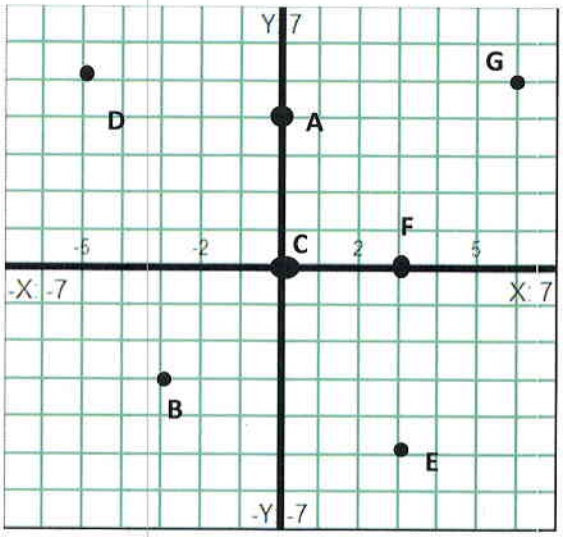
Math 1050, Exam #2, Spring 2014 Name KEY

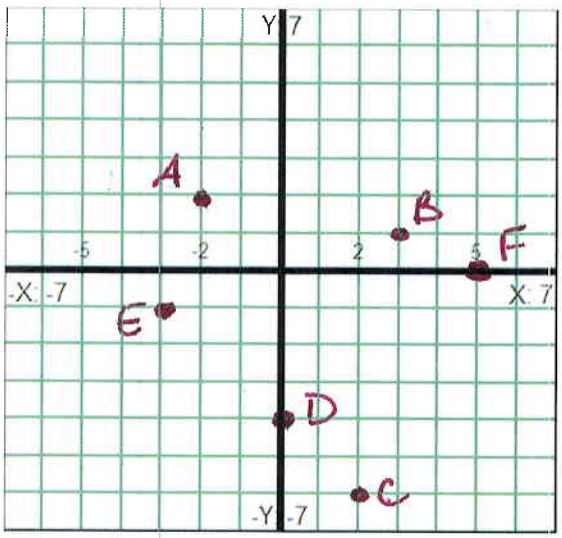
Instructions: Show all work. Use **exact** answers unless specifically asked to round. Answer all parts of each question. Draw diagrams to help organize the data (this is worth partial credit). If you do your work on scrap paper, you should indicate that directly on the test paper along with your final answer. It is preferable, if you can, to do work directly on the test.

1. For the graph shown below, state the coordinates of each point (You may assume the coordinate are all integers.) (7 points)



A. (0,4)
B. (-3,-3)
C. (0,0)
D. (-5,5)
E. (3,-5)
F. (3,0)
G. (6,5)

2. For the points shown below, graph each point and label it on the graph. State which quadrant each point is in. If it is not in a quadrant, state which axis it lies on. (1 point each)



A. (−2,2) II
B. (3,1) I
C. (2,−6) IV
D. (0,−4) y-axis
E. (−3,−1) III
F. (5,0) x-axis

3. Determine if the given points satisfy the equation $y = 2x - 3$. (3 points)
   a. $(-1, -5)$ $2(-1)-3=-2-3=-5$ yes
   b. $(-3,11)$ $2(-3)-3=-6-3=-9$ no
   c. $(-2,7)$ $2(-2)-3=-4-3=-7$ no

4. Fill in the table with points that satisfy the equation $x - 2y + 4 = 0$. (4 points)

x	y	(x,y)
1	5/2	(1, 5/2)
−2	1	(−2, 1)
-2	1	(−2, 1)

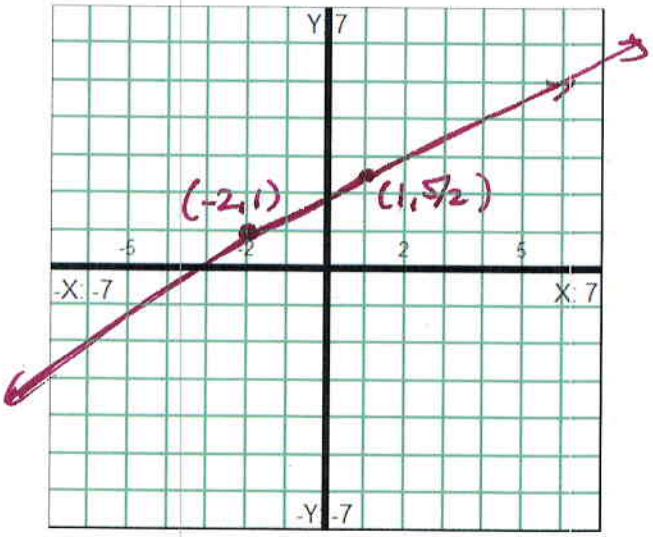
$\frac{x+4}{2} = y$

$\frac{1+4}{2} = \frac{5}{2}$

$x = 2y - 4$

$x = 2(1) - 4 = -2$

5. Use the points you obtained in #4, and graph the equation on the graph below. Label the points. (3 points)

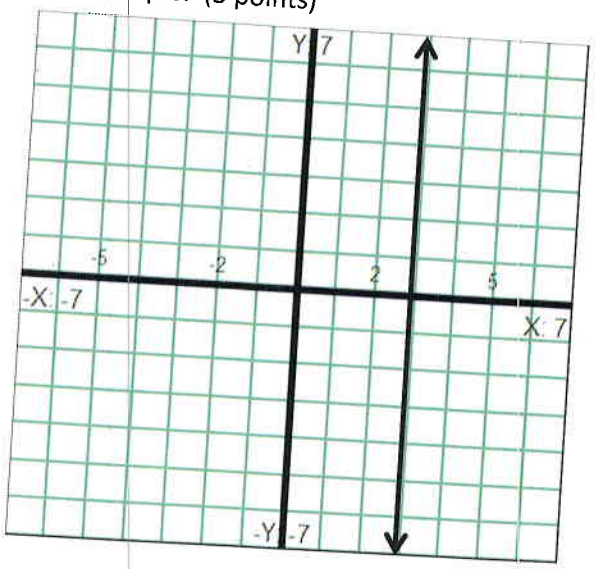


6. Find the equation of the line plotted below. State any intercepts. (3 points)

$X = 3$

x-intercept at (3,0)

no y-intercept



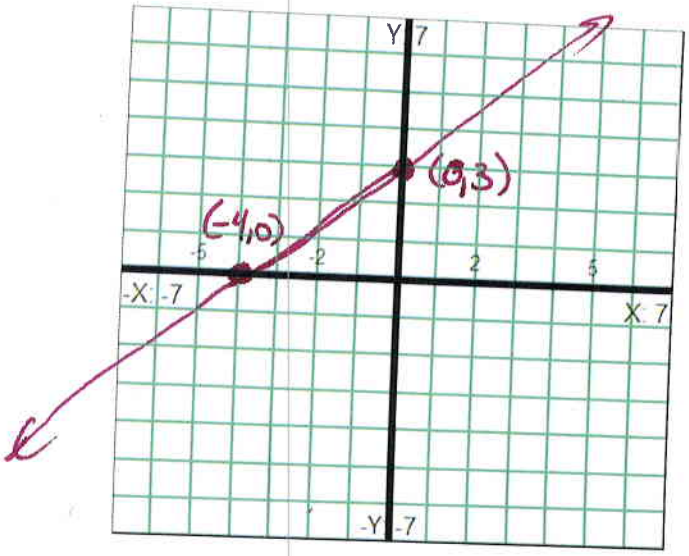
7. Find the x- and y-intercepts of the equation $3x - 4y = -12$. Plot and label those points on the graph and use them to draw the graph of the line. (3 points)

$-4y = -12$

$y = 3$ y-int

$3x = -12$

$x = -4$ x-int



8. Determine if the following equations are **linear** or **nonlinear**. (1 point each)

a. $y = 2$ linear

b. $y = \frac{4}{x}$ non-linear

c. $y = x^2 + 1$ nonlinear

d. $y = \frac{x}{2}$ linear

e. $2x - 5y = 10$ linear

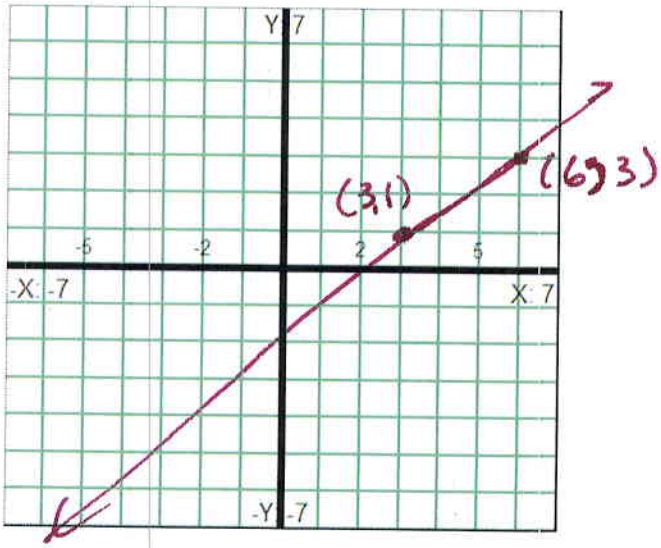
9. Find the slope of the line connecting the points $(2, -2)$ and $(3,5)$. (3 points)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5-(-2)}{3-2} = \frac{7}{1} = 7$$

10. Interpret the slope $m = \frac{4}{5}$. (2 points)

over 5 & up 4 (right)

11. Graph the line that passes through the point $(3,1)$, with a slope of $m = \frac{2}{3}$ on the graph below. Be sure to label at least two additional points on the graph. (4 points)



12. What is the equation of a vertical line that passes through the point $(3,4)$. What is its slope? (2 points)

$X = 3$

Slope is undefined

13. What is the equation of a horizontal line passing through the point $(-4,5)$. What is the slope? (2 points)

$Y = 5$

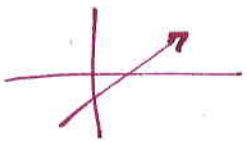
Slope is zero

14. The Standard Form of a linear equation is the form $Ax + By = C$. And equation in such a form is $3x - 4y = 12$. Solve for the Slope-Intercept form. (3 points)

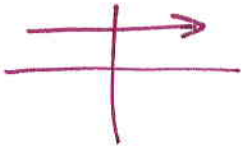
$$\frac{3x - 12}{4} = \frac{4y}{4}$$

$$y = \frac{3}{4}x - 3$$

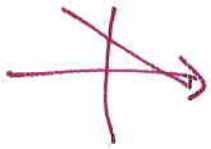
15. Sketch examples of graphs with the following characteristics. (You do not need to provide an equation, just a sketch.) (1 point each)
    a. A line with a positive slope



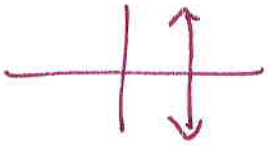
    b. A line with a zero slope



c. A line with a negative slope



d. A line with an undefined slope.



16. Give the equation of a line with the following characteristics. Put your equations in slope-intercept form. (4 points each)

a. Point (5,2) and m= -1/2

$y-2=-\frac{1}{2}(x-5)$

$y-2=-\frac{1}{2}x+\frac{5}{2}$

$+2 \qquad +2$

$y=-\frac{1}{2}x+\frac{9}{2}$

b. Slope is ¼ and y-intercept is 3/8.

$y=\frac{1}{4}x+\frac{3}{8}$

c. Passes through the points (5,-3) and (-3,3).

$m=\frac{3-(-3)}{-3-5}=\frac{6}{-8}=-\frac{3}{4}$

$y+3=-\frac{3}{4}(x-5)$

$y+3=-\frac{3}{4}x+\frac{15}{4}$

$-3 \qquad -3$

$-\frac{12}{4}$

$y=-\frac{3}{4}x+\frac{3}{4}$

d. Passes through the point (4,5) and has an undefined slope.

$x = 4$

17. Find the equation of the line with the following characteristics. Put your equations in standard form. (5 points each)

a. Passes through the point (6,7) and parallel to the line $2x+3y=9$.

$\frac{3y}{3} = \frac{-2x+9}{3}$ $y = -\frac{2}{3}x+3$

$\parallel m = -\frac{2}{3}$

$y-7 = -\frac{2}{3}(x-6)$

$y-7 = -\frac{2}{3}x+4$

$+7 \qquad +7$

$y = -\frac{2}{3}x+11$

$3y = -2x+33$

$2x+3y=33$

b. Passes through the point (-10,-3) and perpendicular to the line $5x-3y=4$.

$\frac{5x-4}{3} = \frac{3y}{3}$

$\frac{5}{3}x - \frac{4}{3} = y$

$\perp m = -\frac{3}{5}$

$y+3 = -\frac{3}{5}(x+10)$

$y+3 = -\frac{3}{5}x-6$

$-3 \qquad -3$

$y = -\frac{3}{5}x-9$

$5y = -3x-45$

$3x+5y=-45$

18. Determine if the pair of lines are parallel or perpendicular, or neither. (4 points each)

a. $L_1 : x - 4y = 24$
$L_2 : 2x - 8y = -8$

$\frac{x - 24}{4} = \frac{4y}{4}$ $m = \frac{1}{4}$

$\frac{2x + 8}{8} = \frac{8y}{8}$ $m = \frac{2}{8} = \frac{1}{4}$

parallel //

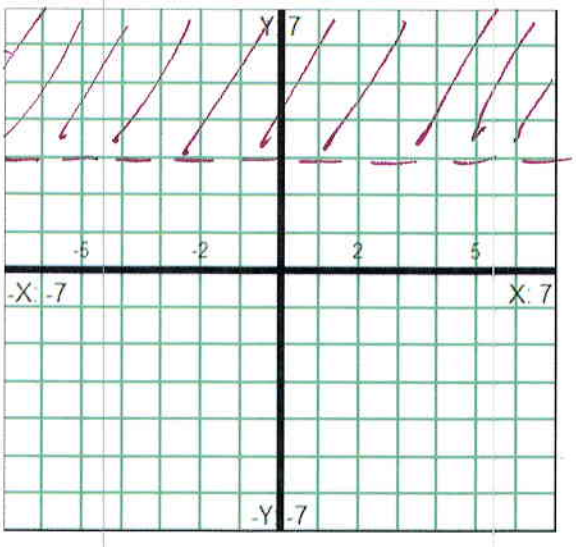
b. Line passing through the points: $L_1 : (-6,-9),(3,6)$
$L_2 : (10,-8),(-5,1)$

$m_1 = \frac{6-(-9)}{3-(-6)} = \frac{15}{9} = \frac{5}{3}$

$m_2 = \frac{1-(-8)}{-5-10} = \frac{9}{-15} = -\frac{3}{5}$ perpendicular ⊥

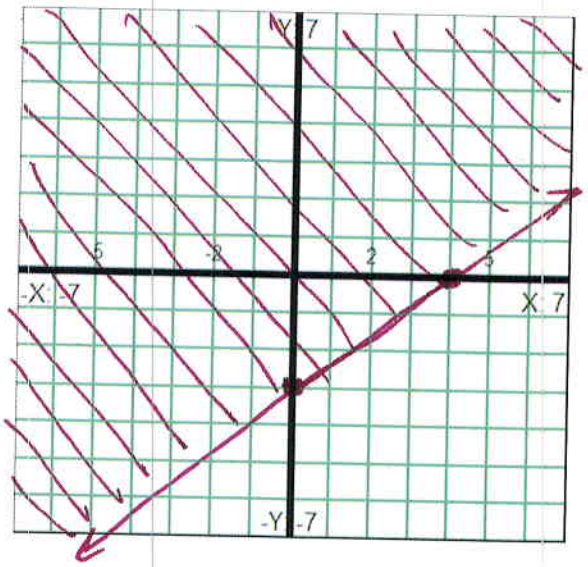
19. Graph the following two variable inequalities on the attached graphs. Be sure to shade the region indicated by the inequality. (4 points each)

a. $y > -3$



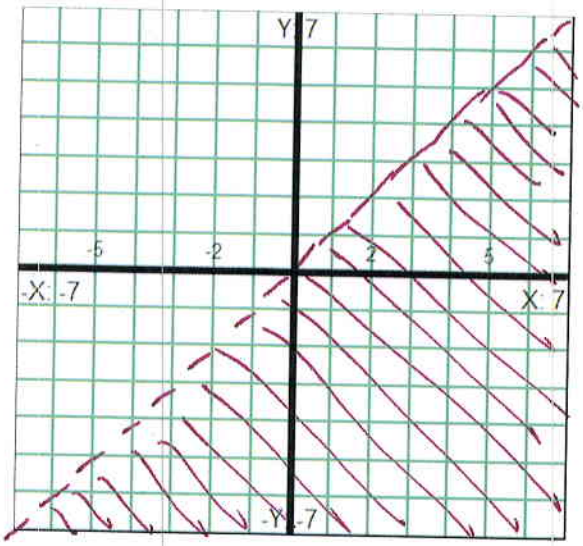
b. $3x - 4y \leq 12$

$\frac{3x-12}{4} \leq \frac{4y}{4}$



c. $x - y > 0$

$x > y$



20. Graph the system of inequalities on the attached graph. Shade the region satisfied by the system. (10 points)

$2x - 4y \leq 4$ *and* $3x + 2y \geq 6$

Solution

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

$2y \geq -3x+6$