17. (10pts) Use the substitution method to solve the system of equations $\begin{cases} x^2 + y = 0 & -(1) \\ x^3 - 6x - y = 0 & -(2) \end{cases}$

(1) $\Rightarrow$ $y = -x^2$ sub in (2)

$x^3 - 6x - (-x^2) = 0$

$x^3 + x^2 - 6x = 0$

$x(x^2 + x - 6) = 0$

$x(x+3)(x-2) = 0$

$x = 0 \quad x = -3 \quad x = 2$

$x = 0 \Rightarrow y = 0$

$x = -3 \Rightarrow y = -9$

$x = 2 \Rightarrow y = -4$

18. (10pts) Write the system of linear equations whose augmented matrix is given below (use x, y, z as variables). Then use the back-substitution method to solve the system of linear equations.

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

$x - y + 2z = 4 \quad -(1)$

$y - z = 2 \quad -(2)$

$z = -2 \quad -(3)$

(3) $\Rightarrow$ $z = -2$

(2) $\Rightarrow$ $y - (-2) = 2 \Rightarrow y = 0$

(1) $\Rightarrow$ $x - 0 + 2(-2) = 4 \Rightarrow x = 8$

$x = 8, \ y = 0, \ z = -2$

19. (10pts) Compute the following, where $A = \begin{bmatrix} 2 & -1 \\ 1 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 0 \\ 2 & -3 \end{bmatrix}$.

(a) $AB = \begin{bmatrix} -2 & 3 \\ 8 & -12 \end{bmatrix}$

(b) $BA = \begin{bmatrix} 0 & 0 \\ 1 & -14 \end{bmatrix}$

By Calculator

20. (10pts) Given the matrix $A = \begin{bmatrix} 3 & 2 & 2 \\ 1 & 1 & 1 \\ -4 & 4 & 3 \end{bmatrix}$, use a calculator to do the following (write the major operational key strokes you used): **Your calculator model is** TI-83 Plus

(a). compute the reduced row-Echelon form of A;

[MATRIX] ▷ MATH ▷ [B: rref] [MATRIX] A [)] [ENTER]

$$\text{rref}(A) = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

(b). compute the inverse matrix A^{-1} of A, (if A^{-1} does not exist, say so).

[MATRIX] A [x^{-1}] [ENTER]

$$A^{-1} = \begin{bmatrix} 1 & -2 & 0 \\ 7 & -17 & 1 \\ -8 & 20 & -1 \end{bmatrix}$$

pg score