Calculus 1 — Chapter 8 Mock Quiz

Name: _____ Period: _____ Date: _____

40 points | 40 minutes | No Calculator

Show all work. Use proper matrix notation. Simplify all entries.

1. Matrix Basics (4 points)

$$A = \begin{bmatrix} 3 & -2 \\ 5 & 0 \\ 4 & 7 \end{bmatrix}$$

(a) Order of A? [1 pt]

(b) Find a_{23}. [1 pt]

(c) Find x and y. [2 pts]

$$\begin{bmatrix} x & 2 & -1 \\ y & -3 \end{bmatrix} = \begin{bmatrix} 5 & 2 & -1 \\ -3 \end{bmatrix}$$

2. Matrix Operations (6 points)

$$A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}, \qquad B = \begin{bmatrix} -1 & 3 \\ 2 & -2 \end{bmatrix}$$

(a) $A + B$ [2 pts]

(b) $A - B$ [2 pts]

(c) $2A - B$ [2 pts]

3. Matrix Multiplication (6 points)

$$A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 3 & 2 \end{bmatrix}, \qquad B = \begin{bmatrix} 2 & 1 \\ 1 & 0 \\ -1 & 2 \end{bmatrix}$$

(a) Order of AB? [1 pt]

(b) Calculate AB, showing row-column products. [4 pts]

(c) Is BA defined? Give its order. [1 pt]

4. Matrix Equation (3 points)

Find x and y. Show your equations.

$$[2x + 1\ 3\ \ -\ 2\ y\ -\ 4\ ] = [9\ 3\ \ -\ 2\ 2\ ]$$

5. Determinants (4 points)

$$A = [3\ 2\ 6\ 4\ ], \qquad B = [2\ 1\ 3\ 4\ ]$$

(a) Find $det(A)$ and $det(B)$. [2 pts]

(b) Which matrix has no inverse? Explain. [2 pts]

6. (5 points)

Find A^{-1}.

$$A = [3\ 5\ 2\ 3\ ]$$

7. (4 points)

Find A^{-1}.

$$A = [3\ 2\ 3\ 3\ ]$$

8. (8 points)

Use an inverse matrix to solve: $2x + y = 7, x + y = 5$.

Recall: In $AX = B$, A contains the coefficients, X is the column matrix of unknowns, and B contains constants.

$$X = [x\ y\ ]$$

(a) Write $AX = B$. [2 pts]

(b) Find $det(A)$. [1 pt]

(c) Find A^{-1}. [2 pts]

(d) Find X. ($X = A^{-1}B$). [2 pts]

(e) Find(x, y). [1 pt]