

Linear: $25/105 = 23.8\%$
 Functions: $33/105 = 31.4\%$
 Inverse: $22/105 = 20.95\%$
 Matrices: $16/105 = 15.2\%$

70 questions

105 points

Name _____
 Hour _____

Final Exam Review Algebra II A Paced

Point-slope form is: $y - y_1 = m(x - x_1)$

Slope-intercept form is: $y = mx + b$

Which form are the following equations in? (1pt each)

1. $y - 3 = 4(x - 0)$

P-S

2. $y = 5x - 2$

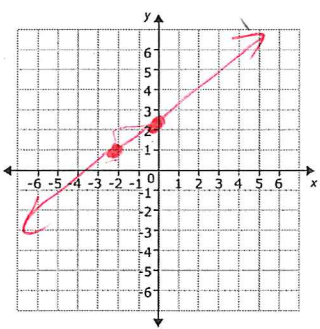
S-I

3. $y = x + 1$

S-I

Write the equation for the line in point-slope form and in slope-intercept in the following (3pts each) situations:

4. You have a point of $(-2, 1)$ and a slope of $\frac{1}{2}$. Graphing first will help.

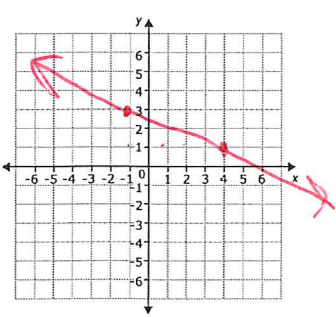


Point-slope form:
 $y - y_1 = m(x - x_1)$
 $y - 1 = \frac{1}{2}(x - -2)$
 Slope = $\frac{\text{Rise}}{\text{Run}}$

Slope-intercept form:

$y = mx + b$
 y-int
 $y = \frac{1}{2}x + 2$

5. You have a point of $(-1, 3)$ and a slope of $-\frac{2}{5}$. Graphing first will help.



Point-slope form:
 $y - 3 = -\frac{2}{5}(x - -1)$

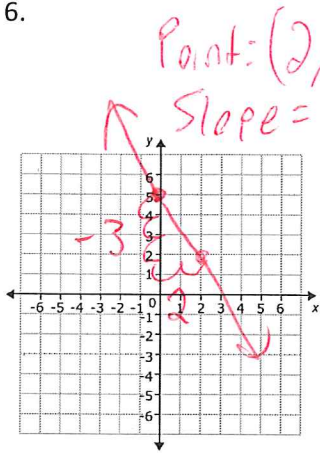
Slope-intercept form:

$y = -\frac{2}{5}x + 2.5$
 y-intercept.

9 pts

Write the equation for the line in point-slope form and slope-intercept: (2 pts each)

6.



Point: $(2, 2)$
Slope = $-\frac{3}{2}$

Point-slope form:

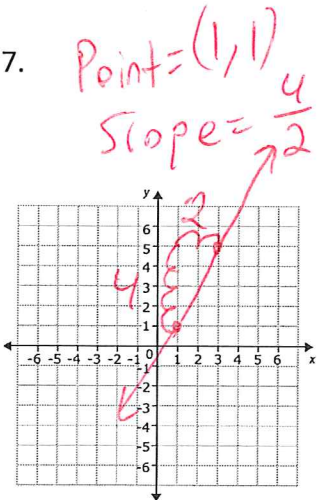
$$y - 2 = -\frac{3}{2}(x - 2)$$

Slope-intercept form:

$$y = -\frac{3}{2}x + 5$$

↑
y-int

7.



Point: $(1, 1)$
Slope = $\frac{4}{2}$

Point-slope form:

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

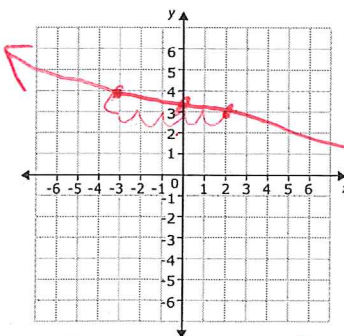
Slope-intercept form:

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

8. You have two points $(-3, 4)$ and $(2, 3)$. Graphing first will help. (3 pts each)

Point-slope form:

Slope-intercept form:



$$y - 3 = -\frac{1}{5}(x - 2)$$

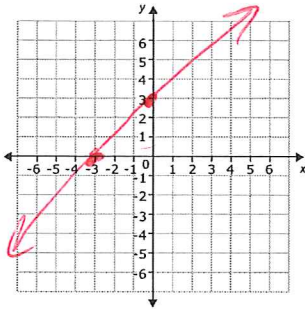
$$y = -\frac{1}{5}x + 3.5$$

Point: $(2, 3)$
Slope: $-\frac{1}{5}$

7 pts

(3 pts each)

9. Graph $-9x + 9y = 27$ by first finding x- and y-intercepts.



x-int: plug in $y=0$ solve for x .

y-int: plug in $x=0$ solve for y .

$$\text{x-int: } -9x + 9(0) = 27$$

$$\frac{-9x}{-9} = \frac{27}{-9}$$

$$\boxed{x = -3}$$

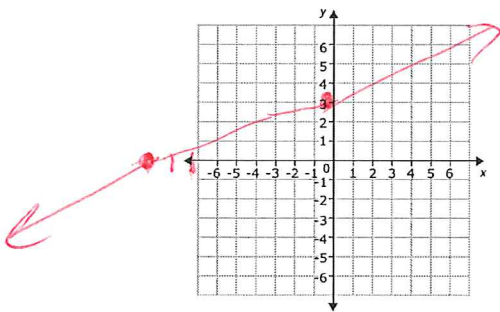
y-int:

$$-9(0) + 9y = 27$$

$$9y = 27$$

$$\boxed{y = 3}$$

10. Graph $-3x + 9y = 27$ by first finding x- and y-intercepts.



$$\text{x-int: } -3x + 9(0) = 27$$

$$\frac{-3x}{-3} = \frac{27}{-3}$$

$$x = -9$$

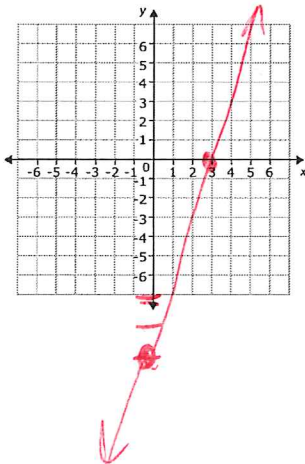
y-int:

$$-3(0) + 9y = 27$$

$$9y = 27$$

$$\frac{9y}{9} = \frac{27}{9}$$
$$y = 3$$

11. Graph $9x - 3y = 27$ by first finding x- and y-intercepts.



x-int:

$$9x - 3(0) = 27$$

$$\frac{9x}{9} = \frac{27}{9}$$

$$x = 3$$

~~y-int~~ y-int:

$$9(0) - 3y = 27$$

$$-3y = 27$$

$$y = -9$$

9 pts

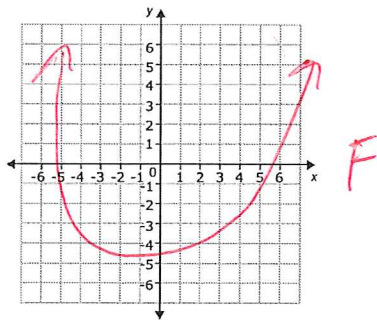
Functions

A function is something that must pass the **vertical line test (VLT)**. The vertical line test simply means we pass a vertical line across our graph and then we have two possibilities:

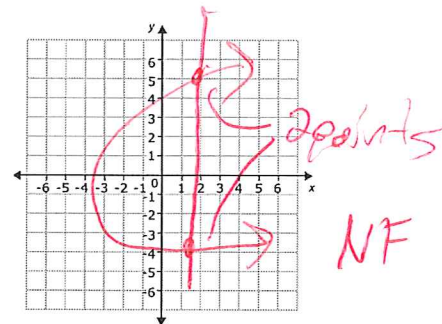
- 1) The vertical line touches the graph at only one spot at a time = It is a function! OR
- 2) The vertical line touches the graph more than once at a certain time = It is not a function.

1) Decide whether the following are functions or not by using the vertical line test. (1 pt each)

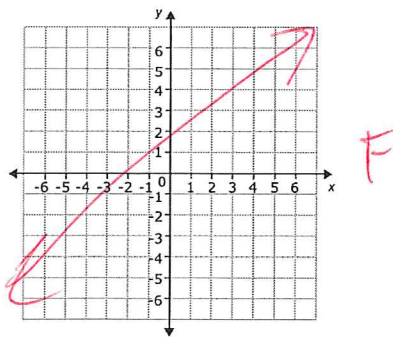
a)



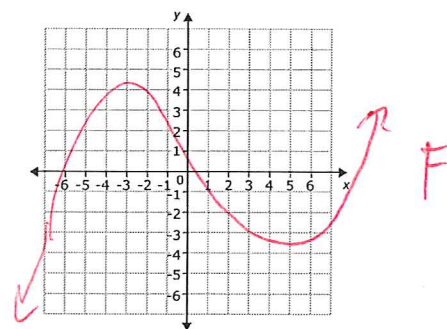
b)



c)



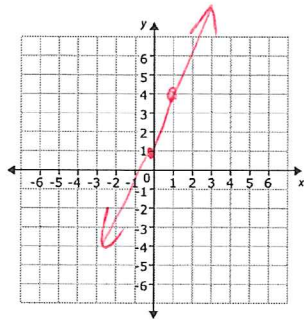
d)



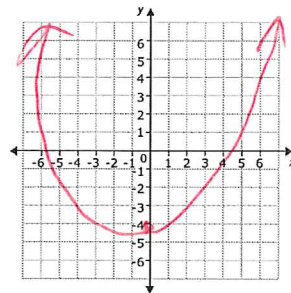
(4 pts)

2) Use a graphing calculator to graph the following functions. (1 pt each)

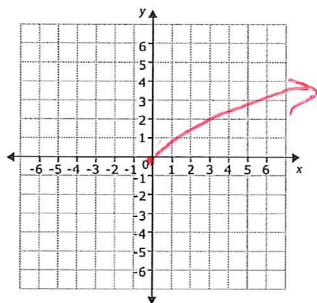
a) $y = 3x + 1$



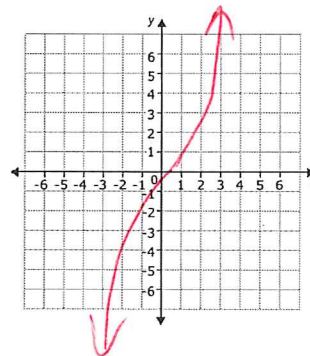
b) $y = 3x^2 - 4$



b) $y = \sqrt{x}$



d) $y = x^3$



3) Use a calculator to find the table of x- and y-values for these functions. (1 pt each)

e) $y = x + 2$

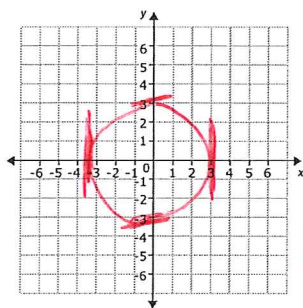
x	y
-1	1
0	2
1	3

f) $y = x^2 + 1$

x	y
-1	2
0	1
1	2

4) Find the domain and the range for the following: (2 pts each)

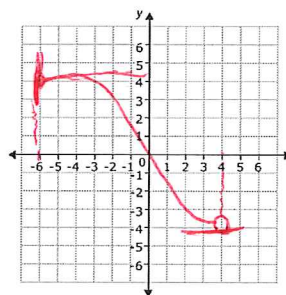
a)



Domain: x-values
Range: y-values

Domain: $-3 \leq x \leq 3$
Range: $-3 \leq y \leq 3$

b)



D: $-6 \leq x \leq 4$
R: $-4 < y \leq 4$

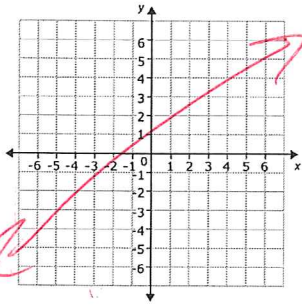
$0 = <$

$0 = \leq$

10 pts

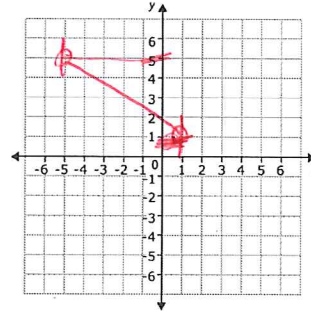
4) (Continued): Find the domain and range of the following: (2 pts each)

c)



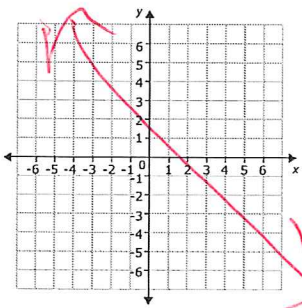
D: All real
R: All real

d)



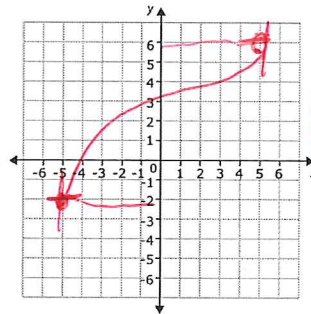
D: $-5 < x < 1$
R: $1 < y < 5$

e)



D: All real
R: All real

f)



D: $-5 \leq x \leq 5$
R: $-2 \leq y < 6$

5) Add and subtract the following functions. (2 pts each)

a) $(7x^2 + 2x - 4) + (8x - 2 + 7x^2)$

$$7x^2 + 2x - 4 + 8x - 2 + 7x^2$$

$$14x^2 + 10x - 6$$

b) $(4x^2 - 3x + x^4) - (3x^3 + 6x - 2x^2)$

$$4x^2 - 3x + x^4 - 3x^3 - 6x + 2x^2$$

$$6x^2 - 9x + x^4 - 3x^3$$

c) $(2x^2 - 9x) + (2x - 4x^2)$

$$-2x^2 - 7x$$

d) $(5x^2 - 10) - (6x^2 + 2 - 3x)$

$$-x^2 - 12 + 3x$$

6) Multiply/dividing the following functions. Suppose that $f(x) = x^4$, $g(x) = x$, and $h(x) = 12 - x^2$

a) Find $h(x) \cdot g(x)$

$$(12 - x^2) \cdot (x)$$

b) Find $\frac{f(x)}{h(x)}$

$$\frac{x^4}{12 - x^2}$$

c) Find $\frac{g(x)}{h(x)}$

$$\frac{x}{12 - x^2}$$

(19 pts)

Inverse Functions and Families of Functions

1. Find the inverse of the following relations. (1 pt each)

a)

x	y
0	4
8	7
6	5
9	10

b)

x	y
-2	-4
4	6
-8	-10
4	5

1. a.

x	y
4	0
7	8
5	6
10	9

b.

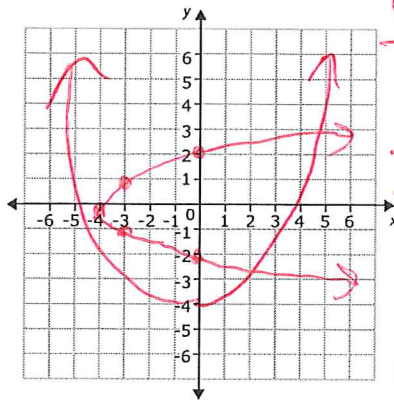
x	y
-4	-2
6	4
-10	-8
5	4

2.

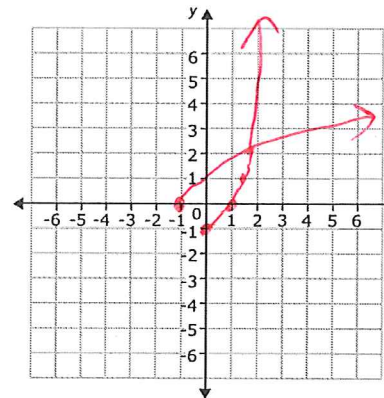
With the use of a calculator, graph the original function and its inverse. (2 pts each)

a) $y = x^2 - 4$

b) $y = \sqrt{x+1}$



Original		Inverse	
x	y	x	y
-2	0	0	-2
-1	-3	-3	-1
0	-4	-4	0
1	-3	-3	1
2	0	0	2



orig		Inverse	
x	y	x	y
-1	0	0	-1
0	1	1	0
1	1.4	1.4	1
2	1.7	1.7	2

3. Solve for the inverse function. (2 pts each)

a) $y = -3x - 2$

$$x = -3y - 2$$

$$\begin{array}{r} +2 \\ \hline \frac{x+2}{-3} = \frac{-3y}{-3} \end{array} \rightarrow \frac{x+2}{-3} = y \rightarrow \frac{x+2}{-3} = f^{-1}(x)$$

c) $y = 2(x-8)$

$$y = 2x - 16$$

$$x = 2y - 16$$

$$\begin{array}{r} +16 \\ \hline \frac{x+16}{2} = \frac{2y}{2} \end{array}$$

$$\frac{x+16}{2} = y \rightarrow f^{-1}(x) = \frac{x+16}{2}$$

b) $y = -3x^2 - 2$

$$x = -3y^2 - 2$$

$$\begin{array}{r} +2 \\ \hline \frac{x+2}{-3} = \frac{-3y^2}{-3} \end{array}$$

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

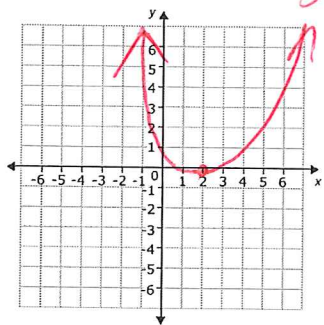
$$\pm \sqrt{\frac{x+2}{-3}} = y$$

$$\pm \sqrt{\frac{x+2}{-3}} = f^{-1}(x)$$

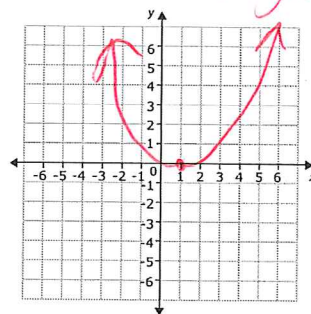
12 pts

4. Draw a sketch of the following functions. You should not need a calculator to do so. (1 pt each)

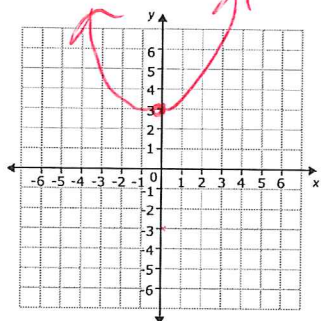
a) $y = (x - 2)^2$ ~~Right 2~~ Right 2



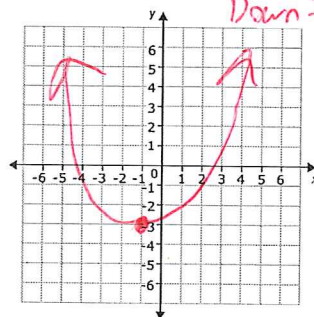
b) $y = (x - 1)^2$ Right 2.



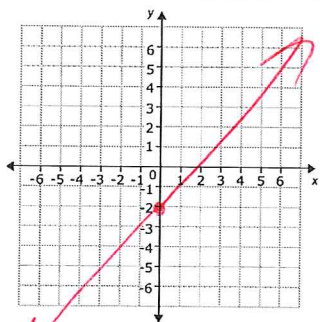
c) $y = x^2 + 3$ UP 3



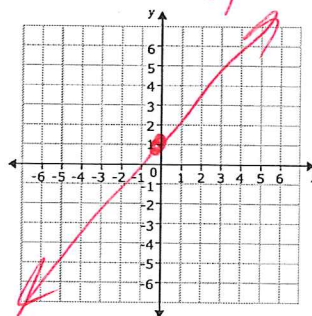
d) $y = (x + 1)^2 - 3$ left 1 Down 3



e) $y = x - 2$ Down 2



f) $y = x + 1$ up 1



5. Will the equation $y = x$ or $y = x^2$ be stretched or compressed: (1 point each)

a) $y = (7/8)x$

Compression

$\frac{7}{8}$ is less than 1!

b) $y = 10x^2$

Stretch

10 is bigger than 1!

6. Write the function rule for each function reflected over the x-axis: (1 pt each)

a) $y = 3x - 1$

$y = -(3x - 1)$

b) $y = 4x + 1$

$y = -(4x + 1)$

10 pts

Matrcies final Exam Review

Simplify.

$$1) 4 \begin{bmatrix} 3 & -1 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 12 & -4 & 4 \end{bmatrix}$$

$$2) \begin{bmatrix} -5 \\ -6 \end{bmatrix} - \begin{bmatrix} 0 \\ -2 \end{bmatrix}$$

$$\begin{bmatrix} -5 \\ -4 \end{bmatrix}$$

$$3) \begin{bmatrix} -6 & -3 & -3 \end{bmatrix} + \begin{bmatrix} 4 & 3 & -1 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 0 & -4 \end{bmatrix}$$

$$4) \begin{bmatrix} -6 & 2 \\ 4 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 0 \\ -3 & -3 \end{bmatrix}$$

$$\begin{bmatrix} -12 & -6 \\ 1 & -3 \end{bmatrix}$$

Find the inverse of each matrix.

$$5) \begin{bmatrix} -3 & -3 \\ 4 & 2 \end{bmatrix}^{-1} = \begin{bmatrix} 1/3 & 1/2 \\ -2/3 & -1/2 \end{bmatrix}$$

$$6) \begin{bmatrix} -4 & -2 & 3 \\ 3 & -2 & -3 \\ 5 & 2 & -1 \end{bmatrix}^{-1} = \begin{bmatrix} 1/5 & 1/10 & 3/10 \\ -3/10 & -11/40 & -3/40 \\ 2/5 & -1/20 & 7/20 \end{bmatrix}$$