MATH 156: Precalculus Fall 2015 Worksheet §1.10: Lines

By the end of this section you must know how to:

- find the slope of a line given
 - its equation, OR
 - its graph, OR
 - two points on the line
- find the equation of a line given
 - two points on the line OR
 - its slope and a point on the line OR
 - its slope and an intercept (x or y) OR
 - a point and a line parallel to it OR
 - a point and a line perpendicular to it OR
 - its graph
- graph a line given its equation
- find the x- and y-intercepts of a line (if they exist)
- write and recognize the equation of a vertical line and a horizontal line

DEFINITION: The slope m of a line through $A(x_1, y_1)$ and $B(x_2, y_2)$ is

EXAMPLE 1: Given the points A(2,-3), B(10,5), C(-5,-3) and D(2,7), find the slope of a line through:

- 1. A and B
- 2. A and C
- 3. A and D

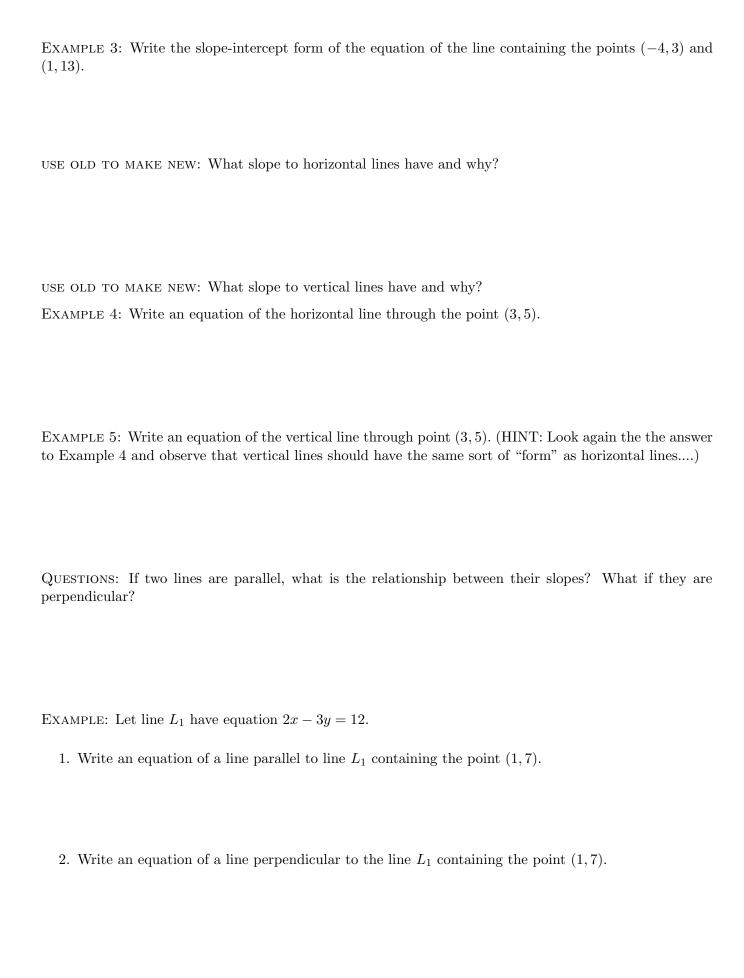
USE OLD TO MAKE NEW: Use the DEFINITION OF SLOPE ABOVE to show that
if you KNOW (1) the slope m and (2) a point on the line (x_1, x_2) you can write the equation of the line. (This is called <i>point-slope form.</i>)
EXAMPLE 2: Write the equation of the line with a slope of 5 and containing the point $(-20,4)$.

Notation: A line in the form y = mx + b is called *slope-intercept* form.

EXAMPLE: Rewrite the equation from example 2 so that it is in slope-intercept form.

QUESTIONS: What is the y-intercept of the line from example 2? The x-intercept?

Graph the line from example 2.



YOU CONSTRUCT EXAMPLES:

1. Give the equation of a line that has no x-intercepts and sketch it.
2. Give the equation of a line that has no y -intercepts and sketch it.
3. Give the equation of a line with negative slope and sketch it.
Last Example The relationship between Fahrenheit (F) and Celsius (C) temperature is given by $F = \frac{9}{5}C + 32$.
1. Explain how you know F and C have a linear relationship.
2. Give a detailed interpretation of what the $9/5$ means in this equation.
3. Give a detailed interpretation of what the 32 means in this equation.
4. Water boils at $212^{o}F$. Use the equation to determine the temperature in degrees Celsius at which water boils.

5. Find the temperature at which the scales agree.