MATH 260 – QUIZ #3   Name: ___KEY___

Directions: Please show all work for maximum credit. This quiz is worth 10 points. Good luck!

1. Given the following matrix A.

$$A = \begin{bmatrix} 4 & 2 & -3 \\ 5 & -3 & 0 \\ 2 & 4 & -5 \end{bmatrix}$$

(2 points) a. Use cofactors to find det(A).

$$-5 \begin{vmatrix} 2 & -3 \\ 4 & -5 \end{vmatrix} + (-3) \begin{vmatrix} 4 & -3 \\ 2 & -5 \end{vmatrix} = -5(-10+12) + (-3)(-20+6)$$

$$= -5(2) + (-3)(-14)$$

$$= -10 + 42 = 32$$

(3 points) b. Find adj(A).

$$M_C = \begin{bmatrix} 15 & 25 & 26 \\ -2 & -14 & -12 \\ -9 & -15 & -22 \end{bmatrix}$$

$$adj(A) = = \begin{bmatrix} 15 & -2 & -9 \\ 25 & -14 & -15 \\ 26 & -12 & -22 \end{bmatrix}$$

2. Given that A and B are 3x3 matrices and that $\det(A) = 4$ and $\det(B) = 3$.

(1 point) a. Find $\det(AB)$. $\det(A) \cdot \det(B) = 4 \cdot 3 = 12$

(1 point) b. If matrix C is the result of performing $2R_1$ to matrix A, find $\det(C)$. $2 \cdot 4 = 8$

$\det(C) = 2 \cdot \det(A)$

(1 point) c. If matrix D is the result of performing $5R_2 + R_3 \rightarrow R_3$ to matrix B, find $\det(D)$. 3

$\det(D) = \det(B)$

(2 points) 3. Use Cramer's Rule to solve the following system of linear equations, if possible.

$$18x_1 + 12x_2 = 13$$
$$30x_1 + 24x_2 = 23$$

$$x_1 = \frac{\begin{vmatrix} 13 & 12 \\ 23 & 24 \end{vmatrix}}{\begin{vmatrix} 18 & 12 \\ 30 & 24 \end{vmatrix}} = \frac{312 - 276}{432 - 360} = \frac{36}{72} = \frac{1}{2}$$

$$x_2 = \frac{\begin{vmatrix} 18 & 13 \\ 30 & 23 \end{vmatrix}}{72} = \frac{414 - 390}{72} = \frac{24}{72} = \frac{1}{3}$$

$$\left(\frac{1}{2}, \frac{1}{3} \right)$$