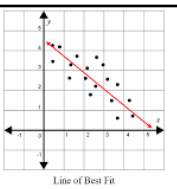
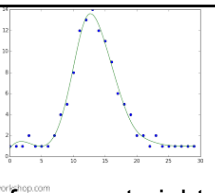
Date: _____





2.5 Linear and Non-Linear Relations

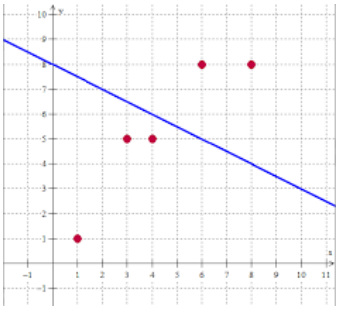
1) Linear Relationships

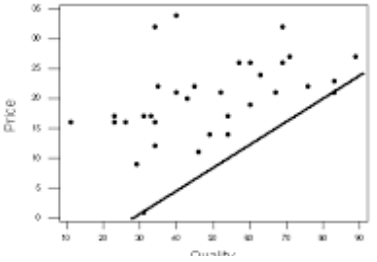
A linear relation is a relation between two variables that forms a straight line when it is graphed. When we are working with a scatter plot, we can classify a relationship as linear when the points fall in a pattern that a line would accurately represent. This is called a line of best fit.

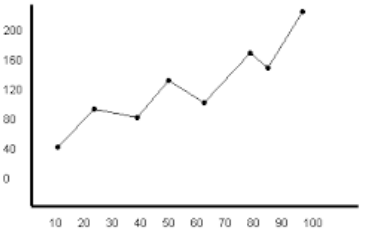
A good line of best fit:

- follows the trend of the data
- passes through as many points as possible
- separates the other points evenly on both sides of the line
- is a line - like one straight line drawn with a rule (NO CONNECT THE DOTS!!!)

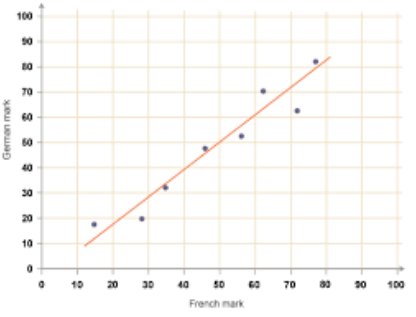
Bad Lines of Best Fit

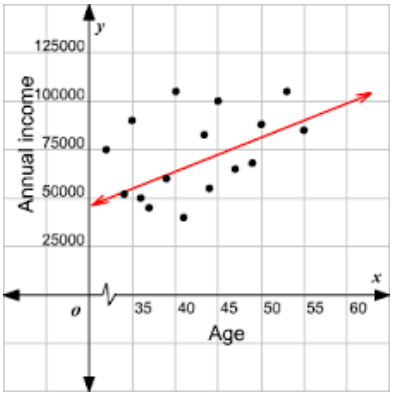






Good Lines of Best Fit



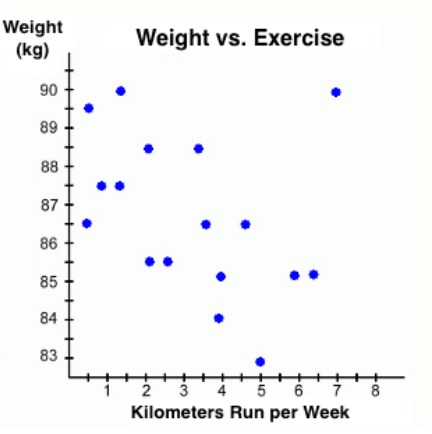


Data that shows a strong correlation is close to the line of best fit (if you draw an oval around it, it is long and narrow).

Data that shows a weak correlation is has a general trend, but is more spread out (forms a wider oval when you enclose it).

Data that shows no correlation cannot be represented with a line of best fit. It has no apparent pattern (forms a circle when you enclose it).

Example 1: Draw a line of best fit on the scatter plot shown below. Is the correlation positive or negative? Strong or weak?



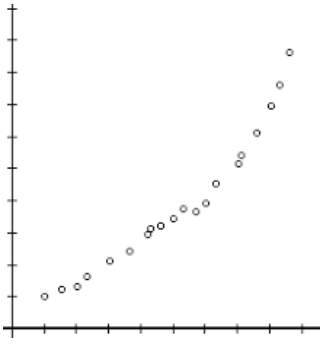
Which point in this data seems to be an outlier? How will your line change if we discard this point?

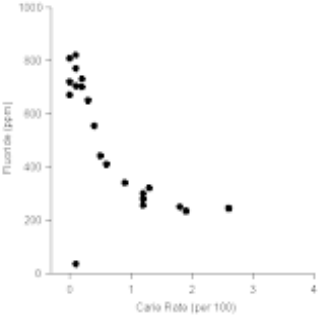
Use your line of best fit to predict the weight of a person that runs 8 km per week. Did you interpolate or extrapolate?

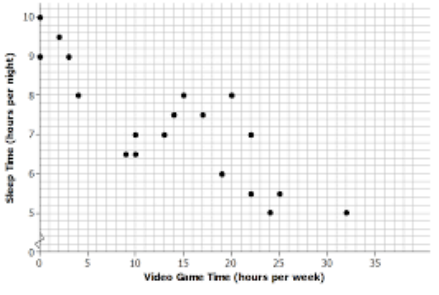
Non-Linear Relationships

Sometimes two sets of data will show a relationship that does not fall in a straight line. This is called a non-linear relation, and we would draw a curve of best fit to model them. A good curve of best fit fits the data in the same way that a line of best fit does, so follow the same rules!

Example 2: Draw a curve of best fit for each of the scatter plots below.







Identify each relation as strong or weak.