Algebra 2 – Pre-Test

Name:________________________Date:____________________Period:___

1. On January 1, a company had \$360,000.00 in an account. On June 1 of the same year, the same company had \$210,000.00 in its account. If the amount in the company's account changed by an equal amount each month, find the rate of change. Label your answer with the correct units.

$$\frac{-\$150{,}000}{5\text{ months}} = -\$30{,}000 \text{ per month}$$

2. A thief is running from police officers in a high-rise building. It is reported that the thief was on the 12^{th} floor and going up the stairwell at a rate of 2 floors per minute. The police are dropped off by helicopter on the roof (which is the 174^{th} floor) and descend through the stairwell at a rate of 1 floor per minute.

a. Write an expression for the floor the thief is on after t minutes.

$12+2t$

b. Write an expression for the floor the police is on after t minutes.

$174-1t$

c. Write an equation to find the amount of time for the police to reach the thief.

$12+2t=174-1t$

$+1t \qquad +1t$

d. Solve the equation and explain your answer.

$12+3t=174$

$-12 \qquad -12$

$3t=162$

$\frac{3t}{3}=\frac{162}{3}$

$t=54$ min

e. At what floor will they meet?

120th floor

3. Next summer Thomas plans to mow lawns in his neighborhood to earn money for a new pair of rollerblades. The relationship between the hours he will work (h) and the amount of money that he can earn (d) is shown in the table below:

Hours (h)	Money Earned (d)
1	$6.00
2	$12.00
3	$18.00
4	$24.00

a. Based on this data, how much would you predict that Thomas can earn for 6 hours of work?

$36

b. Based on this data, how much would you predict that Thomas could earn for h hours of work?

$d=6h$

c. Based on this data, how many hours would you predict that Thomas would have to work to earn $ 270.00?

$\frac{270.00}{6}$ 45 hrs

d. Write a formula that uses the given variables to represent this problem.

e. What are the numerical values of the slope and the intercept? (The intercept in this case refers to the intercept of the "Money Earned" axis.)

Slope = 6 Intercept = 0

4. Solve the following equations. Show all your work.

a. $6x + 3 = 2x + 15$

$x = 3$

b. $2(x + 3) + 4 = 30$

$x = 10$

c. $3(2x - 7) + 2x = 51$

$x = 9$

d. $3x - 2(x - 5) = 10 - x$

$x = 0$

5. In Vermont the speed limit on some major highways is 75 miles per hour. To find the fine a speeder has to pay when he travels over the speed limit, the State of Vermont uses the following procedure:

- **Take the speed of the car and subtract 75**
- **Multiply the difference by $45**

a. Select a variable to represent the fine f and another variable to represent the miles per hour the speeder is traveling s.

b. Write an equation that shows the relationship between the fine and the miles per hour the speeder is traveling.

$$45(s-75) = f$$

$$(s-75)\times 45 = f$$

c. Explain what values the variable may have for the miles per hour.

$$s > 75$$

$$(65-75)\times 45 = -450$$

d. Find the fine if the rate of the speeder is 95 miles per hour.

$900

e. Find how many miles per hour the speeder was traveling if the fine is $360.

$$\frac{360}{45} = 8 + 75 = 83 \text{ mph}$$

Properties of Real Numbers

Class Goals – By the end of the period, you will understand and be able to…

- Identify, Use, and Apply the Properties of Real Numbers.
- Evaluate expressions.
- Combine Like Terms.

Let a, b, and c be real numbers, variables, or algebraic expressions.

	Property	Description or Example
1.	Commutative Property of Addition $a + b = b + a$	When adding, you can change the order around.
2.	Commutative Property of Multiplication $a \cdot b = b \cdot a$	When multiply, you can change the order around.
3.	Associative Property of Addition $a + (b + c) = (a + b) + c$	When adding, you can change the grouping around.
4.	Associative Property of Multiplication $a \cdot (b \cdot c) = (a \cdot b) \cdot c$	When multiplying, you can change the grouping around.
5.	Distributive Property $a \cdot (b + c) = a \cdot b + a \cdot c$	The thing outside gets multiplied through to every term inside.
6.	Additive Identity Property $a + 0 = a$	anything plus 0 is itself
7.	Multiplicative Identity Property $a \cdot 1 = a$	anything times 1 is itself
8.	Additive Inverse Property $a + (-a) = 0$	Anything plus its opposite is 0.
9.	Multiplicative Inverse Property $a \cdot \left(\frac{1}{a}\right) = 1$ Note: a can not $= 0$	Anything times its reciprocal is 1.

State the order of operations (No abbreviations).

Parentheses
Exponents
Multiplication or Division
Addition or Subtraction

We use these two properties most when solving equations.

Example #1 Evaluate the expression.

a. $4-2\cdot 7+3^2$

$4-14+9 = -1$

b. $\dfrac{4-6\cdot(-3)}{3+2\cdot 2} = \dfrac{4+18}{3+4}$

$\dfrac{22}{7}$

c. $3x+7y$ where $x=4$ and $y=-3$

$|12+-21|$

-9

d. $x\cdot 3x+1^2$, where $x=2$

$2\cdot 3(2)+1^2$

$2\cdot 6+1$

$12+1$

13

11

Evaluate the expression.

1. $4x^2-2x^3$, where $x=-1$

$x=-1$

6

2. $\dfrac{3x}{4y}-4$, where $x=10$ and $y=5$

$\dfrac{(3(10))}{(4(5))}-4$

$\dfrac{30}{20}-4=-2.5$

What are Like Terms?

Same Variable, same exponents

Example #2 Simplify the expression by combining like terms.

a. $4x+5y+2x-3y+7x$

$(4x+2x+7x)+(5y-3y)$

$\boxed{13x+2y}$

b. $3x^2-5x+2x-4x^2$

$3x^2-4x^2-5x+2x$

$-1x^2-3x$

Simplify the expression.

2. $5x^2-3x-5+2x+7$

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