**Algebra 2**
**Unit: Systems of Equations and Inequalities**
**Section: Systems of Equations with Three Variables**

**Review Worksheet Key**

1) Solve the following systems of equations.

a. $x + y + z = 8$
$2x - 3x + z = 1$
$x = z - 2y$

$$\begin{bmatrix} 1 & 1 & 1 \\ 2 & -3 & 1 \\ 1 & 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 8 \\ 1 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1/11 & 3/11 & 4/11 \\ 3/11 & -2/11 & 1/11 \\ 7/11 & -1/11 & -5/11 \end{bmatrix} \begin{bmatrix} 8 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix}$$

The solution is (1, 2, 5).

b. $x + y + z = 3$
$3x - y + z = 13$
$x = -4y$

$$\begin{bmatrix} 1 & 1 & 1 \\ 3 & -1 & 1 \\ 1 & 4 & 0 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 13 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -4/10 & 4/10 & 2/10 \\ 1/10 & -1/10 & 2/10 \\ 13/10 & -3/10 & -4/10 \end{bmatrix} \begin{bmatrix} 3 \\ 13 \\ 0 \end{bmatrix} = \begin{bmatrix} 4 \\ -1 \\ 0 \end{bmatrix}$$

The solution is (4, -1, 0).

2. Jimmy has a handful of pennies, nickels and dimes that are worth $1.46. There are 20 coins all together and he has the same number of dimes as pennies and nickels combined. How many of each does he have?

$0.01P + 0.05N + 0.10D = 1.46$

$P + N + D = 20$

$D = P + N$

$$\begin{bmatrix} 0.01 & 0.05 & 0.10 \\ 1 & 1 & 1 \\ -1 & -1 & 1 \end{bmatrix} \begin{bmatrix} P \\ N \\ D \end{bmatrix} = \begin{bmatrix} 1.46 \\ 20 \\ 0 \end{bmatrix}$$

There are 1 penny, 9 nickels and 10 dimes.

3. In a triangle, the largest angle is six times the smallest angle. Also, the middle angle is twice the smallest angle. What are the measures of each angle?

A = largest angle, B = middle angle, C = smallest angle

$A = 6C$

$B = 2C$

$A + B + C = 180$

$$\begin{bmatrix} 1 & 0 & -6 \\ 0 & 1 & -2 \\ 1 & 1 & 1 \end{bmatrix} \begin{bmatrix} A \\ B \\ C \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 180 \end{bmatrix}$$

The smallest angle is 20 degrees. The middle angle is 40 degrees. The largest angle is 120 degrees.