

**MATH221**

Midterm #1, 02/25/16

Total 100

Show all work legibly.

Name: \_\_\_\_\_

1. (25) Solve the system

$$\begin{array}{rclcl} x_1 & +5x_2 & +8x_3 & = & 0 \\ 2x_1 & & -4x_3 & = & -10 \\ & x_2 & +3x_3 & = & 2 \end{array}$$

$x_1 =$

$x_2 =$

$x_3 =$

2. (25) Determine values of  $h$  for which the system

$$-4x_1 + 12x_2 = 0, \quad hx_1 - 6x_2 = -3$$

- (15) Has no solutions.

$h$  is:

- (10) Has only one solution

$h$  is:

3. (25) Let  $A = \begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$ .

(a) (10) Find  $A^{-1}$  if exists.

$$A^{-1} =$$

(b) (15) If  $B$  is a  $2 \times 3$  matrix so that  $AB = C = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$ . Find  $B$ .

$B =$

4. (25) True or False? The vectors

$$\mathbf{v}_1 = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \mathbf{v}_2 = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix}, \mathbf{v}_3 = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$$

are linearly dependent.

Mark one and explain.

True       False