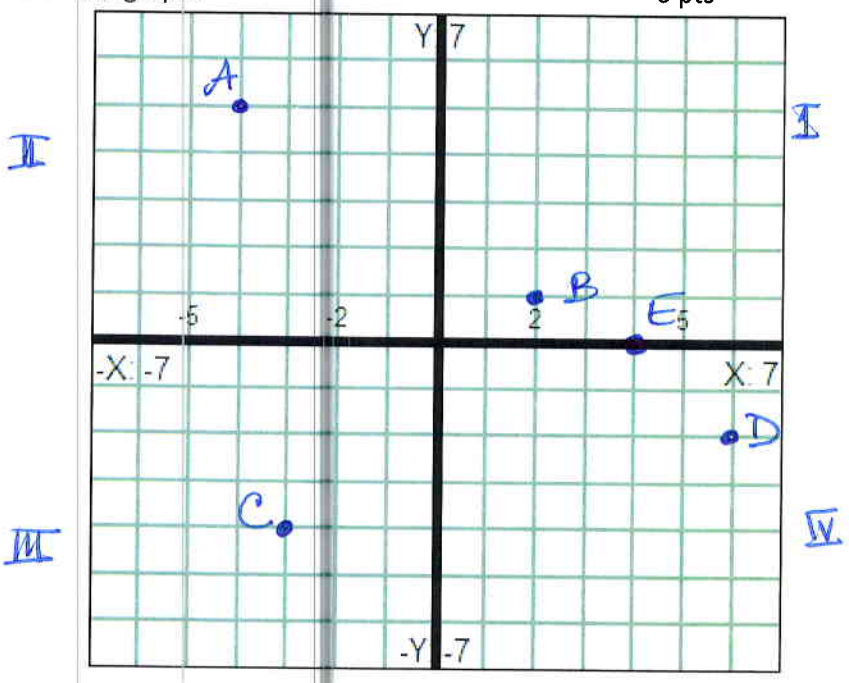
MAT 011, Exam #2, Fall 2015 Name KEY

Instructions: Show all work. Use exact answers unless specifically asked to round. Be sure to answer all parts of each questions.

1. Plot the points. Label the quadrants on the graph. 6 pts
   a. $(-4,5)$
   b. $(2,1)$
   c. $(-3,-4)$
   d. $(6,-2)$
   e. $(4,0)$



2. Complete the table of ordered pairs that satisfy the equation $2x + 7y = 5$. For the last box, choose your own point. 4 pts

x	y
0	$5/7$
-1	1
-3	$11/7$
$5/2$	0

$2(0)+7y=5 \Rightarrow y=\frac{5}{7}$

$2x+7(1)=5 \Rightarrow 2x=-2 \Rightarrow x=-1$

$2(-3)+7y=5 \Rightarrow -6+7y=5 \Rightarrow 7y=11 \Rightarrow y=\frac{11}{7}$

answers will vary if $y=0$ $2x+7(0)=5$, $x=5/2$

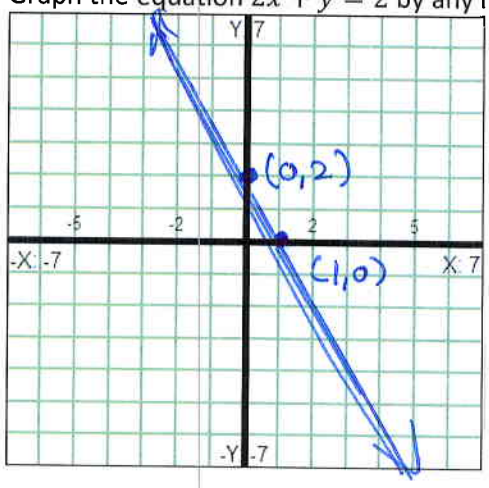
3. Solve for y in the equation $2x - 9y = -20$. 4 pts

$-2x \quad -2x$

$\frac{-9y}{-9} = \frac{-2x-20}{-9}$

$y = \frac{2}{9}x + \frac{20}{9}$

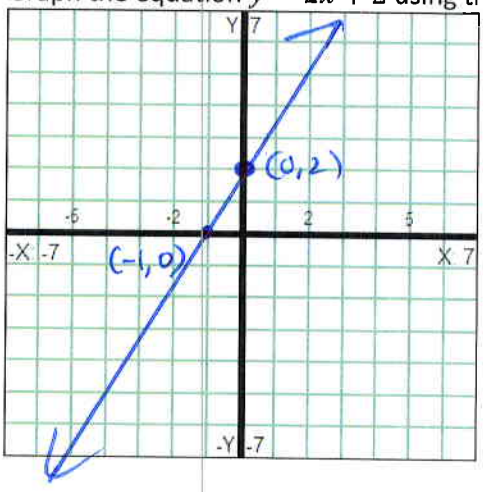
4. Graph the equation $2x + y = 2$ by any method. Clearly label each point that you use. 4 pts



$X=0 \Rightarrow Y=2$

$Y=0 \Rightarrow X=1$

5. Graph the equation $y = 2x + 2$ using the intercept method. 4 pts



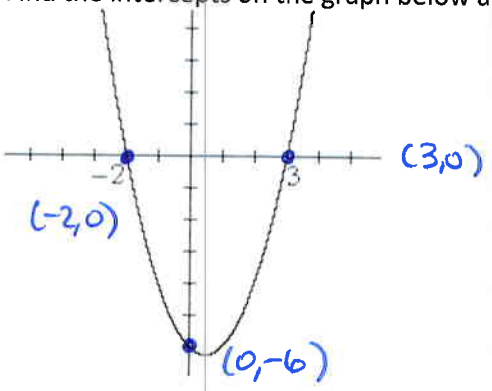
$X=0 \Rightarrow Y=2$

$Y=0 \Rightarrow 0=2x+2$

$\frac{-2x}{-2} = \frac{2}{2}$

$x=-1$

6. Find the intercepts on the graph below and write the coordinate points. 4 pts



7. What is the slope of a horizontal line? 2 pts

$m=0$

8. What is the slope of a vertical line? 2 pts

Undefined or no slope

9. Find the slope of the line connecting the points $(-8,-4), (3,5)$. 4 pts

$m = \frac{5-(-4)}{3-(-8)} = \boxed{\frac{9}{11}}$

10. Are the pairs of lines below parallel, perpendicular or neither?

a. $\begin{cases} 3x+4y=-20 \\ 4x-3y=11 \end{cases}$ 4 pts

$\frac{4y}{4} = \frac{-3x}{4} - \frac{20}{4} \Rightarrow y = -\frac{3}{4}x - 5$

$\frac{-3y}{-3} = \frac{-4x}{-3} + \frac{11}{-3} \Rightarrow y = \frac{4}{3}x - \frac{11}{3}$

Since $(-\frac{3}{4})(\frac{4}{3}) = -1$ These are perpendicular

b. $\begin{cases} x-2y=6 \\ y=\frac{1}{2}x-1 \end{cases}$ 4 pts

$\frac{-2y}{-2} = \frac{-x+6}{-2} \Rightarrow y = \frac{1}{2}x - 3$

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

parallel

Slopes are same ∴

c. $\begin{cases} y=3 \\ 2x-y=7 \end{cases}$ neither 4 pts

$2x - 7 = y$

$m=2$ vs. $m=0$

11. Find the equation of the line with the given properties. Put the equation in slope-intercept form.

a. $m=-2, b=4$ 3 pts

$y = -2x + 4$

b. $m=\frac{2}{3}$, through the point $(5,-6)$ 5 pts

$y-(-6) = \frac{2}{3}(x-5)$

$y+6 = \frac{2}{3}x - \frac{10}{3}$

$-6 \quad -6$

$y = \frac{2}{3}x - \frac{28}{3}$

c. Vertical line through $(2,-3)$ 3 pts

$x = 2$

d. Parallel to $2x + 3y = 12$ through the point $(1, -4)$ — 5 pts

$\frac{3y}{3} = \frac{-2x+12}{3}$

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

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

$y - (-4) = -\frac{2}{3}(x-1)$

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

$-4 \quad -4$

$\boxed{y = -\frac{2}{3}x - \frac{10}{3}}$

e. Through the points (6,1), (2,9) — 5 pts

$m = \frac{9-1}{2-6} = \frac{8}{-4} = -2$

$y - 9 = -2(x-2)$

$y - 9 = -2x + 4$

$+9 \quad +9$

$\boxed{y = -2x + 13}$

f. Perpendicular to the line $x + 5y = 10$, through the point $(-2,7)$ — 5 pts

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

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

new $m = 5$

$y - 7 = 5(x+2)$

$y - 7 = 5x + 10$

$+7 \quad +7$

$\boxed{y = 5x + 17}$

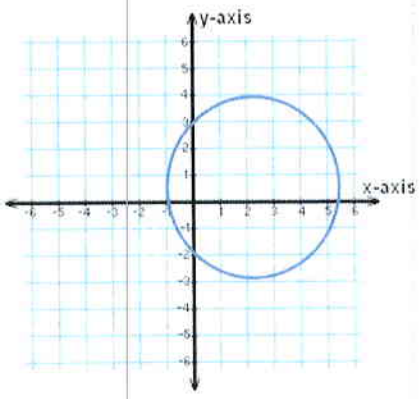
12. Which of the relations are functions? Give the domain and range of each.

a. $\{(1,3), (4,3), (4,6), (10,11), (15,67)\}$ — 4 pts

not a function

D: $\{1, 4, 10, 15\}$

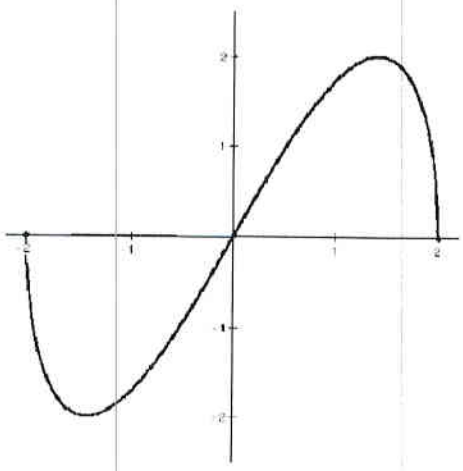
R: $\{3, 6, 11, 67\}$



b. — 4 pts

not a function

D: $[-1, 5.5]$, R: $[-3, 4]$



function

D: $[-2, 2]$

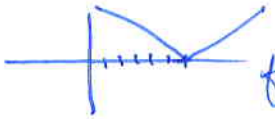
R: $[-2, 2]$

c. 4 pts

d. $y = |x - 6|$ [Hint: Graph the equation on your calculator.] 4 pts.

function

D: $(-\infty, \infty)$ R: $[0, \infty)$



from Cale.

13. Find the values of the function $f(4), f(0), f(-5)$.

a. $f(x) = x^2 + 2$ 3 pts

$f(4) = 4^2 + 2 = 16 + 2 = 18$

$f(0) = 0^2 + 2 = 2$

$f(-5) = (-5)^2 + 2 = 25 + 2 = 27$

b. $f(x) = \sqrt{4 - x}$ 3 pts

$f(4) = \sqrt{4-4} = \sqrt{0} = 0$

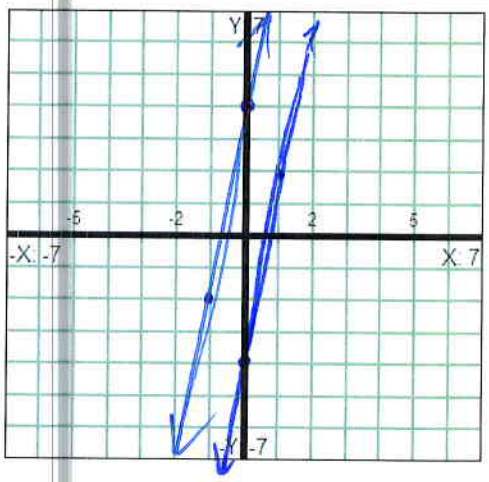
$f(0) = \sqrt{4-0} = \sqrt{4} = 2$

$f(-5) = \sqrt{4-(-5)} = \sqrt{9} = 3$

14. Solve each system of equations graphically. Determine if the system is consistent or inconsistent, and if applicable, independent or dependent.

a. $\begin{cases} 6x - y = 4 \\ \frac{1}{2}y = 2 + 3x \end{cases}$ $y = 6x - 4$ $y = 6x + 4$

5 pts



inconsistent

b. $\begin{cases} 3y - 2x = 3 \\ x + 2y = 9 \end{cases}$

5 pts

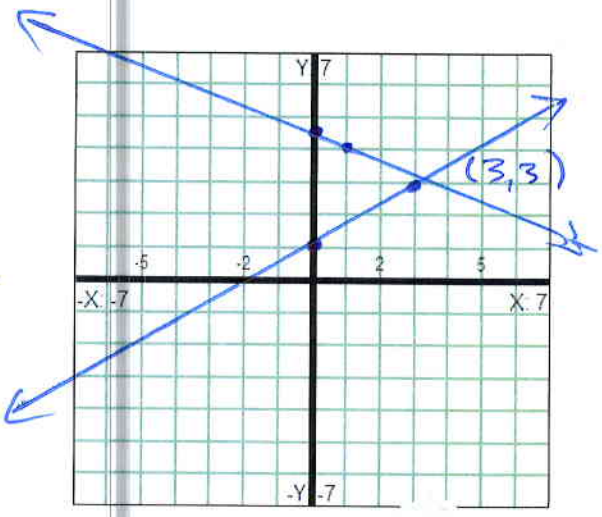
$\frac{3y}{3} = \frac{2x+3}{3}$

$y = \frac{2}{3}x + 1$

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

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

consistent
independent



c. $\begin{cases} 2x + y = 0 \\ y = -2x + 1 \end{cases}$

5 pts

$y = -2x$

inconsistent