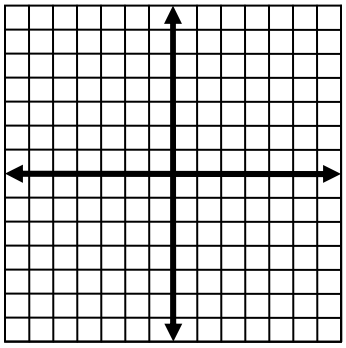
Algebra Name: _____
Semester 2 Final Exam Review

Directions: Show ALL work to receive ALL credit.
The question numbers that are circled should be completed without a calculator.

Chapter 7:

1.) **Solve the system** $\begin{cases} x+y=0 \\ y=-3+\frac{1}{2}x \end{cases}$ **by graphing.**



2.) **Use the addition method to solve the system of equations.** $\begin{cases} 5x+2y=32 \\ x-4=2y \end{cases}$

3.) **Multiple Choice: Mr. Frankel bought 7 tickets to a puppet show and spent $43. He bought a combination of child tickets for $4 each and adult tickets for $9 each. Which system of equations below will determine the number of adult tickets "*a*" and the number of child tickets "*c*" he bought?**

a.) $\begin{cases} a=c-9 \\ 9a+4c=43 \end{cases}$ b.) $\begin{cases} 9a+4c=43 \\ a+c=7 \end{cases}$ c.) $\begin{cases} a+c=7 \\ a+c=301 \end{cases}$ d.) $\begin{cases} 4a+4c=50 \\ a+c=7 \end{cases}$

4.) **Solve the system for the value of *x*.** $\begin{cases} x+y=0 \\ 2x-y=-9 \end{cases}$

5.) **Solve the linear system by any method.**

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

6.) **The length of a rectangle is 8 cm more than four times the width. If the perimeter of the rectangle is 46 cm, what are the dimensions?**

7.) **Use the substitution method to solve the system of equations.** $\begin{cases} x + 4y = -1 \\ 2x - y = 7 \end{cases}$

8.) **A rental car agency charges $15 per day plus 11 cents per mile to rent a certain car. Another agency charges $18 per day plus 8 cents per mile to rent the same car. How many miles will have to be driven for the cost of a car from the first agency to equal the cost of a car from the second agency? Express the problems as a system of linear equations and solve using the method of your choice.**

9.) **The sum of the ages of Petra and her mother is 53. Her mother is 11 years more than twice as old as Petra. How old are Petra and her mother?**

10.) **Solve the system of equations using the elimination method:** $\begin{cases} 3x + 6y = 9 \\ x - 6y = 11 \end{cases}$

11.) **<u>Multiple Choice:</u> Which system of equations has no solution?**

a.) $\begin{cases} 7x + 9y = 5 \\ -21x - 27y = 14 \end{cases}$ b.) $\begin{cases} 7x + 9y = 5 \\ 4x + 7y = 14 \end{cases}$ c.) $\begin{cases} 7x - 9y = 10 \\ 7x - 36y = 40 \end{cases}$ d.) $\begin{cases} 7x - 9y = 5 \\ 14x - 19y = 10 \end{cases}$

12.) **<u>Multiple Choice</u>: Describe the solution(s) of the system.** $\begin{cases} 6x + 4y = 10 \\ 8x + 12y = -20 \end{cases}$

a.) No Solution b.) (–7, 13) c.) (5, –5) d.) (–1, 4)

13.) **Multiple Choice: Which choice best describes the solution(s) of the system of equations?** $\begin{cases} -24x + 8y = 24 \\ -15x + 5y = 15 \end{cases}$

a.) Infinitely Many Solutions

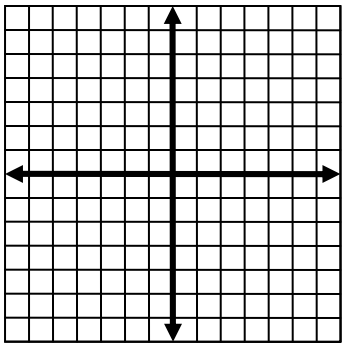
b.) (–1, 0) is the only solution

c.) (1, 48) is the only solution

d.) No Solution

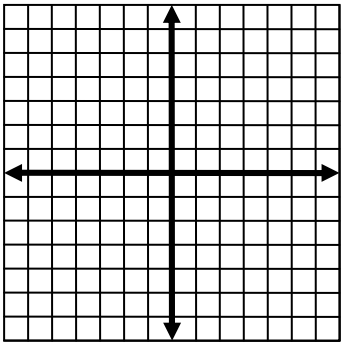
14.) **Solve the system of linear inequalities by graphing**

$\begin{cases} y \le 2x - 1 \\ y \prec -3 \end{cases}$



15.) **Solve the system of linear inequalities by graphing**

$\begin{cases} y \ge x - 4 \\ y \le -2x - 8 \end{cases}$



Chapter 8:

16.) **Simplify. The final answer must have positive exponents. Leave all answers in exponential form.**

a.) $8^1 \bullet 8^6$

b.) $r^4 \bullet r^5 \bullet r^6$

c.) $(-3c^4)(2c^3d^6)$

d.) $(x^2)^5$

e.) $(2qr^5)^3(qr)^6$

f.) $(3x^4y^2)^3$

g.) $(-4 \bullet 3)^2$

h.) $\left(\dfrac{x^3}{y^8}\right)^2$

i.) $\dfrac{5^4 \bullet 5^5}{5^6}$

j.) $\dfrac{1}{9x^{-2}y^{-4}}$

h.) $(-2)^0(3x^{-2}y^{-2})^{-1}$

l.) $\dfrac{7^4}{7^6}$

17.) **Simplify:** $(-3t^5r^8)^4$

18.) **Simplify the expression using positive exponents.** $\left(\dfrac{j^5}{k^9}\right)^8$

19.) **Rewrite** $2^0 \bullet 2^{-9}$ **using positive exponents.**

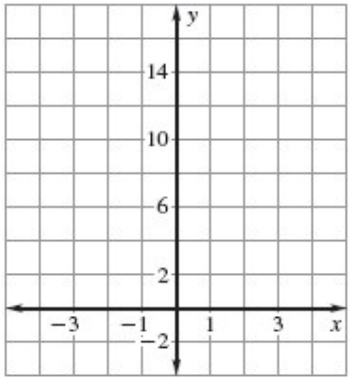
20.) **Rewrite the expression using positive exponents.** $(-3)^0\left(2x^{-1}y^{-1}\right)^2$

21.) **Write an exponential function to model the situation and tell what each variable represents.**
A price of \$130 increases 5% each year.

22.) **Find the value of \$1500 deposited for 8 years in an account paying 6% annual interest compounded yearly.**

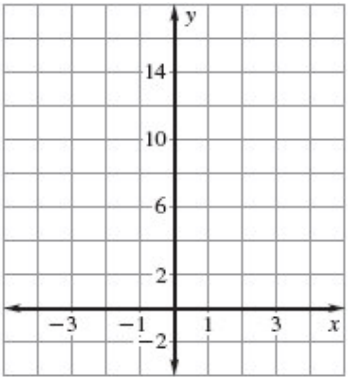
23.) **Write an exponential function to model the situation.**
A population of 290 animals decreases at an annual rate of 9%.

24.) a.) **Graph the function** $y = 3^x$**.**



Does this graph represent exponential growth or exponential decay?

25.) **Graph the function** $y = 4 \bullet \left(\frac{1}{2}\right)^x$



Does this graph represent exponential growth or exponential decay?

26.) **<u>Multiple Choice:</u> Which equation below represents *exponential decay.***

a.) $y = (0.89)^t$ b.) $y = (2.16)^t$

Chapter 9:

27.) **True or False.** $2x^{-2} + x^{-1}$ is a polynomial.

28.) **Use the polynomial** $6x^3 - 6x + 4x^5 - 2$ **to answer the questions below.**

a.) Rewrite the polynomial in standard form.

b.) What is the degree?

c.) What is the leading coefficient?

d.) How many terms does the polynomial have?

e.) Classify the polynomial by the number of terms.

29.) **Use the polynomial** $4x^2 + 3 - 2x$ **to answer the questions below.**

a.) Rewrite the polynomial in standard form.

b.) What is the degree?

c.) What is the leading coefficient?

d.) How many terms does the polynomial have?

e.) Classify the polynomial by the number of terms.

30.) **Find the sum or difference.**

a.) $(2a^7 + 3a^3 - 6) + (-2a^3 + 4 + 6a^7)$

b.) $(3e^4 - 4) - (8e^3 + 2)$

c.) $(6b^3 + 3b^2 + 8) - (2b^3 - 8b^2 + 6b - 5)$

d.) $(-4z^4 - 4z^3 - 6) + (-6z^4 - 7z^3 - 3)$

e.) $(5x^4 - 5x^6 - 5) + (9x^6 - 7 - 3x^4)$

f.) $(-5x^2 + 7x) + (3x + 2x^2)$

31.) **Find the product. Write all final answers in standard form.**

a.) $-6(3x+4)$ b.) $(x+3)(-4x+5)$ c.) $(2x+3)(5x-4)$

d.) $(x+6)(x-6)$ e.) $(9x-4)(3x^2+6x-1)$ f.) $(4c+2)^2$

g.) $(x^2-2x+3)(x+5)$ h.) $(x+7)(x+4)$ i.) $(x^2+x)(3x+2)$

32.) **Find the missing term.**

a.) $(x+9)^2 = x^2+18x+$ _____ b.) $(x-2)^2 = x^2-4x+$ _____ c.) $(x+6)^2 = x^2+12x+$ ____

33.) **Solve.**

a.) $(x+4)(2x-2)=0$ b.) $x(3x-4)(x+2)=0$ c.) $(3x-1)(x-4)(2x+5)=0$

34.) **Factor completely then find <u>all</u> solutions.**

a.) $x^2-x-6=0$ b.) $x^2-16x+63=0$ c.) $x^2-7x+12=0$

d.) $4x^2+7x-2=0$ e.) $49x^2-21x+2=0$ f.) $x^2-3x-10=0$

g.) $3x^2-19x+6=0$ h.) $36x^2-16=0$ i.) $x^2+6x+9=0$

35.) **Factor each polynomials completely.**

a.) $2x^2 - 50y^2$ b.) $p^2 - 169q^2$ c.) $4x^2 - 12x + 9$

36.) **Factor by Grouping.**

a.) $x^3 + 3x^2 - 4x - 12$ b.) $x^3 + 4x^2 - 25x - 100$

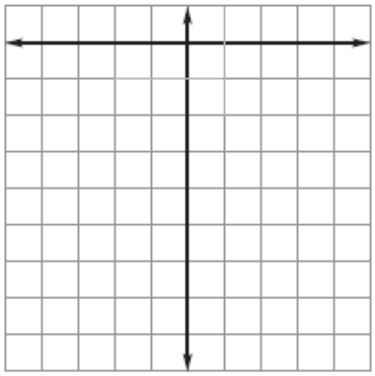
Chapter 10:

37.) **Multiple Choice: How would you translate the graph of $y = -x^2$ to produce the graph of $y = -x^2 - 4$?**

a.) Translate the graph of $y = -x^2$ down 4 units **b.) Translate the graph of $y = -x^2$ up 4 units**

c.) Translate the graph of $y = -x^2$ left 4 units **d.) Translate the graph of $y = -x^2$ right 4 units**

38.) **Graph the function.** $y = -3x^2$



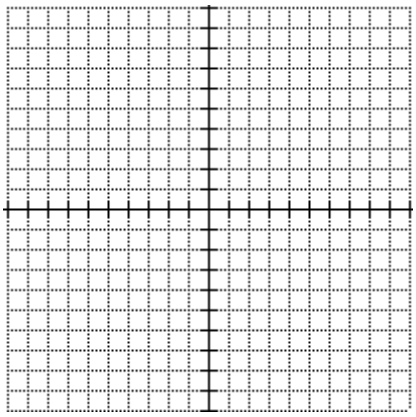
39.) **Describe how the graph of each function below compares to the graph of $y = x^2$.**

a.) $y = 0.5x^2$ b.) $y = 9x^2$

40.) **How would you shift the graph of $y = x^2$ to produce the graph of $y = x^2 - 8$?**

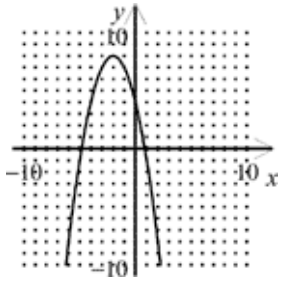
41.) **Find the *vertex* and the *axis of symmetry* of the parabola.** $y = -2x^2 + 4x + 6$

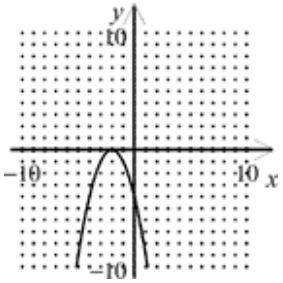
42.) **Graph the quadratic equation** $y = 3x^2 + 12x - 3$

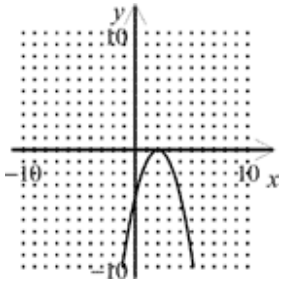


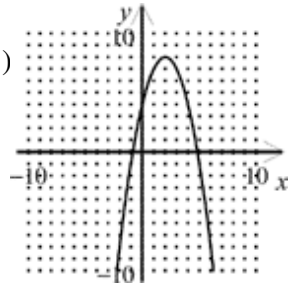
43.) **Multiple Choice:** **Which graph below represents the quadratic equation** $y = -x^2 - 4x - 4$

List the solutions of the answer : _____

a.) 

b.) 

c.) 

d.) 

44.) **Multiple Choice:** **Find all solutions to the quadratic equation.** $49x^2 - 36 = 0$

a.) $-\frac{49}{36}, \frac{49}{36}$ b.) $-\frac{36}{49}, \frac{36}{49}$ c.) $-\frac{6}{7}, \frac{6}{7}$ d.) $-\frac{7}{6}, \frac{7}{6}$

45.) **Find all solutions to each quadratic equation**

a.) $x^2 = 9$ b.) $x^2 + 3 = -17$ c.) $4x^2 + 120 = 120$

46.) **Solve each equation. Round the solutions to the nearest hundredth.**

a.) $5x^2 = 75$ b.) $7x^2 - 4 = 100$ c.) $3(x+6)^2 = 33$

47.) **Solve the equation by completing the square.** $x^2 + 6x - 3 = 0$

48.) **Find the value of *c* that makes the expression a perfect square trinomial.**

a.) $x^2 + 18x + c$ b.) $x^2 + 22x + c$

49.) **Use the quadratic formula to solve the equation. Round your solution to the nearest hundredth, if necessary.**

a.) $x^2 - 2x - 1 = 0$ b.) $2x^2 - x = 1$ c.) $3x^2 - x - 3 = 0$

50.) **Multiple Choice:** **Use the discriminant to find the number of real solutions the equation** $3x^2 - 3x + 4 = 0$ **has.**

a.) No Solutions b.) Not Enough Information c.) Two Solutions d.) One Solution

51.) **Use the discriminant to determine the number of real solutions of each equation.**

a.) $2x^2 + 6x + 2 = 0$ b.) $4x^2 - 3x - 7 = 0$ c.) $5x^2 - 3x + 1 = 0$ d.) $9x^2 - 30x + 25 = 0$

52.) **Multiple Choice:** **The table gives the number of inner tubes, *I*, sold in a bike shop between 1985 and 1990. Determine which model best fits the data.**

Year, *t*	1985	1986	1987	1988	1989	1990
Inner tubes, *I*	40	56	74	91	113	127

a.) Linear b.) Absolute Value c.) Quadratic d.) Exponential

In 53-55, a.) Tell whether the table of values represents a *linear, exponential,* or *quadratic function*.
b.) Write an equation for the function.

53.)

x	–2	–1	0	1	2
y	$\frac{4}{9}$	$\frac{4}{3}$	4	12	36

54.)

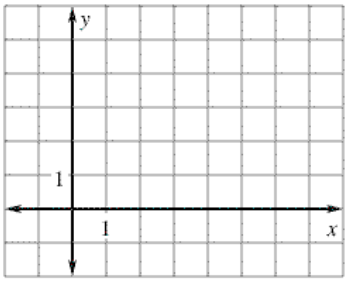
x	–2	–1	0	1	2
y	1	7	13	19	25

55.)

x	–2	–1	0	1	2
y	11	10	9	8	7

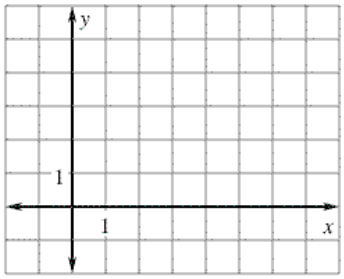
Chapter 11

56.) **Graph the function** $f(x) = \sqrt{x} - 1$



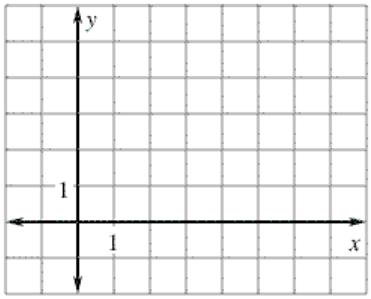
Domain: _____ Range: _____

57.) **Graph the function** $f(x) = \sqrt{x-1}$

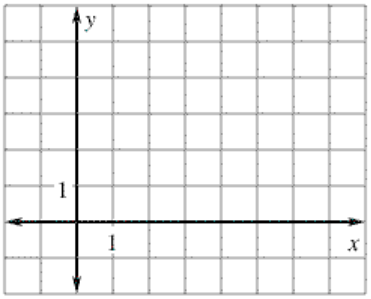


Domain: _____ Range: _____

58.) **Graph the function** $y = \sqrt{x-2} + 3$



59.) **Graph the function** $y = \sqrt{x-3} + 2$



60.) **Simplify:**

a.) $\sqrt{200}$ b.) $\sqrt{20}$ c.) $\sqrt{10} \bullet \sqrt{4}$ d.) $\sqrt{6} \bullet \sqrt{20}$

e.) $\sqrt{\frac{9}{4}}$ f.) $7\sqrt{6} + 8\sqrt{6} - 3\sqrt{6}$ g.) $\sqrt{32} + \sqrt{72}$

h.) $3\sqrt{3} + 9\sqrt{3} - 4\sqrt{3}$ i.) $5\sqrt{5} + 3\sqrt{36} + 2\sqrt{80}$

61.) **Solve each equation. <u>Check for extraneous solutions</u>.**

a.) $\sqrt{x+3} = -6$ b.) $\sqrt{x+9} - 9 = 2$ c.) $\sqrt{6x+4} = 25$

d.) $\sqrt{x+72} = x$ e.) $\sqrt{2x+7} = 5$ f.) $\sqrt{1-2x} = -4$

g.) $\sqrt{2-x} = 2-x$ h.) $5\sqrt{x} - 30 = 0$ i.) $\sqrt{2x+1} = \sqrt{5x-32}$

62.) **<u>Multiple Choice:</u> Find the midpoint of (4, 16) and (9, –2).**

a.) $\left(\frac{13}{2}, 7\right)$ b.) $(13, 14)$ c.) $\left(10, \frac{7}{2}\right)$ d.) $(-13, -14)$

63.) **Multiple Choice:** **If** $M(0,-8)$ **is the midpoint of** $\overline{RS}$ **. If** ***S*** **has coordinates** $(-2,-14)$ **, find the coordinates of** ***R*****.**

a.) $(2,-2)$ b.) $(2,-6)$ c.) $(3,-2)$ d.) $(3,-6)$

64.) **Find the distance between the two points.**

a.) (–4, –2), (2, 3) b.) (–5, 3), (4, –1)

65.) **Find the distance and the midpoint between the points** $C(-8,-4)$ **and** $G(2,-3)$ **.**

66.) ***M*****(4, 4) is the midpoint of** $\overline{RS}$ **. If** ***S*** **has coordinates (9, 13), find the coordinates of** ***R*****.**

Chapter 12

67.) **Find an equation of variation when** ***y*** **varies inversely with** ***x*** **and** ***y*** **= 7 when** ***x*** **= 5.**

68.) **The price per person of renting a bus varies inversely with the number of people renting the bus.**
It costs $20 per person if 27 people rent the bus.
How much will it cost per person if 95 people rent the bus?

69.) **Tell whether the equation represents** ***direct variation*****,** ***inverse variation*****, or** ***neither*****.**

a.) $y - 3 = 5x$ b.) $10 = xy$ c.) $0.25x = y$

70.) **Divide:**

a.) $\dfrac{x^2+5x+3}{x}$ b.) $\dfrac{x^2-3x+3}{x-5}$ c.) $\dfrac{x^2+5x-5}{x+3}$ d.) $\dfrac{2x^2-x+1}{x+4}$

71.) **Simplify the expression** $\dfrac{(x+2)^2}{x^2-4}$

72.) **Find the product.**

a.) $(x-2)\bullet\dfrac{x+4}{x^2-4}$ b.) $\dfrac{9y^2}{5}\bullet\dfrac{15}{18y}$ c.) $(x-4)\bullet\dfrac{x+3}{x^2-16}$

73.) **Find the quotient.**

a.) $\dfrac{x+3}{x-3}\div\dfrac{x^2-9}{3-x}$ b.) $\dfrac{15x^3}{8x^5}\div\dfrac{10x^4}{4x}$

74.) **Find the sum or difference.**

a.) $\frac{4}{x+8}+\frac{1}{x-8}$

b.) $\frac{1}{x+5}-\frac{9}{x-5}$

75.) **Solve the equation:**

a.) $\frac{x+9}{x+8}=\frac{x+4}{x+7}$

b.) $\frac{3}{x-5}-\frac{1}{x+3}=0$

c.) $\frac{x+1}{3}=\frac{x+5}{x}$