

Chapter 5: Linear Equations

$$y - y_1 = m(x - x_1)$$

$$Ax + By = C$$

$$y = mx + b$$

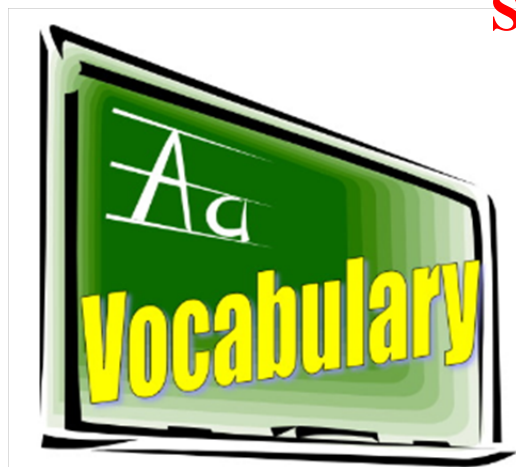


The Big Ideas

What does the slope of a line indicate about the line?

What information does the equation of a line give you?

How can you make predictions based on a scatter plot?



Slope

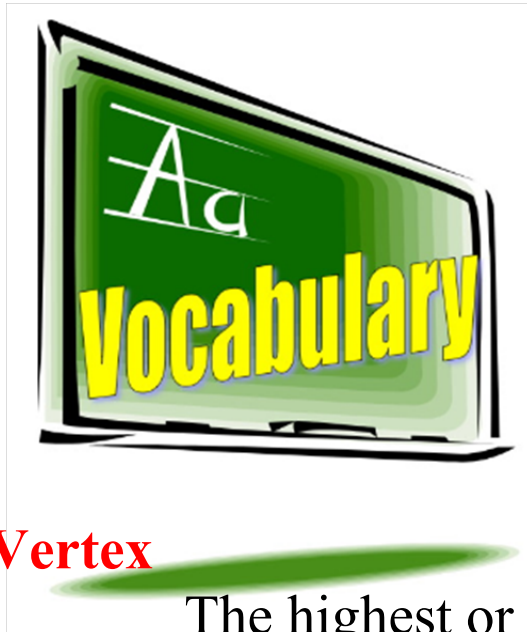
"Rate of change" of a line

Change in the dependent variable
Change in the independent variable

Rise or Vertical Change
Run Horizontal Change

Slope Formula

Given the ordered pairs (x_1, y_1) and (x_2, y_2) that lie on a line, the slope of line is: $\frac{y_2 - y_1}{x_2 - x_1}$

**Y-Intercept**

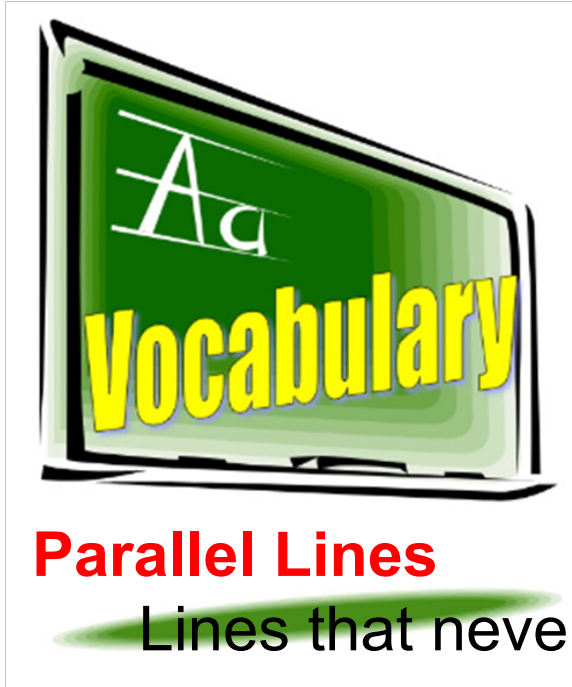
Point at which a line crosses the y-axis
Represented by the point $(0,y)$

X-Intercept

Point at which a line crosses the x-axis
Represented by the point $(x,0)$

Vertex

The highest or lowest point of an absolute value function
The maximum or minimum y-value of an absolute value function
The turning point of an absolute value function



Linear Equation

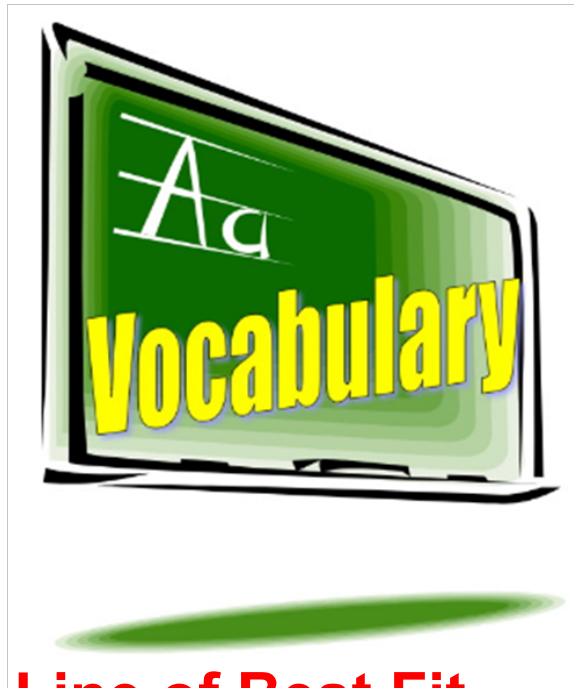
One of three equation formats - point-slope [$y - y_1 = m(x - x_1)$]; slope-intercept ($y = mx + b$); or standard ($Ax + By = C$) that defines the relationship between the points on a line

Parallel Lines

Lines that never intersect

Perpendicular Lines

Lines that intersect to form a right angle



Direct Variation

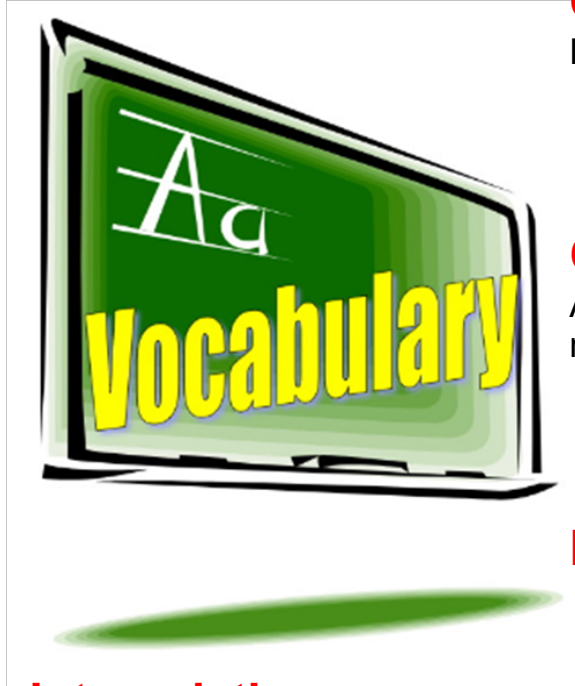
Linear relationship whose equation takes the form of $y = kx$; "k" is referred to as the constant of variation

Trend Line

Line drawn on a scatter plot, near the points, that shows a correlation

Line of Best Fit

Equation that best models / most closely aligns to the linear relationship between the independent and dependent variables in a series of ordered pairs



Correlation

Relationship between ordered pairs in a set of data

Positive correlation - when y increases as x does

Negative correlation - when y decreases as x increases

No correlation - when x and y are not related in any pattern

Correlation Coefficient - "r"

A number between -1 and 1 that tells how closely the line of best fit models the data

$r = -1$ means a strong negative correlation

$r = 0$ means no correlation

$r = +1$ means strong positive correlation

Extrapolation

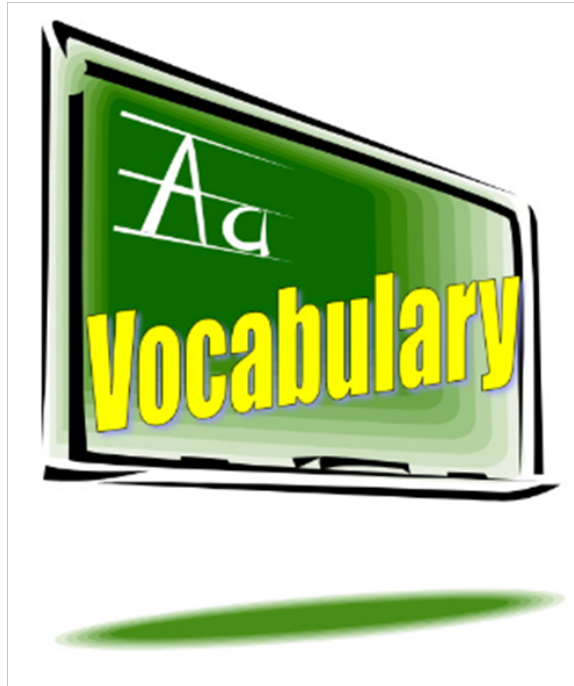
Predicting a value outside a range of known values

Interpolation

Estimating a value between two known values

Causation

When a change in one quantity brings about a change in another quantity



Translation

Shifting a graph left, right up or down on a coordinate grid resulting in the same size and shape graph, but in a different location

Vertex

The point at which a graph changes direction (as in an absolute value graph)

Linear functions can be written in various forms:

$$y = mx + b \quad \text{Slope-Intercept Form}$$

$$y - y_1 = m(x - x_1) \quad \text{Point-Slope Form}$$

$$Ax + By = C \quad \text{Standard Form}$$

$$y = a|x - b| + c \quad \text{Absolute Value Vertex Form}$$

Each format tells us something different about the line.

