

Score:

Name: Solutions  
Period (circle one): 1 2 3 4 5 6  
Team (circle one): a b c d e f

**SM 261 – Matrix Algebra – Quiz 15**  
**Section 3.3 – Applications of Determinants**

1. Use Cramer's Rule to Solve the System: 
$$\begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 5 \\ 0 & 0 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$$

$\uparrow$   $A\vec{x} = B\vec{b}$   $\text{Det}(A) = (1)(2)(3) = 6$

$$x_1 = \frac{\text{Det} \begin{bmatrix} 1 & 2 & 3 \\ 2 & 2 & 5 \\ 4 & 0 & 3 \end{bmatrix} \begin{matrix} R_2 - 2R_1 \\ R_3 - 4R_1 \end{matrix}}{6} = \frac{\text{Det} \begin{bmatrix} 1 & 2 & 3 \\ 0 & -2 & -1 \\ 0 & -8 & -9 \end{bmatrix} \begin{matrix} \\ R_3 - 4R_2 \end{matrix}}{6}$$

$$= \frac{\text{Det} \begin{bmatrix} 1 & 2 & 3 \\ 0 & -2 & -1 \\ 0 & 0 & 5 \end{bmatrix}}{6} = \frac{10}{6} = \frac{5}{3}$$

$$x_2 = \frac{\text{Det} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 5 \\ 0 & 4 & 3 \end{bmatrix} \begin{matrix} \\ R_3 - 2R_2 \end{matrix}}{6} = \frac{\text{Det} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 5 \\ 0 & 0 & -7 \end{bmatrix}}{6} = \frac{-14}{6} = -\frac{7}{3}$$

$$x_3 = \frac{\text{Det} \begin{bmatrix} 1 & 2 & 3 \\ 0 & 2 & 5 \\ 0 & 0 & 3 \end{bmatrix}}{6} = \frac{8}{6} = \frac{4}{3}$$