Name:_________________________-

Math 8 Quiz 10.3

Use matrix methods (Gaussian elimination or Gauss Jordan) to solve: (~~12~~ 20 points)

$$-x - 2y - z = -3$$
$$2x + y + z = 16$$
$$x + y + 2z = 9$$

Remember - There are many different ways to go so our matrices might look different but answers must be same.

You must obtain row echelon form or reduced row echelon form Completely. Be sure to label operations performed at each step.

You can divide Row2 by -3 to get the one. But I did this to avoid fractions

$$\left[\begin{array}{ccc|c} -1 & -2 & -1 & -3 \\ 2 & 1 & 1 & 16 \\ 1 & 1 & 2 & 9 \end{array}\right] \xrightarrow[\substack{2R_1+R_2 \to R_2 \\ R_1+R_3 \to R_3}]{-R_1 \to R_1} \left[\begin{array}{ccc|c} 1 & 2 & 1 & 3 \\ 0 & -3 & -1 & 10 \\ 0 & -1 & 1 & 6 \end{array}\right]$$

not "="

$R_2 \leftrightarrow R_3$
Then
$(-1)(\text{new } R_2)$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 3 \\ 0 & 1 & -1 & -6 \\ 0 & -3 & -1 & 10 \end{array}\right] \xrightarrow{3R_2+R_3 \to R_3} \left[\begin{array}{ccc|c} 1 & 2 & 1 & 3 \\ 0 & 1 & -1 & -6 \\ 0 & 0 & -4 & -8 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 3 \\ 0 & 1 & -1 & -6 \\ 0 & 0 & 1 & 2 \end{array}\right]$$

Row echelon form. Can write system & back substitute or keep going to get reduced row echelon form

$$\cdots \to \left[\begin{array}{ccc|c} 1 & 0 & 0 & 9 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & 1 & 2 \end{array}\right]$$

$(9, -4, 2)$

* check in all 3 eqns