Matrix Worksheet

Name:

1. What augmented matrix would you use to solve for x, y and z?

$$\begin{aligned} 2x - 3y - z &= -7 \\ -x + 2y + z &= 6 \\ 9x - 4y + 4z &= 5 \end{aligned}$$

2. You have 3 containers of different concentrations of HNO_3 (nitric acid). One has 10% HNO_3, the second has 20% HNO_3 and the third has 40% HNO_3. How much of each do you need to make 100 leters of 25% HNO_3? (There is an infinite number of possibilities, but the 40% is the most expensive, so try to find the cheapest way). (*Hint:* $.10x + .20y + .40z = .25(100)$, *and* $x, y\&z$ *must be positive*)

3. Find the reduced row echelon form of the matrix by following the suggested steps:

$$\left[\begin{array}{ccc|c} 1 & -3 & -5 & -8 \\ 2 & -5 & -4 & -8 \\ -3 & 5 & 4 & 5 \end{array}\right]$$

$(a) R_2 = -2r_1 + r_2$
$(b) R_3 = 3r_1 + r_3$
$(c) R_3 = 4r_2 + r_3$
$(d) R_3 = \frac{1}{13} r_3$
$(e) R_1 = 3r_2 + r_1$
$(f) R_1 = -13r_3 + r_1$
$(g) R_2 = -6r_3 + r_2$

4. Find the reduced row echelon form of the matrix by following the suggested steps:

$$\left[\begin{array}{ccc|c} 1 & -3 & 4 & -4 \\ 2 & -5 & 6 & -7 \\ -3 & 3 & 4 & 18 \end{array}\right]$$

$(a) R_2 = -2r_1 + r_2$
$(b) R_3 = 3r_1 + r_3$
$(c) R_3 = 6r_2 + r_3$
$(d) R_3 = \frac{1}{4} r_3$
$(e) R_2 = 2r_3 + r_2$
$(f) R_1 = 3r_2 + r_1$
$(g) R_1 = -4r_3 + r$

5. Find the reduced row echelon form of the matrix by following the suggested steps:

$$\left[\begin{array}{ccc|c} 1 & -1 & 1 & 8 \\ 2 & 3 & -1 & -2 \\ 3 & -2 & -9 & 9 \end{array}\right]$$

$(a) R_2 = -2r_1 + r_2$
$(b) R_3 = -3r_1 + r_3$
$(c) swap 2\&3$
$(d) R_3 = -5r_2 + r_3$
$(e) R_3 = \dfrac{1}{57} r_3$