

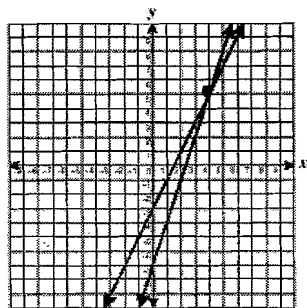
Name Key Date \_\_\_\_\_

Exam Date and Time: \_\_\_\_\_

Read and answer all questions accordingly. All work and problems must be done on your own paper or done on this page for graph paper only and work must be shown. No work = No Credit = NO EXCEPTIONS. It is worth 1.5 quiz grades.

Unit 4-1

- 1) Below is the graph of  $y = 2x - 3$  and  $y = 3x - 7$ . If  $2x - 3 = 3x - 7$  what is the value of  $x$ ?



$x = 4$

- 2) Find the solution to the following system,  $\begin{cases} -2x + y = -7 \\ x + 2y = 11 \end{cases}$   $(5, 3)$

- 3) Find the solution to the following system,  $\begin{cases} 3x + 6y = -3 \\ x + 2y = -1 \end{cases}$  Infinite

- 4) Andrew has bought hot wheel cars for \$1,  $h$  and trading cards for \$3,  $t$ . He purchased 24 items that cost \$38. Write the system of equations below and choose the answer to how many of each did he buy?

$\begin{cases} h + t = 24 \\ \$1h + \$3t = \$38 \end{cases}$   $(\$17, 7)$

- 5) There are three times as many freshmen as seniors. Together there are 2480 freshmen and seniors. Write system of equations can be used to find  $s$ , the number of seniors, and  $f$ , the number of freshmen?

$\begin{cases} f + s = 2480 \\ f = 3s \end{cases}$   $(1860, 620)$

- 6) I have nickels and dimes in my pocket and the value of the coins is \$0.75. The number of nickels is 1 less than twice the number of dimes. Write system of equations can be used to find  $n$ , the number of nickels, and  $d$ , the number of dimes that I have?

$\begin{cases} n = 2d - 1 \\ 0.05n + 0.1d = 0.75 \end{cases}$

Unit 4-2

- 1) When an expression like  $5y$ , it is understood that the coefficient to be what of the following? The exponent?

Coefficient: 5, Exponent: 1

- 2) The area of a rectangle is  $40m^8n^{12}$  square units. If the length of the rectangle is  $8m^3n^7$  units, how many units wide is the rectangle? ( $m$  and  $n$  are not zero)

Width:  $5m^5n^5$

- 3) Simplify,  $(4a^3b^5c)^2 = 16a^6b^{10}c^2$

- 4) Write an expression describes the area in square units of a rectangle which has a width of  $4x^3y^2$  and a length of  $3x^2y^3$ .

$A = (4x^3y^2)(3x^2y^3) = 12x^5y^5$

- 5) Simplify,  $\frac{(8x^3)(2x^5)}{4x^6} = 4x^2$

- 6) Simplify,  $\frac{48a^3bc^5}{-6a^6b^3c^2} = \frac{-8c^3}{a^3b^2}$

- 7) Write an expression for the area of this square with sides of  $5x^3y^2$ .

$A = (5x^3y^2)^2 = 25x^6y^4$

- 8) Perform the indicated operation and simplify your answer,  $(5x^2 - 9) - (2x^2 + 15)$

$3x^2 - 24$

- 9) Simplify,  $(2x + 3)(3x - 5)$

$6x^2 - x - 15$

- 10) The length of a rectangle is  $x$ , and the width of this rectangle is 5 less than three times the length. What is the area of the rectangle?

$L = x$

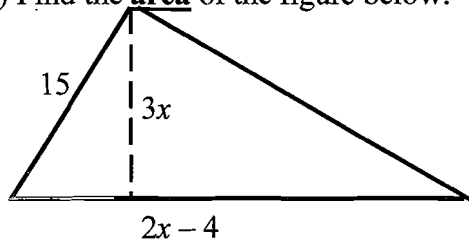
$W = 3x - 5$

$A = (x)(3x - 5)$

$A = 3x^2 - 5x$

11) Determine the GCF of  $35x^4 + 15x^2 - 10x$  GCF:  $5x$

12) Find the **area** of the figure below:



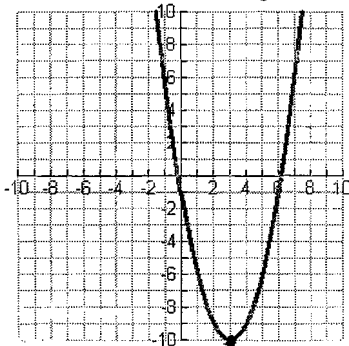
$$A = \frac{bh}{2}$$

$$A = \frac{6x^2 - 12x}{2}$$

$$A = 3x^2 - 6x$$

**Unit 5-1**

1) Determine the vertex, roots, y-intercept, the axis of symmetry, and domain and range of the function.



Vertex:  $(3, -10)$

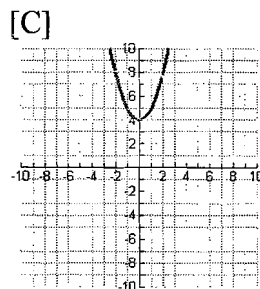
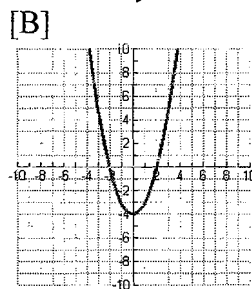
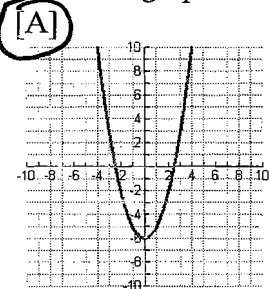
Roots:  $(0, 0)$   $(6, 0)$  y-intercept:  $(0, 0)$

Axis of Symmetry:  $x = 3$

Domain: All Real Numbers

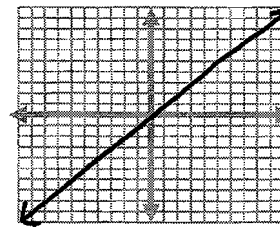
Range:  $y \geq -10$

2) Which graph shows a function  $y = x^2 + c$  when  $c < -4$ ?

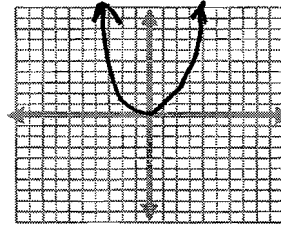


3) Sketch a graph of each type of function.

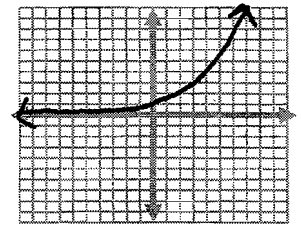
Linear Function



Quadratic Function



Exponential Function

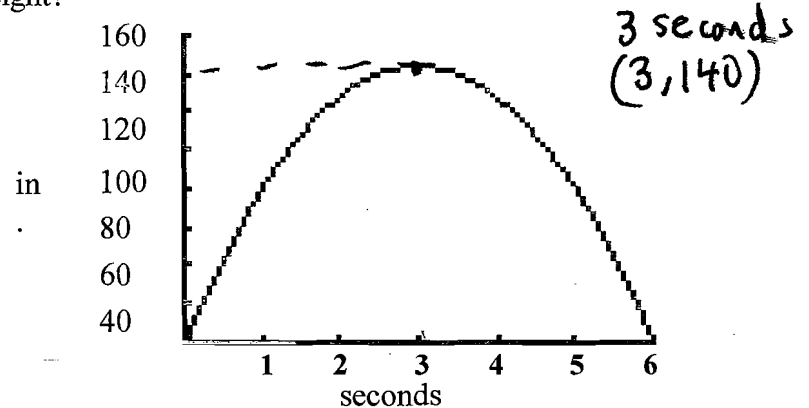


4) How would the graph of  $y = x^2 + 8$  be affected if the function were changed to  $y = x^2 - 3$ ? Down 11

5) Provide an example of a quadratic function that is **wider** than the parent function of a quadratic.  $y = \frac{1}{2}x^2$

6) Provide an example of a quadratic function that is **narrower** than the parent function of a quadratic.  $y = 2x^2$

7) The dolphins at SeaWorld are practicing a new jump for their summer show. The curve represents the equation,  $y = -16x^2 + 96x$ , comparing the time of a single jump and the height reached by the dolphins. Using the graph below, determine how many seconds does it take for the dolphins to reach their maximum height?



8) Which of the following tables represent a quadratic function?

[A]

x	y
1	2
2	4
3	8
4	16

[B]

x	y
2	9
4	10
6	11
8	12

[C]

x	y
1	-8
2	-4
3	0
4	4

**Unit 5-2 and 6-1**

- 1) Factor,  $100x^2 - 81$   $(10x-9)(10x+9)$   
 2) Factor,  $x^2 - 8x + 12$   $(x-2)(x-6)$   
 3) Factor,  $x^2 - 9$   $(x-3)(x+3)$   
 4) The area of a rectangle is given by the equation  $2w^2 - 5w - 12 = 0$  where  $w$  is the width. What is the width of the rectangle?

$(2w+3)(w-4)$  width is 4

- 5) The area of a rectangle is  $6x^2 - 7x - 5$  and the width is  $2x + 1$ . Write an expression best describes the rectangle's length.

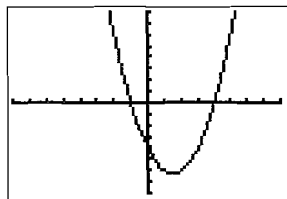
$L = (3x - 5)$

- 6) A square has an area of  $4x^2 + 12x + 9$ . Determine the length of each side of the square.  $S = (2x + 3)$

- 7) The area of a rectangle is given by the expression,  $3x^2 + 11x + 10$ . Determine the dimensions of the rectangle.  $(3x+5)(x+2)$

- 8) Solve,  $(2x+6)(x-3) = 0$ .  $\{-3, 3\}$

- 9) State the roots of the function below.



$(-1, 0)$  and  $(4, 0)$

10) Solve,  $x^2 + x - 90 = 0$ .  $(x-9)(x+10)$

11) Solve,  $5x^2 - 30x + 40 = 0$ .  $5(x-2)(x-4)$   
 $5(x^2 - 6x + 8)$

12) Solve,  $5x^2 - 9x - 2 = 0$ .  $(5x+1)(x-2)$

- 13) Given the domain of  $\{-2, -1, 0, 1, 2\}$ , find the range of the following function  $y = -4x^2 + 7$   $R: \{-9, 3, 7, 3, -9\}$

14) Solve,  $f(x) = 3x^2 - 13x - 10$  using the Quadratic Formula.  
 $\{-2/3, 5\}$

- 15) Why do we solve using the Quadratic Formula vs. Solve through factoring? Quadratic Formula solves ALL Quadratics where as not all quadratics are factorable

**Unit 6-1 (Exponentials)**

- 1) What is the difference between exponential growth vs exponential decay?  $y = Ca^x$ ; Exp Growth  $\nearrow$  Decay  $\searrow$

- 2) Johnson City has been growing at a rate of 3.2% each year. The present population is 12,000. The exponential equation  $f(t) = 12,000(1+.032)^t$  is written to project the population of a town in Johnson City. What is the following is the population after 12 years?  $17512.08$

**Unit 6-2. Leave Answers in Radical form, if necessary.**

1) Simplify,  $-7\sqrt{240}$   $-28\sqrt{15}$

2) Simplify,  $(-\sqrt{9})(-\sqrt{6})(-4\sqrt{9})$   $-36\sqrt{6}$

3) Simplify,  $(\sqrt{7})(-\sqrt{35})$   $-7\sqrt{5}$

4) Simplify,  $\sqrt{\frac{361}{289}}$   $\left\{\frac{19}{17}\right\}$

5) Solve,  $8x^2 = 72$   $\{\pm 3\}$

6) Solve,  $\sqrt{x-3} = 9$   $\{84\}$

7) Solve,  $4\sqrt{11} - 7\sqrt{11} + 11$   $-3\sqrt{11} + 11$

8) Solve,  $-3\sqrt{3} - \sqrt{8} - 3\sqrt{3}$   $-6\sqrt{3} - 2\sqrt{2}$

9) Find the area of the rectangle if the length is  $\sqrt{5}$  and width is  $4\sqrt{20}$ . ~~200~~ 40

10) Find the area of the triangle if the base is  $\sqrt{3}$  and height is  $4\sqrt{20}$ .  $4\sqrt{15}$

11) Rationalize,  $\frac{\sqrt{11}}{\sqrt{20}} = \frac{\sqrt{55}}{10}$

12) Rationalize,  $\frac{7\sqrt{2}}{\sqrt{3}} = \frac{7\sqrt{6}}{3}$

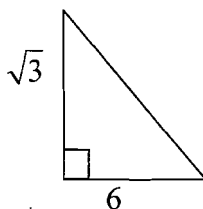
11) Find the missing side of the following right triangle.

$$a^2 + b^2 = c^2$$

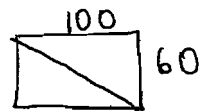
$$36 + 3 = c^2$$

$$c^2 = 39$$

$$c = \sqrt{39}$$



12) A rectangular park has a diagonal walkway from 1 corner to another. The park has a length of 100 yards and a width of 60 yards. Find the approximate length of the diagonal walkway.



diagonal:  $20\sqrt{34}$

13) List 3 ways you will do to help you study for the midterm exam.