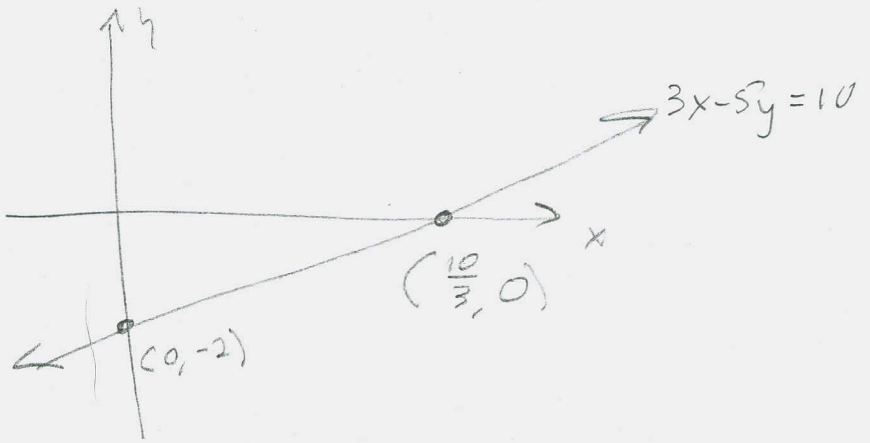
MAT 099
Fall, 2010

Test 2

Name KEY

1. (8 pts) Graph the linear equation $3x - 5y = 10$. Show x- and y-intercepts.

x	y
0	-2
$\frac{10}{3}$	0



2. (7 pts) Graph the linear inequality $3x - 5y \leq 10$. Be sure and show the "good stuff" clearly.
Hint: Use your work from #1.

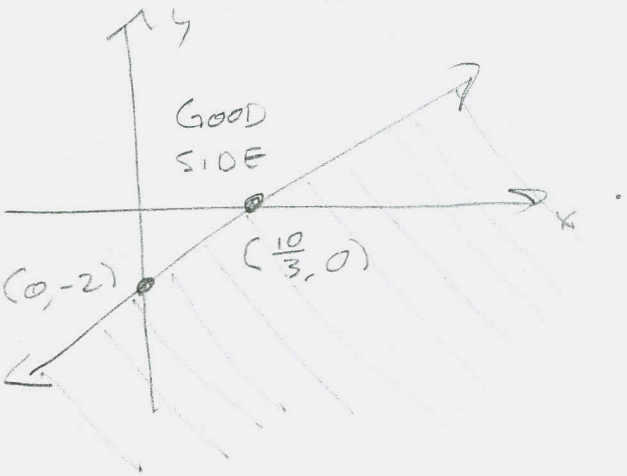
(0,0):

$3(0) - 5(0) \leq 10$?

$0 \leq 10$?

Yes

(0,0) good!

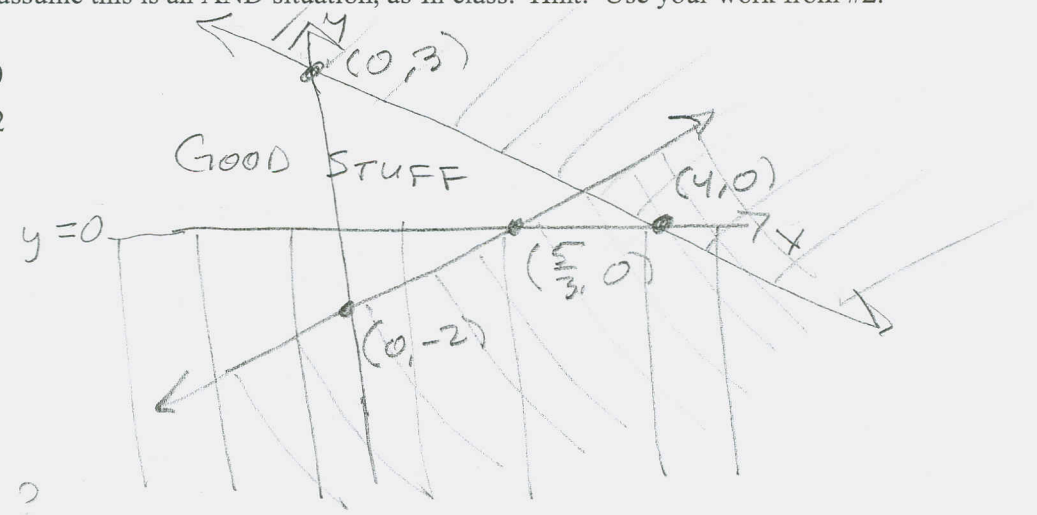


3. (5 pts) Graph the *intersection* of the following inequalities on the same set of coordinate axes. In other words, assume this is an AND situation, as in class. Hint: Use your work from #2.

$3x - 5y \le 10$

$3x + 4y \le 12$

$y \ge 0$



$3x + 4y = 12$

x	y
0	3
4	0

$3(0) + 4(0) \le 12$?

$0 \le 12$? Yes

(0,0) GOOD

4. (5 pts) Write $2x - 8y = 11$ using function notation. What is the slope?

$-8y = -2x + 11$

$y = \frac{-2x + 11}{-8}$

$y = \frac{-2x}{-8} + \frac{11}{-8}$

$f(x) = \frac{1}{4}x - \frac{11}{8}$

$m = \frac{1}{4}$

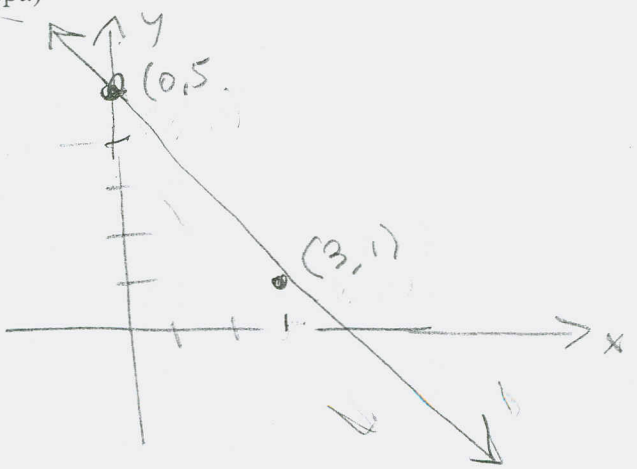
5. (5 pts) Use the slope and y-intercept to graph the linear function $f(x) = -\frac{4}{3}x + 5$. (I don't need to see an x-intercept.)

$m = -\frac{4}{3}$

$b = 5$

DOWN 4

RIGHT 3



6. (5 pts) Find the slope of the line through (3, - 5) and (- 5, 4).

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4-(-5)}{-5-3} = \frac{9}{-8}$$

7. (5 pts) Find an equation of the line through (3, - 5) and (- 5, 4). Give your final answer in **point-slope form**. Hint: Use your work from #6. (Shouldn't take much room!)

$$y - y_1 = m(x - x_1) \Longrightarrow y - (-5) = -\frac{9}{8}(x-3)$$

8. (5 pts) Re-write your answer to #7 in **slope-intercept form**.

$$y + 5 = -\frac{9}{8}x + \frac{27}{8}$$

$$y = -\frac{9}{8}x + \frac{27}{8} - \frac{40}{8}$$

$$\boxed{y = -\frac{9}{8}x - \frac{13}{8}}$$

$$\frac{27}{8} - 5 =$$

$$\frac{27}{8} - \frac{5}{1}\cdot\frac{8}{8} = \frac{27-40}{8}$$

9. (5 pts) Re-write your answer to #7 in **function notation**. (Shouldn't take much room!)

$$\boxed{f(x) = -\frac{9}{8}x - \frac{13}{8}}$$

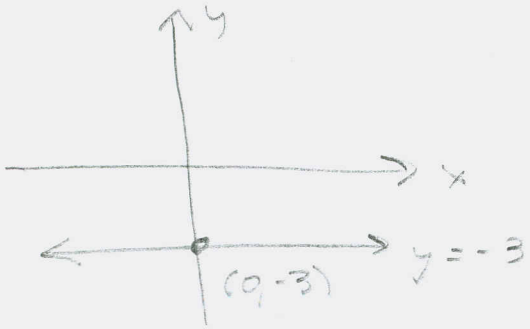
10. (5 pts) Re-write your answer to #7 in **standard form**, with only integer coefficients.

$$\frac{9}{8}x + y = -\frac{13}{8}$$

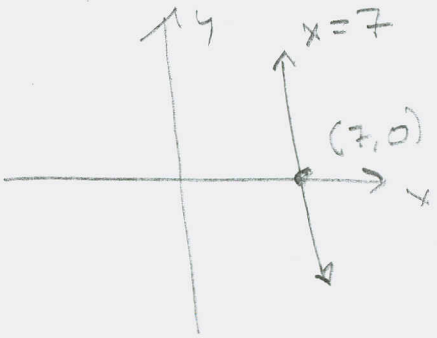
$$\boxed{9x + 8y = -13}$$

Graph the following linear equations:

11. (5 pts) $y = -3$



12. (5 pts) $x = 7$



13. (10 pts) Amanda can clean the windows of Benedetto's tropy home in 12 hours. Steve, a much better window washer, can do the job in a mere 15 hours. Steve is *so* good, he doesn't show up until 10:00 a.m. to help. Amanda starts a 6 a.m. What time will the job be finished?

Let x = the time it takes Amanda, in hours.

y = " " " " Steve, " "

$\frac{1}{12}x + \frac{1}{15}y = 1$

Since $y = x - 4$, we have

$\frac{1}{12}x + \frac{1}{15}(x-4) = 1$

LCD:

$12 = 2 \cdot 2 \cdot 3$

$15 = 3 \cdot 5$

$LCD = 2 \cdot 2 \cdot 3 \cdot 5 = 60$

$60\left(\frac{1}{12}x\right) + 60\left(\frac{1}{15}(x-4)\right) = 60(1)$

$5x + 4(x-4) = 60$

$5x + 4x - 16 = 60$

$9x = 76$

$x = \frac{76}{9}$

$= 8\frac{4}{9} = 8 \text{ hrs}, 26.\overline{6} \text{ min}.$

$\approx$ 2:27 pm

14. (5 pts) Find an equation of the line through (3, 7) that is perpendicular to $y = \frac{8}{3}x - 810$. Give your answer in point-slope form. (Shouldn't take much room!)

$m = \frac{8}{3} \Rightarrow m_{\perp} = -\frac{3}{8}$ $\quad y - 7 = -\frac{3}{8}(x-3)$

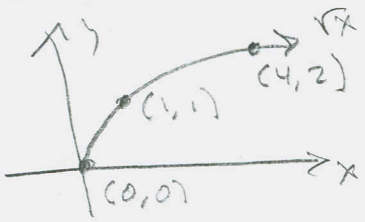
15. (5 pts) Find an equation of the line through (3, 7) that is parallel to $y = \frac{8}{3}x - 810$. Give your answer in point-slope form. (Shouldn't take much room!)

$m = \frac{8}{3} \Rightarrow m_{\parallel} = \frac{8}{3}$ $\quad y - 7 = \frac{8}{3}(x-3)$

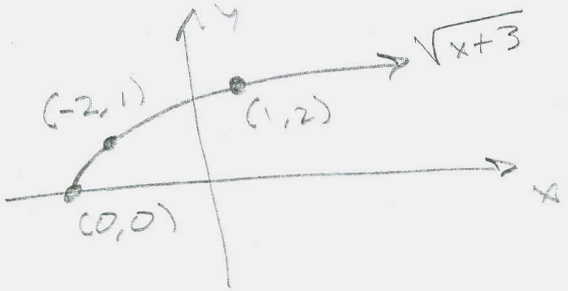
16. (5 pts) Convert $\frac{2}{3}$ hour to minutes.

$\left(\frac{2}{3} \text{ hr}\right)\left(\frac{60 \text{ min}}{1 \text{ hr}}\right) = \left(\frac{2}{3}\right)\left(\frac{60}{1}\right) \text{ min} = 40 \text{ min}$

17. (5 pts) Sketch the graph of $g(x) = \sqrt{x+3}$ by transforming the basic function $f(x) = \sqrt{x}$.
Two graphs, total. Key points to track: (0,0), (1, 1), and (4, 2).



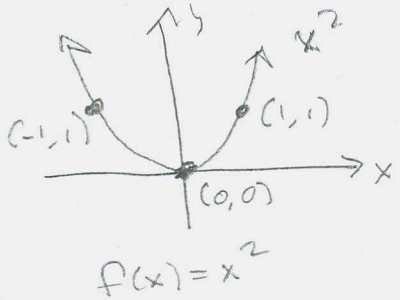
$f(x) = \sqrt{x}$



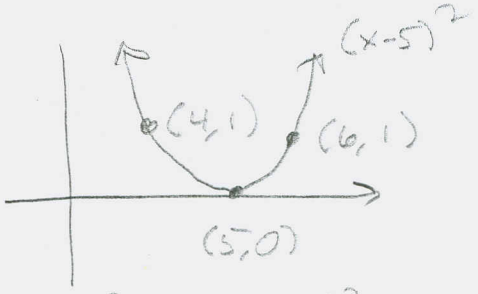
$g(x) = \sqrt{x+3} = f(x+3)$

left 3

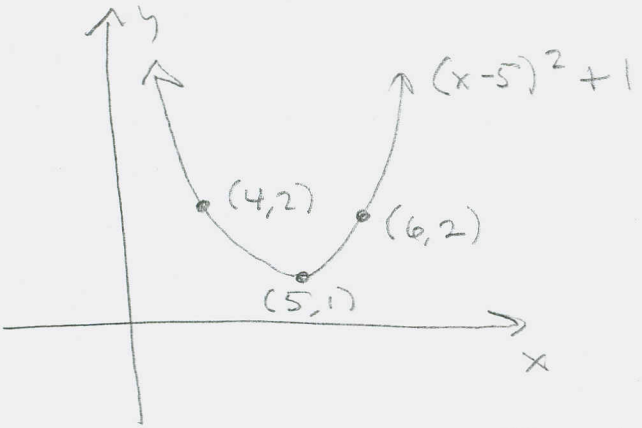
18. (5 pts) Sketch the graph of $g(x) = (x-5)^2 + 1$ by transforming the basic function $f(x) = x^2$.
Key points to track: (- 1, 1), (0,0), and (1, 1).



$f(x) = x^2$



$(x-5)^2 = f(x-5)$
RIGHT 5



$g(x) = (x-5)^2 + 1 = f(x-5) + 1$