Notes Chapter 2

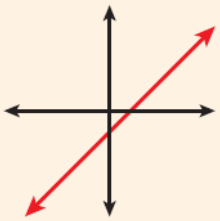
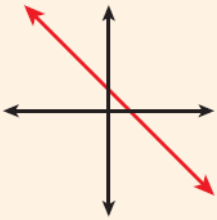
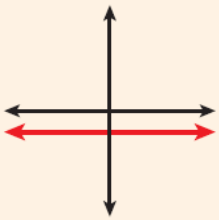
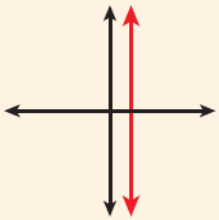
Rate of change = $\frac{change\ in\ dependent\ variable\ (y)}{change\ in\ independent\ variable\ (x)}$

Slope = $\frac{rise}{run}$

Slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$

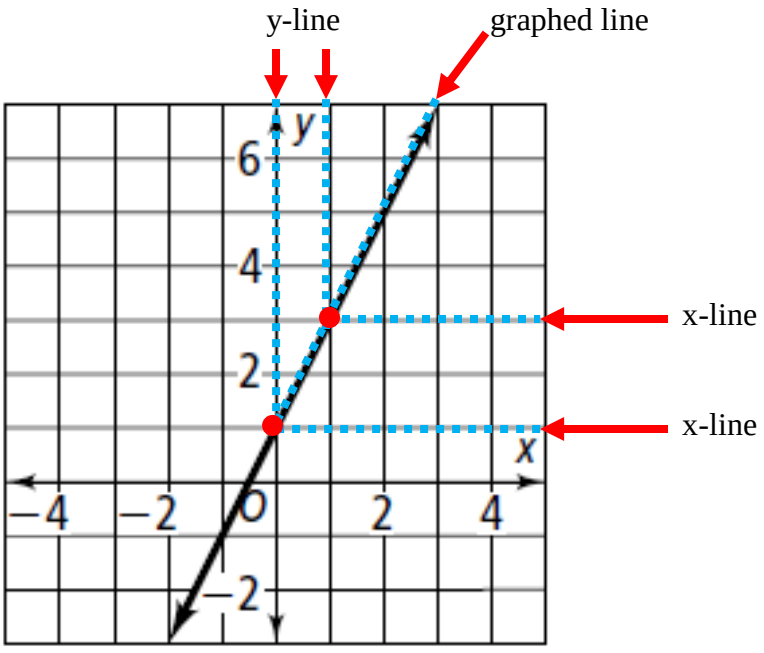
Example: given two points, find the slope between them, $(-2, 3), and\ (-6, -4)$

$$m = \frac{-4-3}{-6-(-2)} = \frac{-4-3}{-6+2} = \frac{-7}{-4} = \frac{7}{4}$$

Positive Slope	Negative Slope	Zero Slope	Undefined Slope
			
Line rises from left to right.	Line falls from left to right.	Horizontal line	Vertical line

When finding the slope of a graphed line find the points that cross the x-lines, y-lines, and graphed line all together at one place.

So using points: (0,1) and (1,3) would be points that could be used in the slope formula



Each pair of points lies on a line with the given slope. Find x or y.

$(7, 4), (3, y)$; slope = $\frac{1}{4}$

Plug in every into the slope formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

7 = x_1 4 = y_1 3 = x_2 y = y_2 $\frac{1}{4}$ = m

Plug values in: $\frac{1}{4} = \frac{y-4}{3-7}$ simplify: $\frac{1}{4} = \frac{y-4}{-4}$

Multiply each side by: (-4) $(-4)\left(\frac{1}{4}\right) = \left(\frac{y-4}{-4}\right)(-4)$ simplify: $-1 = y - 4$

Add 4 to both sides: $-1 + 4 = y - 4 + 4$ simplify: $3 = y$

$(x, 5), (-3, 6)$; slope = -1

Plug in everything into the slope formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

x = x_1 5 = y_1 -3 = x_2 6 = y_2 -1 = m

Plug values in: $-1 = \frac{6-5}{-3-x}$ simplify: $-1 = \frac{1}{-3-x}$

Multiply each side by: $(-3 - x)$ $(-3 - x)(-1) = \left(\frac{1}{-3-x}\right)(-3 - x)$

simplify: $3 + x = 1$

Subtract 3 to both sides: $3 - 3 + x = 1 - 3$

simplify: $x = -2$

Common dependent and independent variables:

Time: minutes, hours, years, etc. is most often **independent (x)**

Cost, height, distance: is most often **dependent (y)**

Ask yourself if it is miles per hour or hours per mile?
Miles per hour, so miles is dependent and hour is independent.

Ask yourself if it is cost per pound or pounds per cost?
Cost per pound, so cost is dependent and pounds is independent.

Formula's

Slope Formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$

Slope-intercept Form: $y = mx + b$

Point-Slope Form: $y - y_1 = m(x - x_1)$

Standard form: $Ax + By = C$

In standard form: A is positive
A and B are NOT fractions or decimals