 422.3$

$+125 \quad +125$

$y = 5.6x - 297.3$

4. Predict pool use if the temperature reaches 105.

Temp: x

people: y

$y = 5.6x - 297.3$

$y = 5.6(105) - 297.3 = 290.7$

5. If there are 375 people at the pool, approximately how hot is it outside?

$375 = 5.6x - 297.3$

$+297.3 \quad +297.3$

$\frac{672.3}{5.6} = \frac{5.6x}{5.6}$

$120 = x$