Name _____ Date _____

Exam Date and Time: _____

Read and answer all questions accordingly. All work and problems must be done on your own paper and work must be shown. No work = No Credit = NO EXCEPTIONS. It is worth two quiz grades.

Chapter 1 – Real Numbers

1) Evaluate $2a^3+(2a)^3$, *when* $a=-3$

2) Classify these numbers whole, natural, integer, rational, and/or irrational & order from least to greatest: 1, 7/5, $\sqrt{2}$, $1.\overline{414}$, π, 0

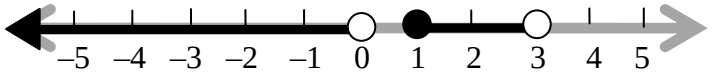
3) The drama club is printing a storybook to raise money. The print shop charges $5 for each book, and $30 to create the film. (The film is a one time charge) How many books can the club print if their budget is $1230?

4) Is $x = -7$ a solution of the equality $5x - 7 \le 3(x - 7)$?

5) Solve for *d* in the equation, $S = \dfrac{CRD}{12d}$

6) Solve: $|x-9|<6$

7) Write the following in Interval Notation and Set Builder Notation.



8) Find the domain and range of the relation
{(2, 4), (–4, 5), (–2, 5), (0, 0)}

Chapter 2 – Linear Functions

1) Given $f(x) = -16x^3 + x$, evaluate $f(0)$, $f(1/2)$, and $f(a)$

2) Is the relation {(2, 4), (–4, 5), (–2, 5), (0, 0)} a function?

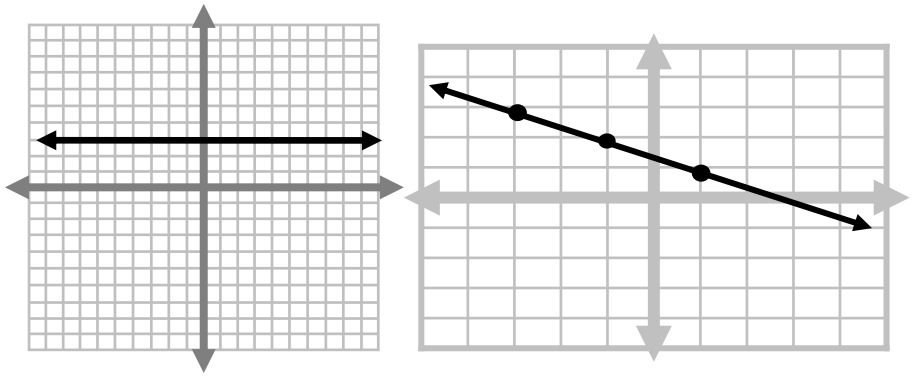
3) In 1983 the pollution in a local lake was rated at 1.4 parts per million. By 1987 it had risen to 2.6 parts per million. Which of the following expresses the rate of change in parts per million from 1983?

4) Graph the line with slope $\dfrac{1}{3}$ that passes through (–6, –4).

5) Find the intercepts of $5x - 5y = 15$.

6) Graph the line using slope intercept form, $y = -3x - 4$

7) What is the equation and slope of these lines?



8) In slope-intercept form, write the equation of the line that is **perpendicular** to $y = -2x - 9$ and passes through (–2, –4).

9) In slope-intercept form, write the equation of the line that contains the points in the table.

x	–2	0	2	4	6
y	–3	1	5	9	13

10) Graph the inequality, $y > \frac{3}{4}x - 2$.

11) Find $g(x)$ if $f(x) = |x|$ and when the vertex is moved two units to the left and three units down. Equation: $f(x) = |x - h| + k$

Chapter 3 - Systems

Use the substitution or elimination to solve and label if it is consistent, inconsistent, independent and/or dependent.

1) $2x + y = 9$
$3x - 4y = 8$

2) $2x + 4y = 6$
$x = 3 - 2y$

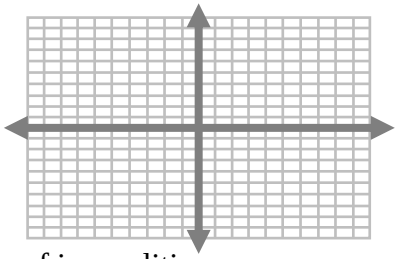
3) $x + y = -9$
$2x + 2y = 4$

4) A rental car agency charges \$15 per day plus 13 cent per mile to rent a certain car. Another agency charges \$19 per day plus 10 cent per mile to rent the same car. How many miles per day 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?

5) Tickets to a local movie were sold at \$4.00 for adults and \$2.50 for students. If 206 tickets were sold for a total of \$785, how many adult tickets were sold?

6) The Modern Grocery has cashews that sell for \$4.50 a pound and peanuts that sell for \$2.50 a pound. How much of each must Albert, the grocer, mix to get 80 pounds of mixture that he can sell for \$3.00 per pound. Express the problem as a system of linear equations and solve.

7) Graph the system of inequalities:
$-y \le 2x + 4$
$y \le x + 3$



8) Determine the solution to the system of inequalities:
$y \ge x + 6$
$3x + y \le 8$

Use the information below to solve the two questions

A grocer buys cases of almonds and walnuts. Almonds are packaged 20 bags per case. Grocer pays \$30 per case of almonds and makes a profit of \$17 per case. Walnuts are packaged 24 bags per case. Grocer pays \$26 per case of walnuts and makes a profit of \$26 per case and makes a profit of \$15 per case. He orders no more than 300 bags of almonds and walnuts together at a maximum of \$400.

9) Determine the constraints and the objective function equation.

10) How many cases of almonds and walnuts maximize the grocer's profit?

11) Solve the linear system.

$$\begin{cases} x + y - 3z = -20 \\ -3y + 2z = 5 \\ z = 4 \end{cases}$$

12) Solve the linear system.

$$\begin{cases} x - 3y + 3z = -4 \\ 2x + 3y - z = 15 \\ 4x - 3y - z = 19 \end{cases}$$

13) Solve the linear system. $\begin{cases} x - y + 2z = 7 \\ 2x + y + z = 8 \\ x - z = 5 \end{cases}$

14) Add, $\begin{bmatrix} 4 & -7 & 4 \\ 8 & 7 & -4 \end{bmatrix} + \begin{bmatrix} 6 & 2 & 1 \\ -9 & 4 & 0 \end{bmatrix}$

15) Solve for x. $\begin{bmatrix} 6 & -6 & 3 \\ 10 & 2 & -9 \end{bmatrix} + x = \begin{bmatrix} 3 & -6 & -8 \\ 1 & -9 & 10 \end{bmatrix}$

16) Evaluate $4B - 4C$, if possible. $B = \begin{bmatrix} 2 & 7 \\ 8 & -6 \end{bmatrix}$ $C = \begin{bmatrix} 0 & 1 \\ 4 & -2 \end{bmatrix}$

17) Solve for AB, if possible; $A = \begin{bmatrix} 3 & 6 \\ 2 & 4 \\ -4 & 0 \end{bmatrix}$ $B = \begin{bmatrix} 7 & 0 & -4 \\ 2 & 6 & 4 \end{bmatrix}$

18) Find the determinant of the matrix: $\begin{bmatrix} -6 & 3 \\ 5 & 4 \end{bmatrix}$

19) Find the determinant of the matrix: $A = \begin{bmatrix} 5 & -5 & 2 \\ 6 & 7 & -1 \\ 1 & -2 & 0 \end{bmatrix}$

20) Solve using Cramer's Rule $\begin{cases} -x - y = 5 \\ -8x - 9y = -1 \end{cases}$

21) The band and orchestra are attending a concert. The band bought 16 student tickets and 3 adult tickets for \$110.50. The orchestra brought 12 student tickets and 4 adult tickets for \$96. Find the cost of each type of ticket using Cramer's Rule.

Chapter 4 – Radicals and Quadratics

1) Graph $f(x) = x^2 + 7x + 6$ and determine its vertex, axis of symmetry, how it opens, minimum/maximum, domain, and range

2) Solve for the zeros: $x^2 - 6x + 18 = 0$

3) Factor $h(x) = x^2 + 23x + 60$

4) Factor and find the roots of the function $5x^2 = 30x - 45$

5) Factor: $x^2 - 5x + 6$

6) Factor: $8x^3 - 4x^2 - 50x + 25$

7) Factor: $x^3 - 1000$

8) Solve using factoring: $-2x^2 - 6x + 56 = 0$

9) $\sqrt{\frac{5}{12}}$

10) $\frac{3}{\sqrt{5}}$

11) $\sqrt{64x^5y^4z^{11}}$

12) $\frac{5+2i}{3-4i}$

13) $\frac{2}{\sqrt{7}-\sqrt{3}}$

14) $\frac{8-4i}{1+i}$

15) $\sqrt{-32}$

16) $\sqrt{-12} + \sqrt{-48}$

17) $(5-2i) - 2(3+i)$

18) $(2+3i)(1-4i)$

19) $\left(i\sqrt{5}\right)^2$

20) $(4-3i)(4+5i)$

21) $i^{20} - i^9$

22) Solve for x, $4 - 2i + 7i = 7i - 14$

24) Convert to Vertex form of $x^2 + 6x - 16 = 0$

25) Solve by completing the square: $2x^2 + 8x = 10$

26) The volume of a bowling ball can be modeled by the function $V(x) = -28x^2 - 28x + 168$, where x represents the radius in inches. Determine the value of x for which $V(x) = 0$.

27) Solve by the quadratic formula: $3x^2 + 10x - 8 = 0$

28) Solve by the quadratic formula: $x^2 + x - 8 = 0$

29) Find the discriminant and type of solutions for $10x^2 - 7x = -3$

30) Find the discriminant and type of solutions for: $5x^2-3x+1=0$

31) Solve: $x^2-7=14-2x^2$

32) A carnival game asks participants to strike a spring with a hammer. The spring shoots a puck towards a bell. If the puck strikes the bell, the participant wins a prize. Suppose a participant strikes the spring and shoots the pick using the equation, $d(x)=16t^2-32t+18$, where *d* is the distance in feet and *t* is the time in seconds since the puck was struck. Is it possible for the participant to win a prize? Show work and briefly explain the answer.

33) If a tightrope walker falls, he will land on a safety net. His height *h* in feet can be modeled by $h(t)=-16t^2+60$, where *t* is the time of seconds. How many seconds will the tightrope walker fall before landing on the safety net?

Chapter 6: Radical Equations

1) $\left(3^4\right)\left(3^{-2}\right)$ 2) $\left(2a^3b^4y\right)^{-7}$ 3) $\frac{3x^4y^3}{x^3y^5}$ 4) $\left(7^{\frac{2}{3}}\right)^{\frac{5}{2}}$ 5) $(3x-2)^{2/3}=8$

6) $\sqrt{x+6}-7=-2$ 7) $\sqrt{2x+1}=\sqrt{x+9}$

8) Describe the transformation from the parent function of the square root, $g(x)=\sqrt{x-1}+3$

9) The formula, $S=\sqrt{\frac{A}{4.828}}$ can be used to approximate the side length *s* of a rectangular octagon with the area A. A stop sign is shaped like a regular octagon with the side length of 12.4 in. To the nearest square inch, what is the area of the stop sign?

10) The formula, $S=\sqrt{\frac{A}{4.828}}$ can be used to approximate the side length *s* of a rectangular octagon with the area A. A stop sign is shaped like a regular octagon with the side length of 12.4 in. To the nearest square inch, what is the area of the stop sign?

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

Equations:

$Slope: \frac{y_2-y_1}{x_2-x_1}; \frac{\Delta y}{\Delta x}$ *Discriminant:* b^2-4ac

$Quadratic\ Formula: x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$Vertex: x=\frac{-b}{2a}; y=f\left(\frac{-b}{2a}\right)$ $\text{Point}-Slope: y-y_1=m(x-x_1)$