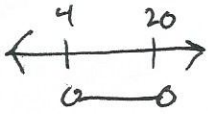


Exam 1
Algebra 2 - Study Guide

1) Solve the following inequalities. Write a solution, and graph the solution set on a number line.

a) $7 < 2x - 1 < 19$

$+1 \quad +1 \quad +1$
 $8 < 2x < 20$
 $4 < x < 10$



b) $|3x - 3| = 12$

$3x - 3 = 12$
 $+3$
 $3x = 15$
 $x = 5$

or $3x - 3 = -12$
 $3x = -9$
 ~~$x = -3$~~

$-3 \text{ or } 5$

2) If a certain car gets 23 miles per gallon, and has a gas tank that can hold 15 gallons, how far can the car travel before it has to refill?

$23 \cdot 15 = 345 \text{ miles}$

3) Find the domain and range of the set of following points $\{(0,3), (2,1), (5,4), (6,9)\}$

$D: 0, 2, 5, 6$

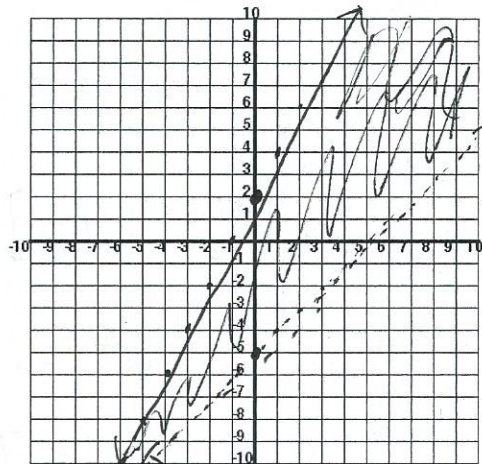
$R: 3, 1, 4, 9$

4) Graph the following set of equations on the axis below. Make sure to pay attention to shading and boundary lines.

$y - x > -5$

$y \leq 2x + 2$

$y > x - 5$ (Dotted Line)
 $y \leq 2x + 2$ (Solid Line)



5) Find the equation in slope intercept form of the line that:

a. goes through the points (1,-2) and (3,4)

$y - 4 = 3(x - 3)$
 $y - 4 = 3x - 9$

$y = 3x - 5$

b. goes through (2,2) and is perpendicular to $y = \frac{1}{2}x$

$y - 2 = -2(x - 2)$
 $y - 2 = -2x + 4$

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-2)}{3 - 1} = \frac{6}{2} = 3$

$y = mx + b$
 $-2 = 3(1) + b$

$y = -2x + 6$

Pt. Slope form

$y - y_1 = m(x - x_1)$

Perpendicular slopes are opposite reciprocals

- 6) Simplify the following expressions so there are no negative exponents and only one of each variable.

a. $\left(\frac{k^2 \cdot s^3}{k^{-4} \cdot s}\right)^3$

$$\frac{k^6 \cdot s^2}{k^{18} s^6}$$

b. $k^3 k^{-2} k^4 = k^5$

- 7) Simplify the following into standard form of a complex number.

$$\frac{3+i}{2-i} \cdot \frac{2+i}{2+i} = \frac{6+5i+i^2}{5} = \frac{5+5i}{5} = 1+i$$

$$\frac{(3+i)(2+i)}{(2-i)(2+i)} = \frac{6+3i+2i+i^2}{4-2i+2i-i^2} = \frac{6+5i-1}{4-i^2} = \frac{6+5i-1}{4+1} = \frac{5+5i}{5} = 1+i$$

- 8) Solve the system of equations using any method:

$$4m + n = 6$$

$$n = 6 - 4m$$

$$m = 2$$

$$5m + 3n = 4$$

$$n = -2$$

$$5m + 3(6 - 4m) = 4$$

$$14 = 7m$$

$$2 = m$$

$$5m + 18 - 12m = 4$$

- 9) Use the given matrices to perform the operations below. **Make sure to circle your answer.**

$$A = \begin{bmatrix} 3 & 2 \\ 4 & 2 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 2 & 4 \end{bmatrix}$$

$$C = \begin{bmatrix} -3 & 2 \\ 0 & 4 \\ 1 & -2 \end{bmatrix}$$

a) $3B = \begin{bmatrix} 3 & 6 & 12 \end{bmatrix}$

b) $\det[A] = 6 - 8 = -2$

c) $B + A$ Can't Do

d) $B \cdot A$ Not possible

e) $B \cdot C = \begin{bmatrix} 1 & 2 \end{bmatrix}$

- 10) Answer the following based on the function $f(x) = 2(x-1)^2 - 3$

a. Does the parabola open up or down?

up

B. What is the vertex?

(1, -3)

c. What is the axis of symmetry?

x = 1

- 11) Answer the following based on the function $h(x) = x^2 - 6x + 8$ $9 - 18 + 8$
 a. Will the parabola open up or down? B. what is the vertex?

up

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

- c. What is the axis of symmetry?

$$x = 3$$

- D. What is the y-intercept?

$$(0, 8)$$

- e. What is the vertex?

$$(3, -1)$$

- F. What are the x-intercepts?

$$(x - 4)(x - 2)$$

$$(4, 0) (2, 0)$$

- 12) Find all of the zeros of the polynomial $f(x) = x^3 - 13x - 12$, given that $(x - 4)$ is a factor of $f(x)$.

$$\begin{array}{r|rrrr}
 4 & 1 & 0 & -13 & -12 \\
 & & 4 & 16 & 12 \\
 \hline
 & 1 & 4 & 3 & 0 \\
 \hline
 & & & x^2 + 4x + 3 &
 \end{array}$$

$$4 \sqrt{110/13}$$

$$(x - 4)(x + 3)(x + 1)$$

$$4, -3, -1$$

- 13) Divide the following polynomials and write the solution below.

$$\frac{x^3 - x^2 + 7}{x^2 + 2x - 1} = x - 3 + \frac{7x + 4}{x^2 + 2x - 1}$$

$$\begin{array}{r}
 x - 3 + \frac{7x + 4}{x^2 + 2x - 1} \\
 \hline
 x^3 - x^2 + 0x + 7 \\
 -(x^3 + 2x^2 - x) \\
 \hline
 -3x^2 + x + 7 \\
 -(-3x^2 - 6x + 3) \\
 \hline
 7x + 4
 \end{array}$$

- 14) Find the zeros of the function given below.

a) $x^3 + x^2 - 16x - 16$
 $(x^3 + x^2) + (-16x - 16)$
 $x^2(x + 1) + -16(x + 1)$

$$-1 \quad 4 \quad -4$$

$$(x + 1)(x - 4)(x + 4)$$

- 15) Simplify into standard form of a polynomial

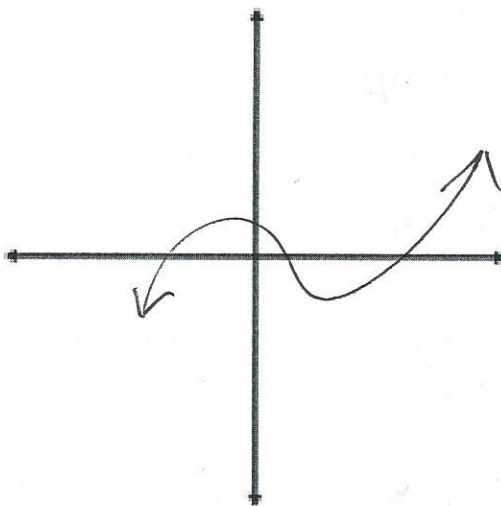
a) $(x - 2)(2x^2 - 3x - 3)$
 $2x^3 - 3x^2 - 3x - 4x^2 + 6x + 6$

$$2x^3 - 7x^2 + 3x + 6$$

b) $7m(m^4 + 2m - 6)$

$$7m^5 + 14m^2 - 42m$$

- 16) Draw a graph that has a positive leading coefficient and an odd degree.



- 17) Find the zeros of the following polynomials.

a. $y = x^2 + 4x + 13$

b. $y = (x+1)^2 - 4$

$$\frac{-4 \pm 6i}{2}$$

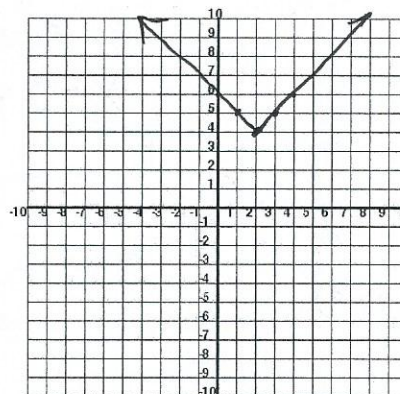
~~non~~
 $-4 \pm \sqrt{16 - 52}$
 $-2 \pm 3i$

$$\pm 2 = x + 1$$

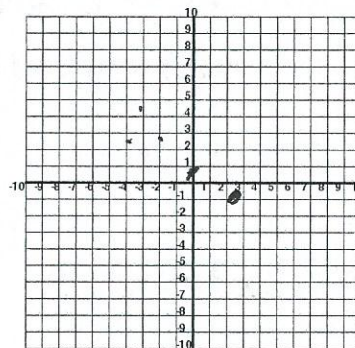
$$x = 1 \text{ or } x = -3$$

- 18) Graph the following function and state the domain and range.

$$y = |x - 2| + 4$$



- 19) Make a scatter plot of 5 points that would have a negative correlation.



20) Solve the equation

$$4(3x - 1) = -3(2x + 8) - 4$$

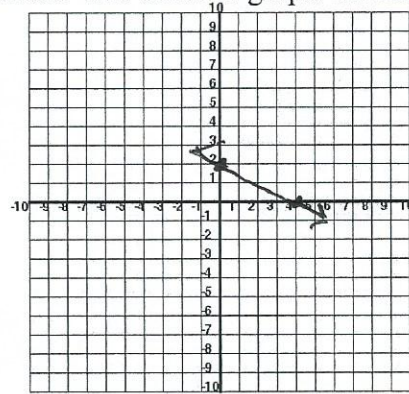
$$12x - 4 = -6x - 24 - 4$$

$$18x = -24$$

21) Find the x and y intercepts of the following equation. Use these to graph the line.

$$6x + 12y = 24$$

$$12y = 24 - 6x \quad x \text{ int } (4, 0)$$
$$y = 2 - \frac{1}{2}x \quad y \text{ int } (0, 2)$$



22) Using your calculator, what is the best fitting linear regression line for the following points:

(1, 7), (1, 6) (2, 6) (3, 5) (4, 4) (5, 5) (6, 3) (7, 2)

$$y = -.69x + 7.25$$

23) Write the product in standard form

$$(3 + 2i)(1 - 5i)$$

$$3 - 15i + 2i - 10i^2$$

$$\boxed{13 - 13i}$$