FINITE MATH

Quiz Review 2.1–2.2

Name Answer Key

Date_____ Period_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the echelon method to solve the system of two equations in two unknowns.

1) $5x + 5y = 70$
$-3x + 3y = -12$

$3(5x+5y=70) \Rightarrow 15x+15y=210$

$5(-3x+3y=-12) \Rightarrow +(-15x+15y=-60)$

$\frac{30y}{30} = \frac{150}{30}$

$y = 5$

$5x+5(5)=70$

$5x+25=70$

$-25 \quad -25$

$\frac{5x}{5} = \frac{45}{5}$

$x = 9$

Solution: (9,5)

Write the augmented matrix for the system. Do not solve.

2) $8x + 6z = 20$
$9y + 4z = 44$
$8x + 7y + 9z = 54$

$$\left[\begin{array}{ccc|c} 8 & 0 & 6 & 20 \\ 0 & 9 & 4 & 44 \\ 8 & 7 & 9 & 54 \end{array}\right]$$

Use the indicated row operation to change the matrix.

3) Replace R_2 by $R_1 + 2R_2$.

$$\left[\begin{array}{cc|c} 1 & -3 & 4 \\ 2 & 3 & 1 \end{array}\right]$$

$$\left[\begin{array}{cc|c} 1 & -3 & 4 \\ 5 & 3 & 6 \end{array}\right]$$

Use the Gauss–Jordan method to solve the system of equations.

4) $3x + 3y = 0$
$5x + 2y = -12$

$$\left[\begin{array}{cc|c} 3 & 3 & 0 \\ 5 & 2 & -12 \end{array}\right] \xrightarrow{-5R_1 + 3R_2 \to R_2} \left[\begin{array}{cc|c} 3 & 3 & 0 \\ 0 & -9 & 36 \end{array}\right] \xrightarrow[-\frac{1}{9}R_2 \to R_2]{\frac{1}{3}R_1 \to R_1}$$

$$\left[\begin{array}{cc|c} 1 & 1 & 0 \\ 0 & 1 & 4 \end{array}\right] \xrightarrow{-R_2 + R_1 \to R_1} \left[\begin{array}{cc|c} 1 & 0 & -4 \\ 0 & 1 & 4 \end{array}\right]$$

Solution: $(-4, 4)$

5) $5x - y + 2z = 21$
$-5x + 7y - 3z = 12$
$7x - 4y + z = -5$

$$\left[\begin{array}{ccc|c} 5 & -1 & 2 & 21 \\ -5 & 7 & -3 & 12 \\ 7 & -4 & 1 & -5 \end{array}\right] \xrightarrow[7R_1 + (-5R_3) \to R_3]{R_1 + R_2 \to R_2} \left[\begin{array}{ccc|c} 5 & -1 & 2 & 21 \\ 0 & 6 & -1 & 33 \\ 0 & 13 & 9 & 172 \end{array}\right] \xrightarrow[67R_1 + 11R_3 \to R_1]{6R_1 + R_2 \to R_2}$$

$$\left[\begin{array}{ccc|c} 30 & 0 & 11 & 159 \\ 0 & 6 & -1 & 33 \\ 0 & 0 & -67 & -603 \end{array}\right] \xrightarrow[-67R_2 + R_3 \to R_2]{67R_1 + 11R_3 \to R_1} \left[\begin{array}{ccc|c} 2010 & 0 & 0 & 4020 \\ 0 & -402 & 0 & -2814 \\ 0 & 0 & -67 & -603 \end{array}\right]$$

$$\xrightarrow[-\frac{1}{67}R_3 \to R_3]{\frac{1}{2010}R_1 \to R_1} \left[\begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 7 \\ 0 & 0 & 1 & 9 \end{array}\right]$$

Solution: $(2, 7, 9)$