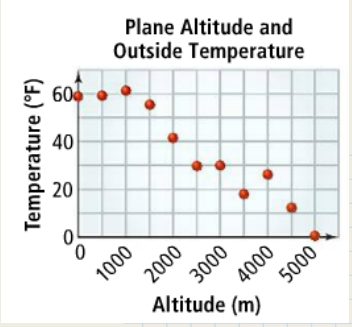
Algebra 1

Chapter 5
Section 5-7

Scatter Plots

Plane Altitude and Outside Temperature											
Altitude (m)	0	500	1000	1500	2000	2500	3000	3500	4000	4500	5000
Temperature (°F)	59.0	59.2	61.3	55.5	41.6	29.8	29.9	18.1	26.2	12.4	0.6

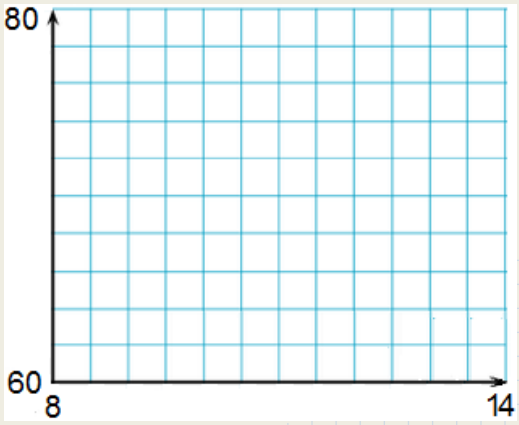
A *scatter plot* is a graph that shows two different data sets as ordered pairs



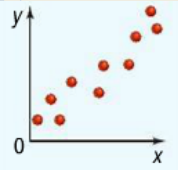
Scatter Plot

Make a scatter plot of the data.

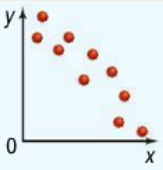
Shoe Size (In.)	Height (In.)
11	75
13	79
9	66
11	71
14	76



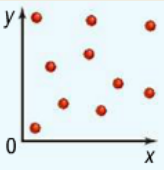
Correlation



When y tends to increase as x increases, the two sets of data have a **positive correlation.**



When y tends to decrease as x increases, the two sets of data have a **negative correlation.**



When x and y are not related, the two sets of data have **no correlation.**

Causation

Correlation is not the same as causation. *Causation* is when a change in one variable ***causes*** a change in the other variable.

- The number of hours worked by a fast food employee and his or her income **Causal Relation**
- The cost of a gallon of milk and the cost of a loaf of bread. **Not a Causal Relation**

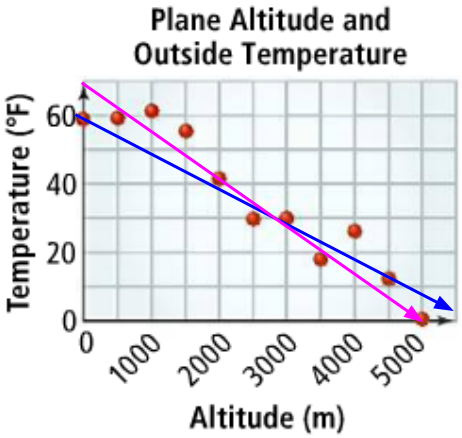
Causal relationship

Not a causal relationship

Trend Line (Line of Best Fit)

A *trend line* is a line drawn through a set of data that shows a positive or negative correlation.

A *line of best fit* shows the line that most accurately describes the relationship of the graph



Interpolation: Estimate within data

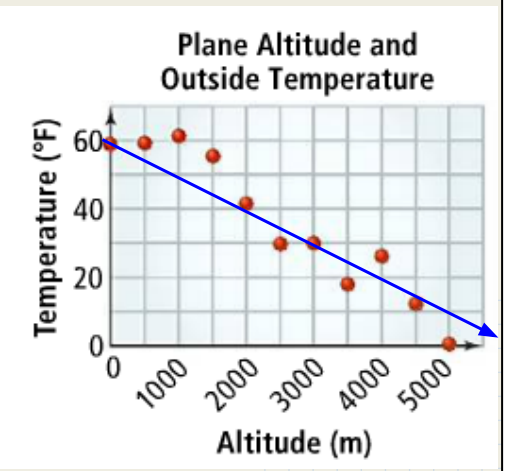
Using the trend line, estimate the temperature at an altitude of 2200m.

$y = -\frac{1}{100}x + 60$

$y = -\frac{1}{100}(2200) + 60$

$y = -22 + 60$

$y = 38$



Interpolation uses a trend line to estimate the rate of change (slope) of a set of data. Interpolation is an estimation of a y value using an x value between the highest and lowest values (0 and 5000 in this example)

Extrapolation: Predictions outside data

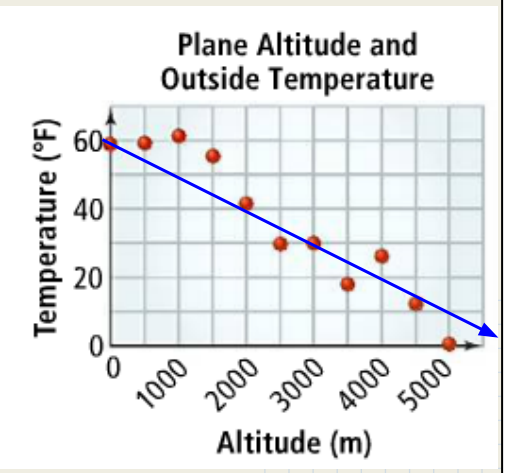
Using the trend line, estimate the temperature at an altitude of 7000m.

$y = -\frac{1}{100}x + 60$

$y = -\frac{1}{100}(7000) + 60$

$y = -70 + 60$

$y = -10$



Extrapolation also uses a trend line to estimate the rate of change (slope) of a set of data. Extrapolation is a prediction of a y value using an x value outside the range of data (numbers not between 0 and 5000 in this example)