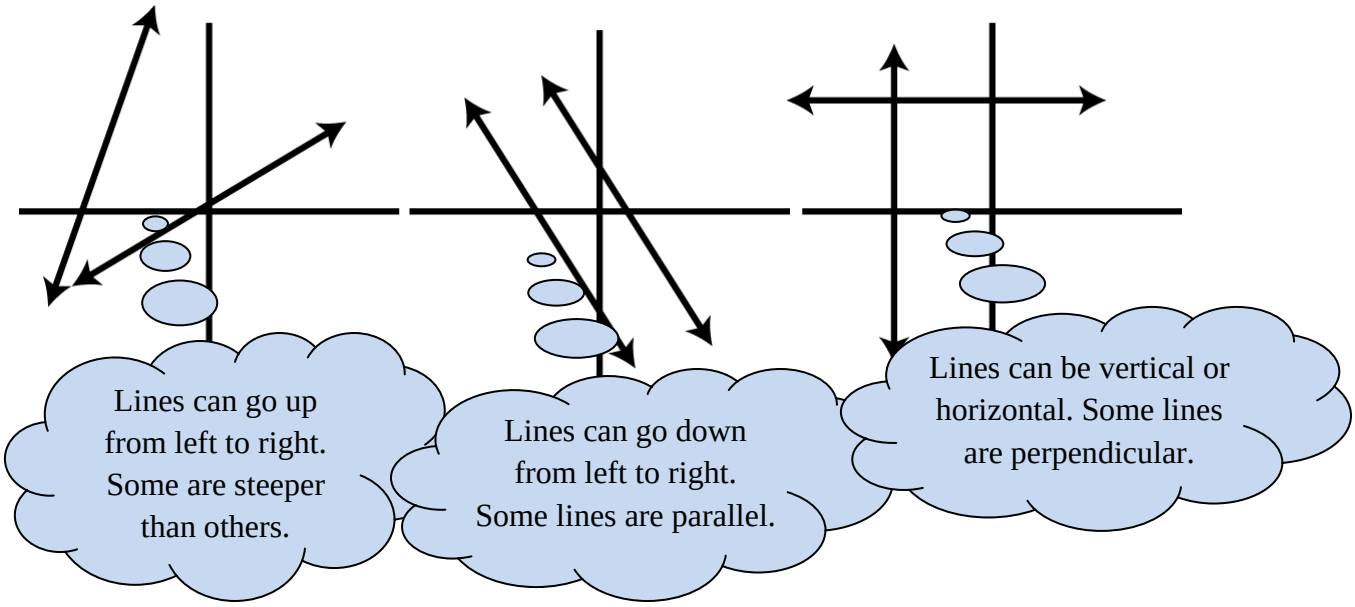
Slope is one of the defining parts of a line. It simply tells us how slanted the line is.

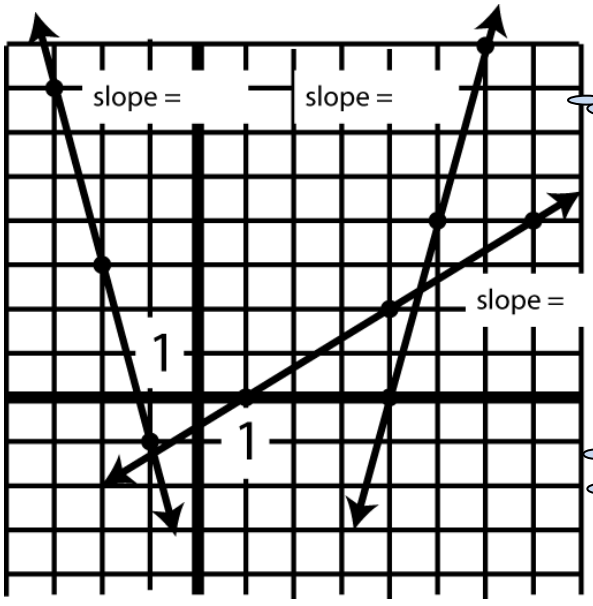
Elementary Algebra
Class Notes
Slope of a Line and Rate of Change (section 3.4)

The slope of a line tells you how slanted it is. Imagine walking up (or down) a line from left to right and you understand why that is important.



Imagine any two points on a line. Slope is the ratio of how far we go up (or down) to how far we go right (or left) to get from one point to the other point. As the steepness of the line changes, this ratio would change too.

Find the slopes of the lines pictured below by using the points and simply counting how far you go up and over to get from one point to the next.



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

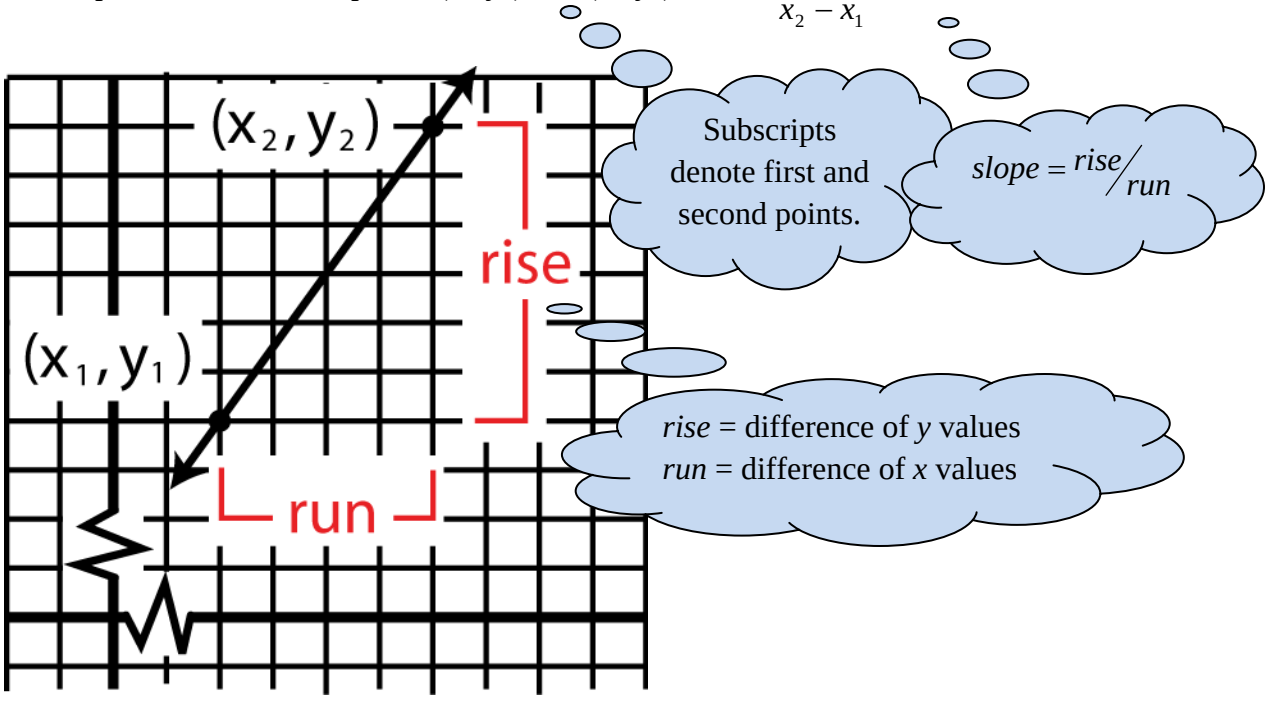
up or right: count as positive
down or left: count as negative

What makes slope negative?

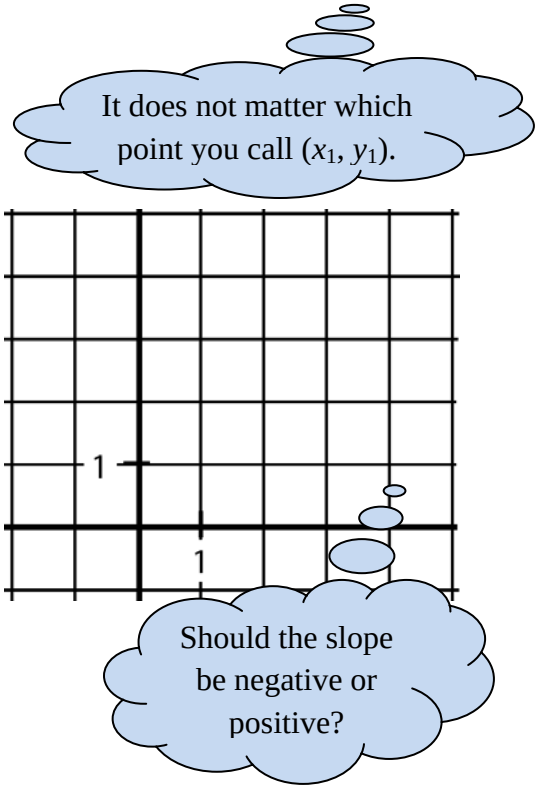
Which line has the largest slope?

Formula for Slope:

The slope between the two points (x_1, y_1) and (x_2, y_2) is $m = \frac{y_2 - y_1}{x_2 - x_1}$.

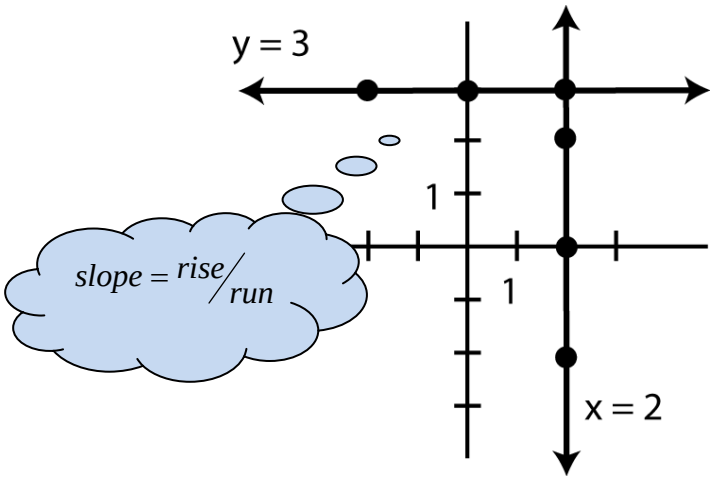


expl 1: Use the formula to find the slope of the line that goes through the points (–1, 4) and (3, 2). Plot the points on the graph to check yourself.



Horizontal and Vertical Lines:

Find the slope of these lines. Rather than using the formula from the previous page, use the quicker "rise over run" method.



Use what you found above to generalize about the slope of all vertical and horizontal lines.

Slope of any vertical line =

Slope of any horizontal line =

Slope-intercept Form of a Line:

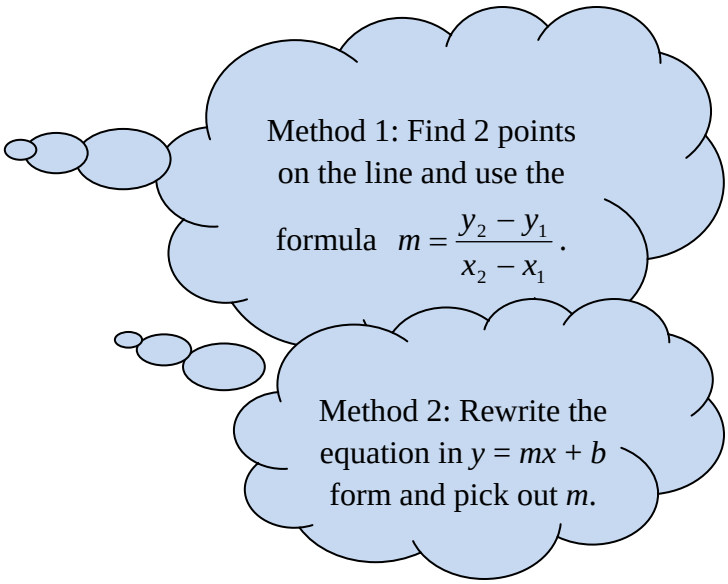
Any (non-vertical) line could be written in the form $y = mx + b$. Here, m is the slope and b is the y-intercept. It also helps to think of (x, y) as a generic point on the line.

expl 2: Find the slope of the line $y = -9.3x + 4.7$.

expl 3: Find the slope of the line $x = 5$.

expl 4: Find the slope of the line $y = -8$.

expl 5: Find the slope of the line $2x - 3y = 12$.



Parallel and Perpendicular Lines:

Worksheet: Parallel and Perpendicular lines: This worksheet focuses on parallel and perpendicular lines and how their slopes are related. It also practices finding slope as "rise over run".

After doing the worksheet, complete the following information.

Slopes of parallel lines are _____.

Slopes of perpendicular lines are _____.

The product of the slopes of perpendicular lines is _____.

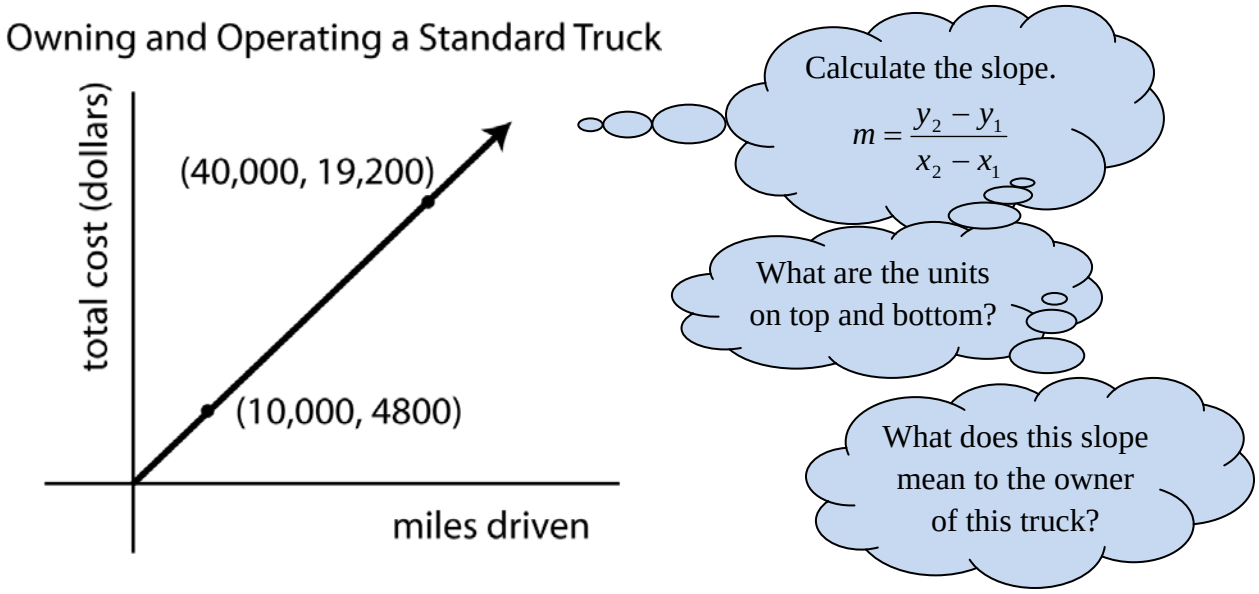
expl 6: Find the slope of a line that is parallel to the line $y = 5x + 3$.

expl 7: Find the slope of a line that is perpendicular to the line $y = 5x + 3$.

Rate of change:

The slope of a line is the difference of the *y* values divided by the difference of the *x* values. This ratio tells us how fast *y* is changing with respect to *x*, or rate of change.

expl 8: Find the slope of the line and write it as a rate of change. Don't forget the units.



Optional Worksheet: Understanding Slope:

This worksheet investigates slope and how linear relationships use it.