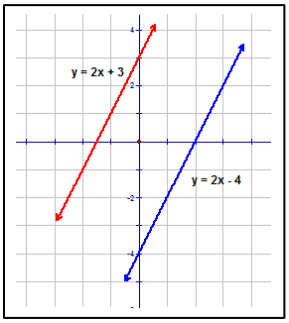
5.5 Writing Equations of Parallel and Perpendicular Lines

What are the **2 things we need to know** to write the equation of a line?

Sometimes, we're given both…sometimes we are given one of the 2 and need to find the other…and sometimes we need to find both!

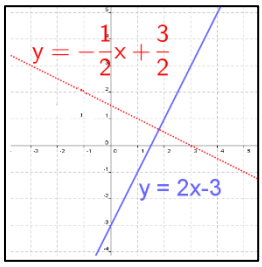
What is the **general form of the equation of a line**?



Parallel lines never _____ and have the _____ slope.
Their y-intercepts (b) _____.

Examples of equations of parallel lines:

Perpendicular lines _____ and have slopes that are _____. Their y-intercepts_____



Opposite means
Reciprocal means

Examples of equations of perpendicular lines:

Review of the steps necessary to write the equation of a line:

1. Find the **slope (m)** if it is not given to you already. If it is not, find it using the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$
2. Plug in the first (or only) coordinate point into the point-slope formula $y - y_1 = m(x - x_1)$
3. Be sure that your final answer is an *equation,* in the form asked of you (do not just state what m and b are)

Review of Writing Equations of Lines

a.) Write the equation of the line in slope-intercept form with a slope of _____ and a y-intercept of _____.
b.) Write the equation of the line in slope-intercept for with a slope of _____ that passes through the point _____.

c.) Write the equation of the line in standard form that passes through the points _____ and _____.

How to write the equation of the line parallel or perpendicular to a given line:

1. Solve the given equation for y, to put it in slope-intercept form
2. Identify the slope of the given line
3. If the equation of the line you are asked to find is:
    a. Parallel to the given line: use the slope of the given line as the slope for the line you're finding
    b. Perpendicular to the given line: take the slope of the given line, find it's negative reciprocal, and use that as the slope for the line you're finding
4. Use the slope you found for your new line, and the point given, and plug into the point-slope formula $y - y_1 = m(x - x_1)$ to find the equation of the line you are asked to find

d.) Write the equation of the line with a that passes through the point _____ and is **parallel** to the line _____

e.) Write the equation of the line with a that passes through the point _____ and is **parallel** to the line _____

f.) Write the equation of the line with a that passes through the point _____ and is **perpendicular** to the line _____

g.) Write the equation of the line with a that passes through the point _____ and is **perpendicular** to the line _____

h.) Determine which lines, if any, are parallel or perpendicular.

Line a: $y = 5x - 3$ Line b: $x + 5y = 2$ Line c: $-10y - 2x = 0$