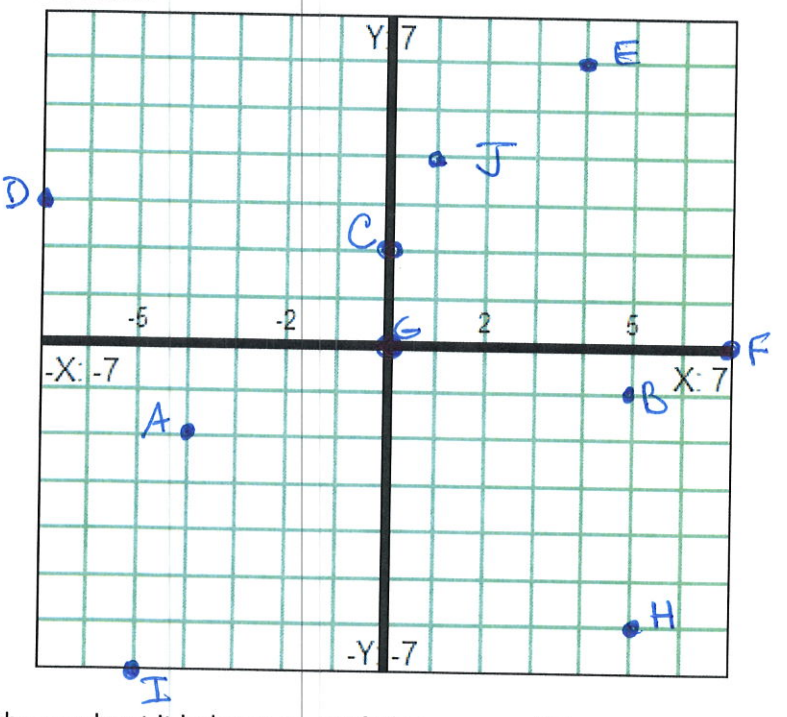
MAT 011, Review for Exam #2 Name KEY

1. Plot the points on the graph below. Label each.
   a. $(-4,-2)$
   b. $(5,-1)$
   c. $(0,2)$
   d. $(-7,3)$
   e. $(4,6)$
   f. $(7,0)$
   g. $(0,0)$
   h. $(4,-6)$
   i. $(-5,-7)$
   j. $(1,4)$




2. For each of the points below, label the quadrant it belongs to, or if it's one one of the axes (which one?). Do not graph.
   a. $(9,0)$ x-axis
   b. $(14,-3)$ QIV
   c. $(-25,60)$ QII
   d. $(0,-11)$ y-axis
   e. $(-22,-45)$ QIII
   f. $(2011,50.8)$ QI

3. Do the points satisfy the equation?
   a. $3x+y=8$ i) $(2,3)$ no ii) $(0,8)$ yes iii) $(8,0)$ no
   b. $x-5y=-1$ i) $(-11,-2)$ yes ii) $(4,1)$ yes

$3(2)+3 \neq 8$
$3(0)+8=8$
$3(8)+0 \neq 8$
$-11-5(-2)=-11+10=-1$
$4-5(1)=-1$

4. Complete the ordered pairs. Choose your own value to complete the last box.
   a. $2x+y=4$

| $x$ | $y$ |
|---|---|
| 0 | 4 |
| 2 | 0 |
| 1 | 2 |
| -2 | 8 |

$2(0)+y=4$
$y=4$

$2x+0=4$
$x=2$

$2(1)+y=4$
$y=2$

← you choose answers will vary

$x=-2$

$2(-2)+y=4$
$+4 \quad +4$
$y=8$

   b. $y=5x+10$

| $x$ | $y$ |
|---|---|
| -2 | 0 |
| -1 | 5 |
| 0 | 10 |
| 1 | 15 |

$5(-2)+10=0$
$5(-1)+10=-5+10=5$
$10=5x+10 \Rightarrow x=0$
$x=1$
$y=5(1)+10=15$

← you choose answers will vary

5. Solve for $y$ in each equation below.

a. $x - y = 3$ $\quad \frac{-y}{-1} = \frac{-x+3}{-1} \Rightarrow y = x - 3$

b. $10x = -5y$ $\quad \frac{10x}{-5} = \frac{-5y}{-5}$ $\quad y = -2x$

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

6. Is the equation linear?

a. $x = y$ yes

b. $x = y^2$ no

c. $y = 1$ yes

d. $y = \sqrt{x-3}$ no

7. Graph each linear equation.

a. $x - y = 2$

$x=0 \rightarrow y=-2$

$y=0 \rightarrow x=2$

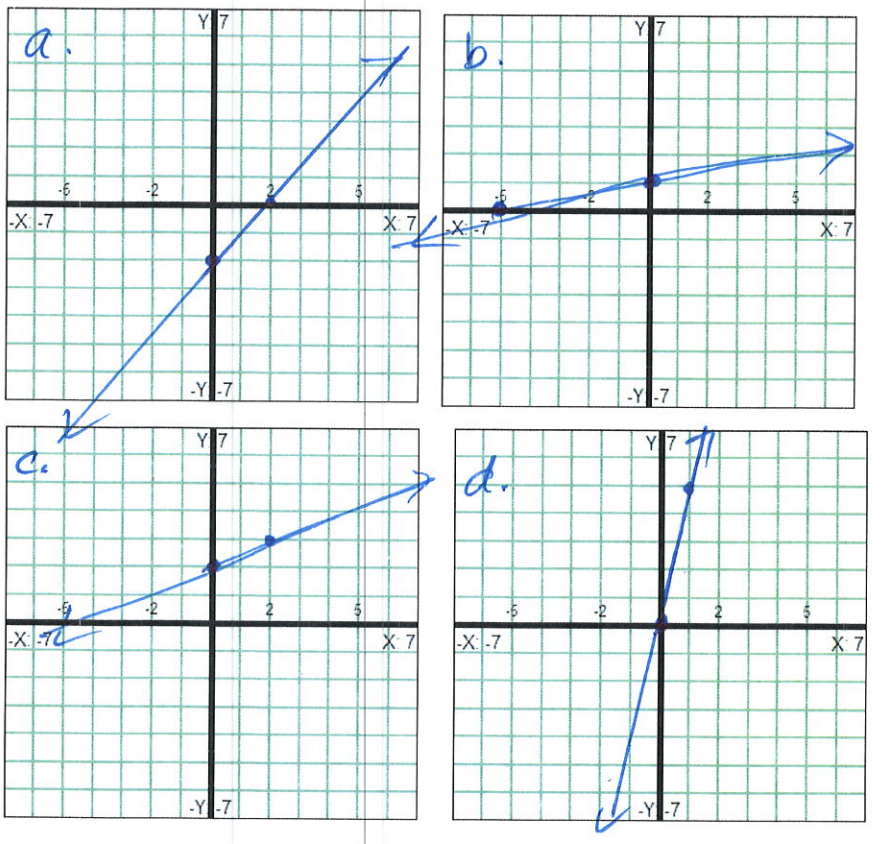
b. $-x + 5y = 5$

$x=0 \quad y=1$

$y=0 \quad x=-5$

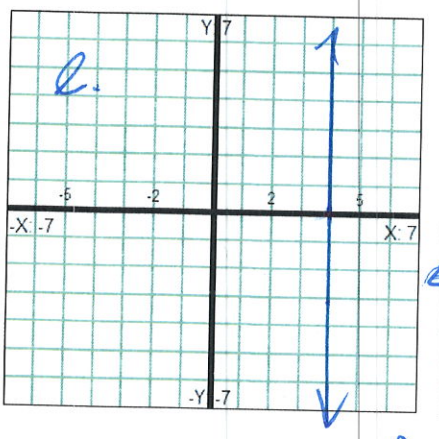
c. $y = \frac{1}{2}x + 2$

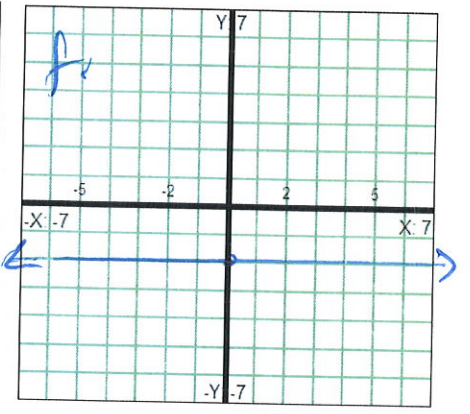
d. $y = 5x$



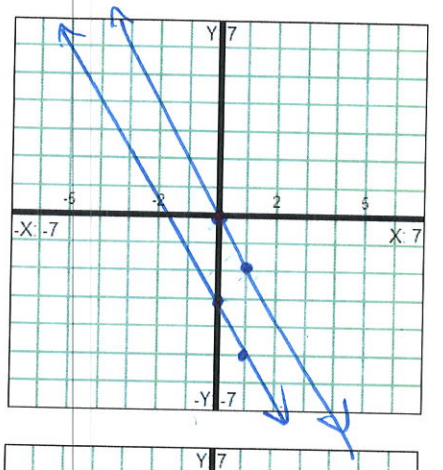
e. $x = 4$

f. $y = -2$

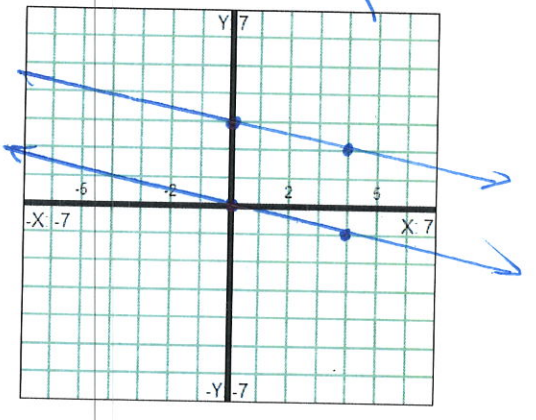


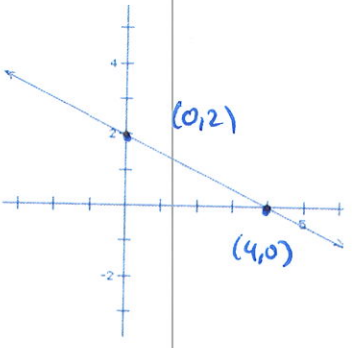

8. Graph the pair of equations on the same graph.
   a. $y = -2x$ and $y = -2x - 3$



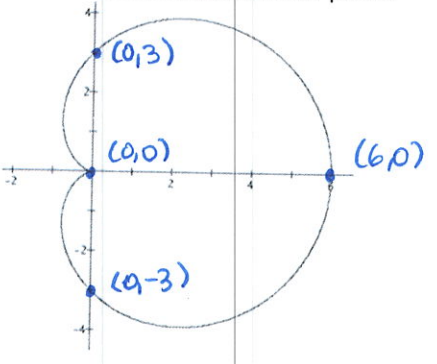

   b. $y = -\frac{1}{4}x$ and $y = -\frac{1}{4}x + 3$



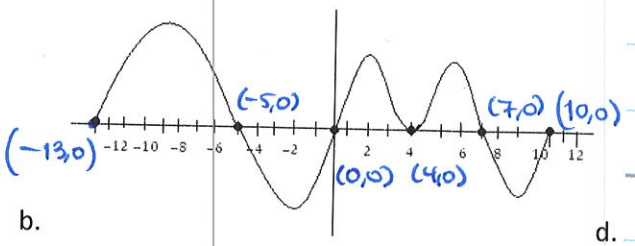

9. Find all the intercepts on the graphs below. List each as a coordinate point.



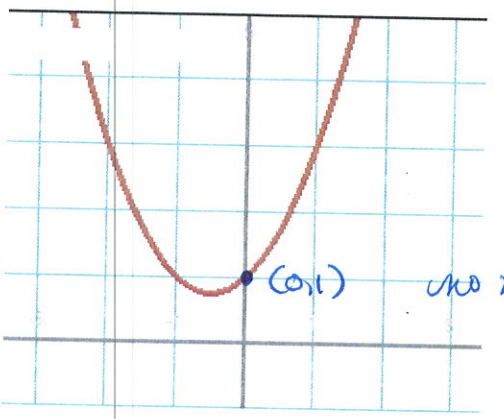

a.




c.




b.




d. no x-intercepts

10. Graph the lines by using intercepts.

a. $x + 8y = 8$

x=0 y=1

b. $4 = x - 3y$

x=0

$4 = -3y$

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

y=0 x=4

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

x=0 y=3

$0 = -\frac{3}{5}x + 3$

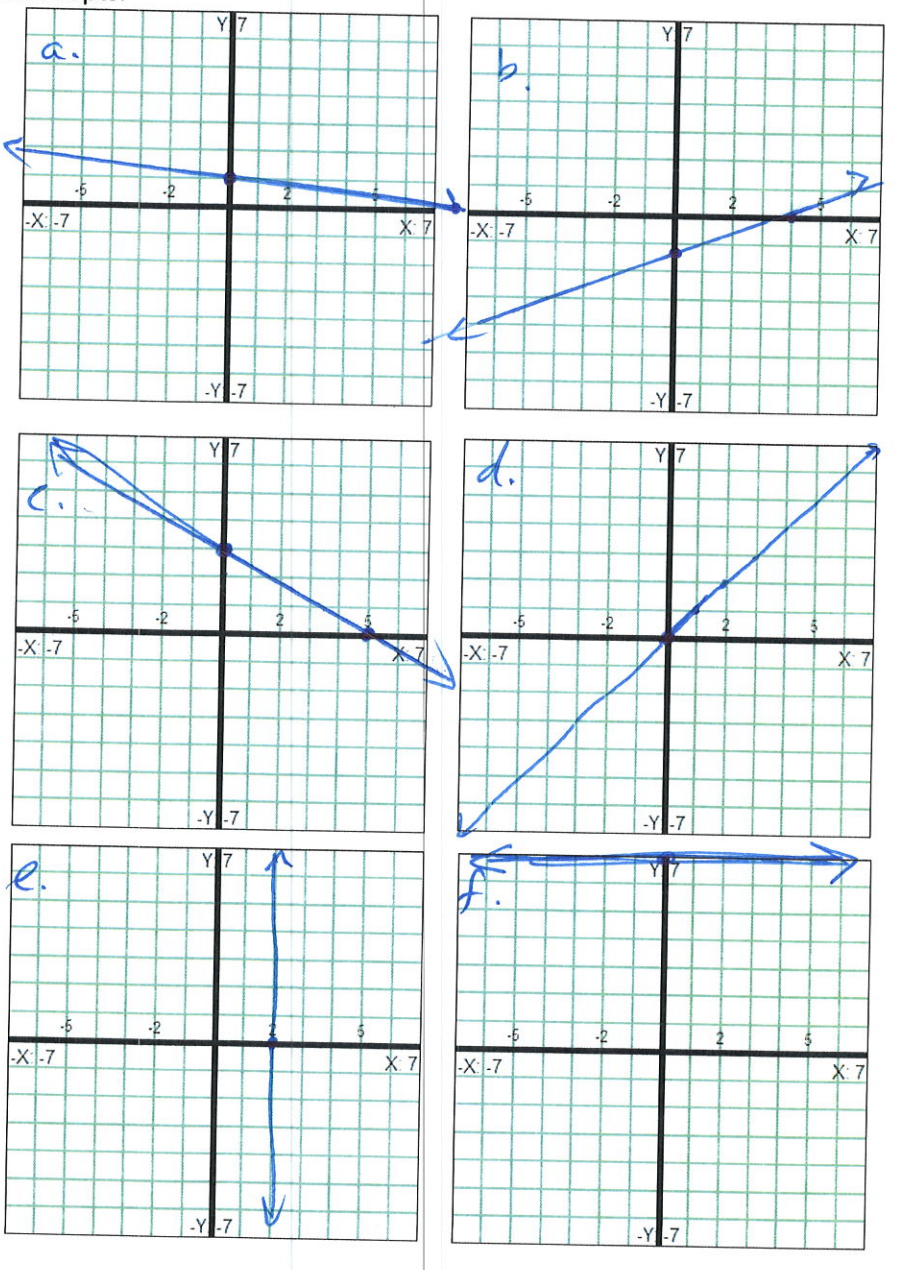
$\frac{3}{5}x = 3$ x=5

d. $x = y$

x=0, y=0

e. $x = 2$

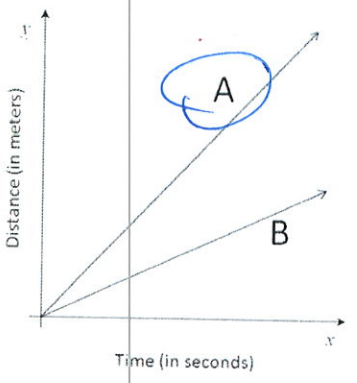
f. $y = 7$



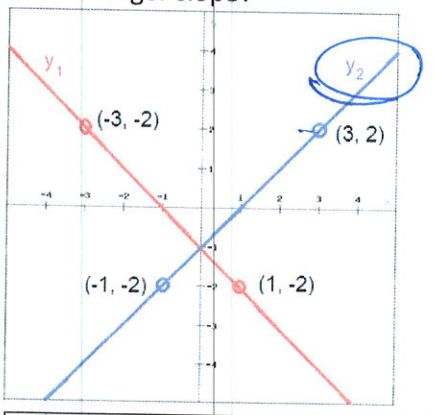
11. Compare the slopes of the lines. Which line has a larger slope?

A

a.



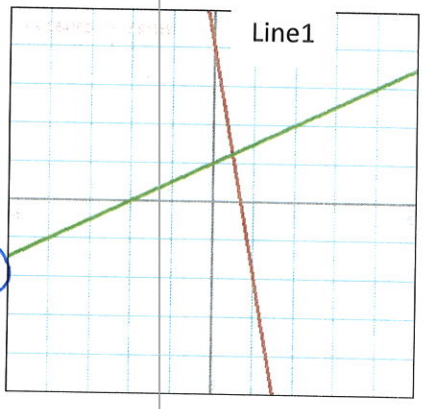

c.



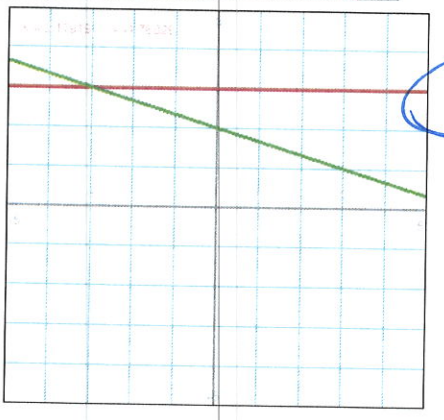

$y_2$

line 2

b.




d.




line 1

12. Find the slope of the line connecting the given points.

a. $(-2,8), (1,6)$ $\frac{6-8}{1-(-2)} = \frac{-2}{3} = -\frac{2}{3}$

b. $(5,1), (-2,1)$ $\frac{1-1}{-2-5} = \frac{0}{-7} = 0$

c. $(3,1), (2,6)$ $\frac{6-1}{2-3} = \frac{5}{-1} = -5$

d. $(6,-6), (6,2)$ $\frac{2-(-6)}{6-6} = \frac{8}{0}$ undefined

13. What is the slope of the line?

a. $2x + y = 7$ $y = -2x + 7$ $m = -2$

b. $x = 1$ undefined

c. $2x - 3y = 10$ $\frac{-3y}{-3} = \frac{-2x+10}{-3} \Rightarrow y = \frac{2}{3}x - \frac{10}{3}$ $m = \frac{2}{3}$

d. $y = -4$ 0

e. $y = -0.3x + 2.5$ $m = -.3$

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

a. $\begin{cases} y = \frac{2}{9}x + 3 \\ y = -\frac{2}{9}x \end{cases}$ neither

b. $\begin{cases} y = 4x - 2 \\ 4x + y = 5 \end{cases}$ $y = -4x + 5$ neither

c. $\begin{cases} 10 + 3x = 5y \\ 5x + 3y = 1 \end{cases}$ $y = \frac{3}{5}x + 2$ $\frac{3y}{3} = \frac{-5x+1}{3} \Rightarrow y = -\frac{5}{3}x + \frac{1}{3}$ perpendicular

d. $\begin{cases} 6x = 5y + 1 \\ 12x + 10y = 1 \end{cases}$ $\frac{5y}{5} = \frac{6x-1}{5} \Rightarrow y = \frac{6}{5}x - \frac{1}{5}$ $\frac{10y}{10} = \frac{-12x+1}{10} \Rightarrow y = -\frac{6}{5}x + \frac{1}{10}$ neither

15. Find the equation of the line with the given properties. Put the equation in slope-intercept form, and in standard form.

a. $m = 5, b = -8$ $y = 5x - 8$ ; $-5x + y = -8$ or $5x - y = 8$

b. $m = -\frac{1}{2}, (-8,9)$ $y - 9 = -\frac{1}{2}(x+8) \Rightarrow y - 9 = -\frac{1}{2}x - 4 \Rightarrow y = -\frac{1}{2}x + 5$ ; $x + 2y = 10$

c. $m = -\frac{1}{5}, b = \frac{1}{9}$ $y = -\frac{1}{5}x + \frac{1}{9}$ ; $9x + 45y = 5$

d. $m = 3, (2,2)$ $y - 2 = 3(x-2) \Rightarrow y - 2 = 3x - 6 \Rightarrow y = 3x - 4$ ; $-3x + y = -4$ or $3x - y = 4$

e. Horizontal line through $(3, -4)$ $y = -4$

f. Vertical line through $(7,1)$ $x = 7$

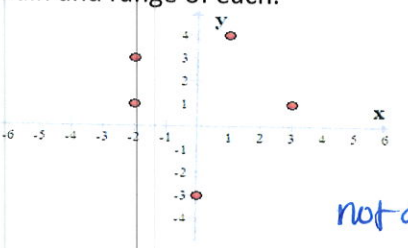
g. Parallel to $3x - 4y = 8$ through $(5, -2)$ $-4y = -3x + 8 \Rightarrow y = \frac{3}{4}x - 2$ $y + 2 = \frac{3}{4}(x-5) \Rightarrow y = \frac{3}{4}x - \frac{23}{4}$ ; $-3x + 4y = -23$ or $3x - 4y = 23$

h. Perpendicular to $y = \frac{1}{2}x - 6$, through $(-4,6)$ $m = -2$ $y - 6 = -2(x+4) \Rightarrow y = -2x - 2$ ; $2x + y = -2$

i. Through the points $(6,3), (7,6)$ $m = \frac{6-3}{7-6} = \frac{3}{1} = 3$ $y - 3 = 3(x-6) \Rightarrow y = 3x - 15$ ; $-3x + y = -15$ or $3x - y = 15$

j. Through the pints $(4,4), (-1,-2)$ $m = \frac{-2-4}{-1-4} = \frac{-6}{-5} = \frac{6}{5}$ $y - 4 = \frac{6}{5}(x-4) \Rightarrow y = \frac{6}{5}x - \frac{8}{5}$ ; $-6x + 5y = -8$ or $6x - 5y = 8$

16. Which of the relations are functions. State the domain and range of each.




a. $\{(2,4), (6,9), (-1,4), (-5,11), (-3,-3)\}$ function

D: $\{2, 6, -1, -5, -3\}$

R: $\{4, 9, 11, -3\}$

d. not a function

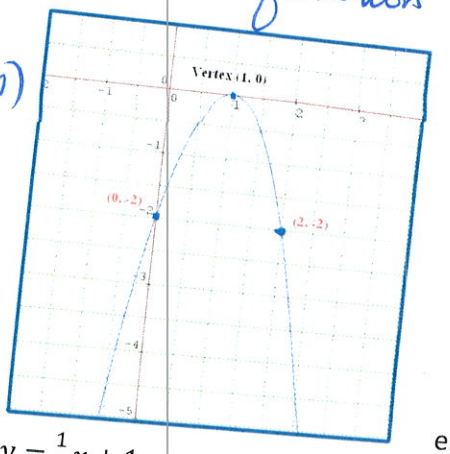
D: $\{-2, 0, 1, 3\}$

R: $\{-3, 1, 3, 4\}$

function

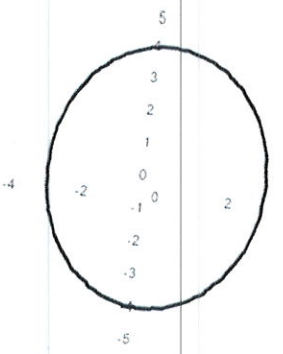
D: $(-\infty, \infty)$
R: $(-\infty, 0]$

b.




not a function
D: $[-3, 3]$
R: $[-4, 4]$

e.



c. $y = \frac{1}{4}x + 1$

R: $(-\infty, \infty)$ ; function D: $(-\infty, \infty)$

d. $x + x^2 - y^2 = 5$ ← no a function

R: $[-\sqrt{5}, \sqrt{5}]$

D: $[-\sqrt{5.25}, \sqrt{5}]$

17. Find the values $f(2), f(0), f(-3)$ for the functions.

a. $f(x) = x^2 - 6$ $f(2) = 4 - 6 = -2$, $f(0) = -6$, $f(-3) = 9 - 6 = 3$

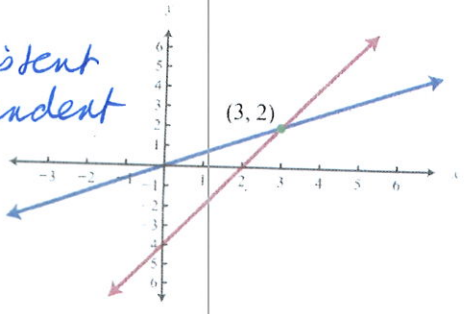
b. $f(x) = 3x - 7$ $f(2) = 3(2) - 7 = -1$, $f(0) = -7$, $f(-3) = -9 - 7 = -16$

c. $f(x) = \sqrt{2 - x}$ $f(2) = 0$, $f(0) = \sqrt{2}$, $f(-3) = \sqrt{5}$

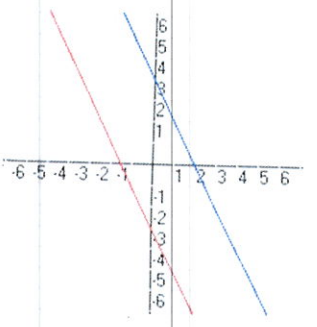
d. $f(x) = |x + 1|$ $f(2) = 3$, $f(0) = 1$, $f(-3) = 2$

18. Determine where the graphs of the system is consistent or inconsistent, and if applicable, independent or dependent.

Consistent independent

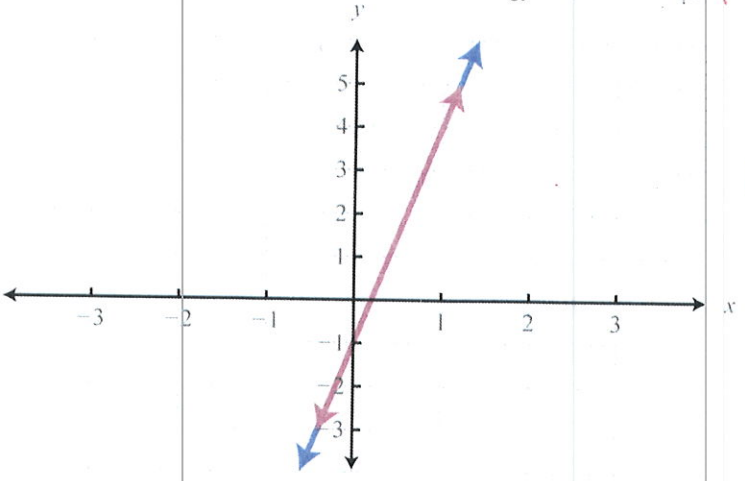



a.



inconsistent

c.



Consistent dependent

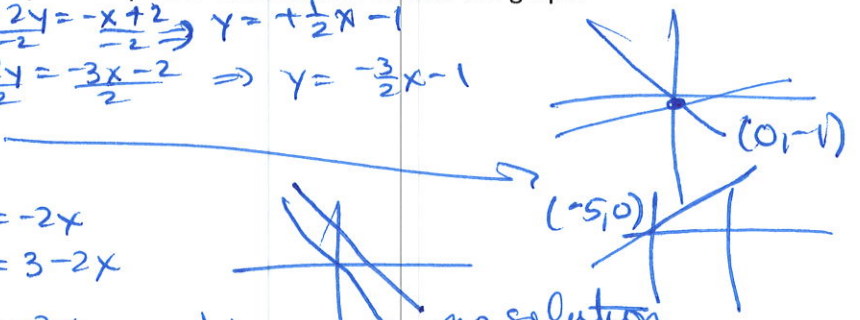
b.

19. Solve the systems graphically. Clearly state the solution. Sketch the graph.

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

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

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




b. $\begin{cases} x = -5 \\ y = x + 5 \end{cases}$




c. $\begin{cases} 2x + y = 0 \\ 2y = 6 - 4x \end{cases}$

$y = -2x$

$y = 3 - 2x$



no solution

d. $\begin{cases} 3x + y = 0 \\ 2y = -6x \end{cases}$

$y = -3x$

$y = -3x$

any point on this line.

20. Are the points solutions to the system?

$\begin{cases} 2x - 3y = 8 \\ x - 2y = 6 \end{cases}$

a. $(-2, -4)$ yes

b. $(7,2)$ yes

$2(-2) - 3(-4) = -4 + 12 = 8$

$2(7) - 3(2) = 14 - 6 = 8$