Systems of Equations in Three Variables Practice

Name: _____ Date: _____

Question 1

Solve

I. Equation 1 : $x + y = 7$ Equation 2 : $3y + 2z = 9$ Equation 3 : $4x + z = 5$

II. Equation 1 : $x + y = 0$ Equation 2 : $x + z = 1$ Equation 3 : $2x + y + z = 2$

III. Equation 1 : $2x - 3y + z = 5$ Equation 2 : $x + 3y + 8z = 22$ Equation 3 : $3x - y + 2z = 12$

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IV. Equation 1 : $x + y + z = 5$ Equation 2 : $2x + 3y - z = 2$ Equation 3 : $2x + 3y - 2z = 4$

V. Equation 1 : $x - y + z = 4$ Equation 2 : $5x + 2y - 3z = 2$ Equation 3 : $4x + 3y - 4z = -2$

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Name: **Key** Date: _____

Question 1

Solve

I. Equation 1: $x + y = 7$ Equation 2: $3y + 2z = 9$ Equation 3: $4x + z = 5$

$4x + z = 5$ multiply $\longrightarrow$ $-8x - 2z = -10$

$+ \quad 3y + 2z = 9$

$-8x + 3y = -1$

$x + y = 7$ multiply $\longrightarrow$ $8x + 8y = 56$

$+ \quad -8x + 3y = -1$

$11y = 55$ solve $\longrightarrow$ $y = 5$

$x + (5) = 7$ solve $\longrightarrow$ $x = 2$ $3(5) + 2z = 9$ solve $\longrightarrow$ $z = -3$

$(2, 5, -3)$

II. Equation 1: $x + y = 0$ Equation 2: $x + z = 1$ Equation 3: $2x + y + z = 2$

$x + z = 1$ multiply $\longrightarrow$ $-x - z = -1$

$+ \quad 2x + y + z = 2$

$x + y = 1$

$x + y = 1$ multiply $\longrightarrow$ $-x - y = -1$

$+ \quad x + y = 0$

$0 = -1$

no solution

III. Equation 1: $2x - 3y + z = 5$ Equation 2: $x + 3y + 8z = 22$ Equation 3: $3x - y + 2z = 12$

$2x - 3y + z = 5$

$+ \quad x + 3y + 8z = 22$

$3x + 9z = 27$

$3x - y + 2z = 12$ multiply $\longrightarrow$ $9x - 3y + 6z = 36$

$+ \quad x + 3y + 8z = 22$

$10x + 14z = 58$

$3x + 9z = 27$ multiply $\longrightarrow$ $30x + 90z = 270$

$10x + 14z = 58$ multiply $\longrightarrow$ $+ \quad -30x - 42z = -174$

$48z = 96$ solve $\longrightarrow$ $z = 2$ $(3, 1, 2)$

$3x + 9(2) = 27$ solve $\longrightarrow$ $x = 3$ $2(3) - 3y + (2) = 5$ solve $\longrightarrow$ $y = 1$

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IV. Equation 1: $x + y + z = 5$ Equation 2: $2x + 3y - z = 2$ Equation 3: $2x + 3y - 2z = 4$

$x + y + z = 5$ multiply $\longrightarrow$

$$\begin{array}{r} -2x - 2y - 2z = -10 \\ + \quad 2x + 3y - z = 2 \\ \hline y - 3z = -8 \end{array}$$

$2x + 3y - z = 2$ multiply $\longrightarrow$

$$\begin{array}{r} -2x - 3y + z = -2 \\ + \quad 2x + 3y - 2z = 4 \\ \hline -z = 2 \end{array}$$

solve $\downarrow$

$z = -2$

$y - 3(-2) = -8$ solve $\longrightarrow$ $y = -14$

$x + (-14) + (-2) = 5$ solve $\longrightarrow$ $x = 21$

$(21, -14, -2)$

V. Equation 1: $x - y + z = 4$ Equation 2: $5x + 2y - 3z = 2$ Equation 3: $4x + 3y - 4z = -2$

$x - y + z = 4$ multiply $\longrightarrow$

$$\begin{array}{r} 3x - 3y + 3z = 12 \\ + \quad 5x + 2y - 3z = 2 \\ \hline 8x - y = 14 \end{array}$$

$x - y + z = 4$ multiply $\longrightarrow$

$$\begin{array}{r} 4x - 4y + 4z = 16 \\ + \quad 4x + 3y - 4z = -2 \\ \hline 8x - y = 14 \end{array}$$

$8x - y = 14$ multiply $\longrightarrow$

$$\begin{array}{r} -8x + y = -14 \\ + \quad 8x - y = 14 \\ \hline 0 = 0 \end{array}$$

Dependent