Mathematics 1275CO/OL27 **Quiz #1**
Instructor: Suman Ganguli **Due: Thursday, Sept 16** **Name:** _____

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1. Find the equation of the line passing through the points $(-1, 5)$ and $(3, -3)$, according to the following steps:
   a. What is the slope m of the line? Show your calculations:

Solution:

$$m = \frac{5-(-3)}{-1-3} = \frac{8}{-4} = -2$$

   b. Write down the equation of the line in point-slope form, using the point $(-1, 5)$. (No need to simplify yet.)

Solution:

$$y - 5 = -2(x+1)$$

   c. Write down another equation of the same line, also in point-slope form, but using the point $(3, -3)$:

Solution:

$$y + 3 = -2(x-3)$$

   d. Simplify either (or both!) of your answers from (b) and/or (c) to get the equation of the line in slope-intercept form:

Solution:

$$y + 3 = -2(x-3) \Longrightarrow y = -2x + 6 - 3 \Longrightarrow y = -2x + 3$$

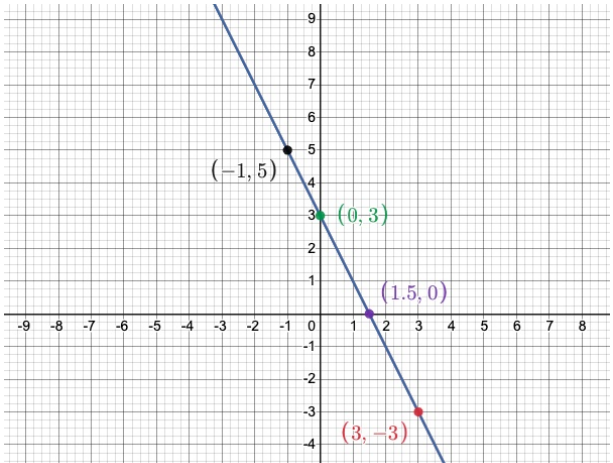
$$y - 5 = -2(x+1) \Longrightarrow y = -2x - 2 + 5 \Longrightarrow y = -2x + 3$$

   e. Use any of the equivalent equations of the line from (b)-(d) to algebraically solve for the x-intercept (i.e., plug in $y = 0$ and solve for x):

Solution:

$$0 = -2x + 3 \Longrightarrow -2x = -3 \Longrightarrow x = \frac{3}{2}$$

   f. Sketch a graph of the line. Label the two given points $(-1, 5)$ and $(3, -3)$, and also label the x- and y-intercepts with their coordinates:



2. Consider the linear equation $x - 2y = -4$.

   a. Put the given linear equation in slope-intercept form:

   Solution:

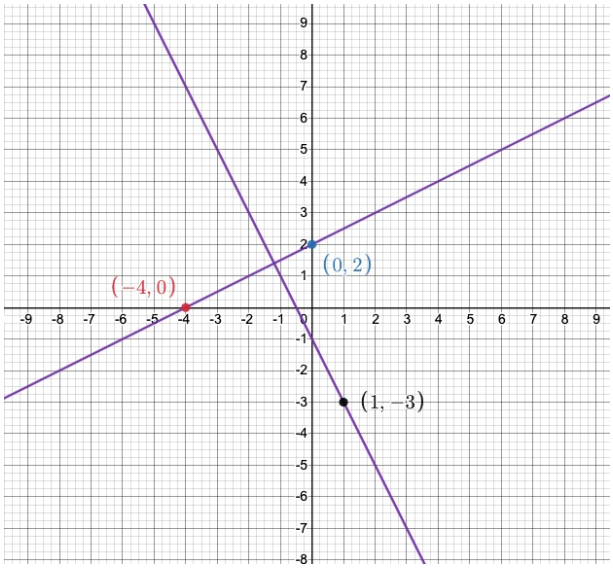
   $$x - 2y = -4 \Longrightarrow -2y = -x - 4 \Longrightarrow y = \frac{1}{2}x + 2$$

   b. Solve for the x-intercept of the line algebraically:

   Solution:

   $$0 = \frac{1}{2}x + 2 \Longrightarrow \frac{1}{2}x = -2 \Longrightarrow x = -4$$

   c. Sketch the graph of the line described by the equation. Label the x- and y-intercepts with their coordinates.



   d. What is the slope of any line perpendicular to the given line?

   $m_p =$

   Solution: Since $m = \frac{1}{2}$, $m_p = -2$

   e. Write down the equation of the line which passes through the point $(1, -3)$ and is perpendicular to the one you graphed above. Also sketch the graph of this line on the same coordinate plane.

   Solution:

   $$y + 3 = -2(x - 1) \Longrightarrow y = -2x - 1$$