Math 111: Quiz 3

Name SOLUTIONS

1. Find an equation for a line that is perpendicular to the line $y = 3x - 2$ through the point $(-1, 5)$.

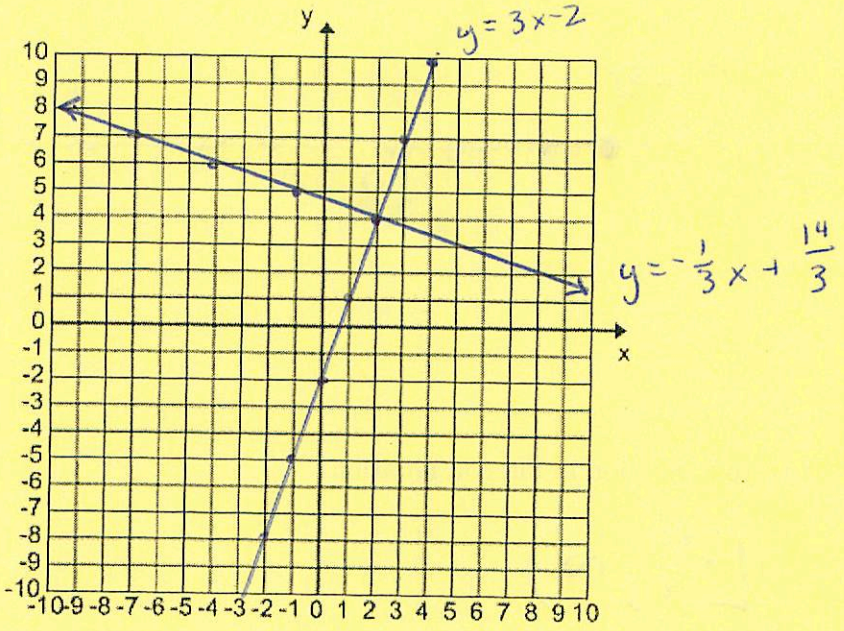
Slope of line 2 is $-\frac{1}{3}$ because $(-\frac{1}{3})(3) = -1$

$y = -\frac{1}{3}x + b$. Plug in the point $(-1, 5)$

$5 = -\frac{1}{3}(-1) + b \longrightarrow 5 = \frac{1}{3} + b \longrightarrow \frac{15}{3} - \frac{1}{3} = b \longrightarrow \frac{14}{3} = b$

$y = -\frac{1}{3}x + \frac{14}{3}$

(b) Graph both lines on the grid below. Be sure to label both lines.



(c) Find the **exact** x-intercepts and y-intercepts for the original line $y = 3x - 2$ AND the **exact** x-intercepts and y-intercepts for line you found in part (a). (You should find 4 intercepts total.)

Line 1: Let $x=0$: $y=-2$ (y-int)

Let $y=0$: $0 = 3x - 2$

$\frac{2}{3} = x$ (x-int)

Line 2: Let $x=0$: $y = \frac{14}{3}$ (y-int)

Let $y=0$: $0 = -\frac{1}{3}x + \frac{14}{3}$

$(-3)(-\frac{14}{3}) = -\frac{1}{3}x(-3)$

$14 = x$ (x-int)

2. (a) Solve the following inequality for x: $-2(x+3) \leq \frac{1}{4}$

Distribute: $-2(x+3) \leq \frac{1}{4}$

$-2x - 6 \leq \frac{1}{4}$

$-2x \leq \frac{1}{4} + \frac{24}{4}$

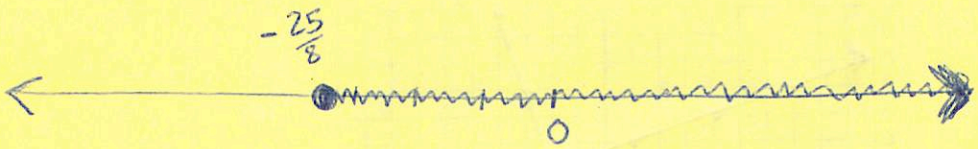
$-2x \leq \frac{25}{4}$

Flip inequality

$x \geq -\frac{25}{4} \cdot \frac{1}{2}$

$x \geq -\frac{25}{8} = -3\frac{1}{8}$

(b) Give your solution graphically on a number line.



(c) Give your solution in interval notation.

$\left[-\frac{25}{8}, \infty\right)$