Name:

Math 207 Section A, Quiz 2

1. Perform the indicated operation. If operation is undefined, say undefined.

$$A = \begin{bmatrix} 1 & 1 & 0 \\ 0 & -2 & 4 \end{bmatrix}, \qquad B = \begin{bmatrix} 0 & 1 & 0 \\ 2 & -1 & 6 \end{bmatrix}$$

(a) (4 points) $2A - B$

$$2\begin{bmatrix} 1 & 1 & 0 \\ 0 & -2 & 4 \end{bmatrix} - \begin{bmatrix} 0 & 1 & 0 \\ 2 & -1 & 6 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & 2 & 0 \\ 0 & -4 & 8 \end{bmatrix} - \begin{bmatrix} 0 & 1 & 0 \\ 2 & -1 & 6 \end{bmatrix}$$

$$= \begin{bmatrix} 2 & 1 & 0 \\ -2 & -3 & 2 \end{bmatrix}$$

(b) ~~(4 points)~~ AB

$$\begin{bmatrix} 1 & 1 & 0 \\ 0 & -2 & 4 \end{bmatrix}\begin{bmatrix} 0 & 1 & 0 \\ 2 & -1 & 6 \end{bmatrix}$$

$2 \times 3 \qquad 2 \times 3$

Middle numbers not equal, so undefined

(c) (4 points) AB^T

$$\begin{bmatrix} 1 & 1 & 0 \\ 0 & -2 & 4 \end{bmatrix}\begin{bmatrix} 0 & 2 \\ 1 & -1 \\ 0 & 6 \end{bmatrix} = \begin{bmatrix} 1 & 1 \\ -2 & 26 \end{bmatrix}$$

3. (8 points) Use linear algebra to determine the polynomial function that whose graph passes through the given points

$$(0,0), (1,1), (2,0)$$

$p(x) = a_0 + a_1 x + a_2 x^2$

$p(0) = a_0 = 0$

$p(1) = a_0 + a_1 + a_2 = 1$

$p(2) = a_0 + 2a_1 + 4a_2 = 0$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 \\ 1 & 2 & 4 & 0 \end{array}\right]$$

$-R_1 + R_2$, $-R_1 + R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \\ 0 & 2 & 4 & 0 \end{array}\right]$$

$-2R_2 + R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 2 & -2 \end{array}\right]$$

$1/2\, R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & -1 \end{array}\right]$$

$-R_2 + R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & -1 \end{array}\right]$$

$a_0 = 0$

$a_1 = 2$

$a_2 = -1$

$p(x) = 2x - x^2$