Math 3160 - Test 1

Name:___

ame:______ No calculators and show all work.

1. Solve the following systems of linear equations using row reduction.

$$\begin{cases} x_1 & -2x_2 & +2x_3 & -6x_5 & = 3\\ & & 4x_4 & = 6\\ & & x_4 & +x_5 & = 0\\ & & 2x_2 & -2x_3 & +6x_5 & = 10 \end{cases}$$

2. Solve the following systems of linear equations using row reduction.

ſ	x_1	$+2x_{2}$	$+3x_{3}$	= 3
{	x_1	$+x_{2}$	$+x_{3}$	=2
J	$-x_1$		$-x_3$	= -1

3. Solve the following systems of linear equations using row reduction.

$$\begin{cases} 2x_1 + 2x_2 + 3x_3 = 2\\ x_1 + x_2 + x_3 = 3\\ & x_3 = 0 \end{cases}$$

4. Solve the following systems of linear equations by setting up problem as a matrix problem and by finding an inverse matrix.

ſ	x_1	$+2x_{2}$	$+4x_{3}$	= 0
ł	x_1		$-x_{3}$	=2
l	x_1	$+x_{2}$	$+x_{3}$	= -3

5. Solve the following using Cramer's rules.

ſ	$2x_1$	$-2x_{2}$	$+4x_{3}$	= 2
ł		$-x_{2}$	$+3x_{3}$	= 0
		$-3x_{2}$		= 2

6. Row reduce the matrix B to REF and compute the determinant of the matrix B using the row reduction techniques.

 $B = \left[\begin{array}{rrrr} 1 & 4 & 0 \\ 0 & 3 & 0 \\ 0 & 3 & 5 \end{array} \right]$

- 7. Let P(1, -1, 4), Q(0, 3, 4) and R(2, 0, 0) be points in \mathbb{R}^3 .
 - (a) Compute the area of the triangle formed by the points P, Q and R.
 - (b) What is the volume of the parallel piped formed by the vectors \vec{PQ}, \vec{PR} and $\hat{\jmath}$?
 - (c) What is the angle at the point P in the Triange from Problem 7a?

8. Matrix Problems

- (a) Solve the following for X. Assume A, B, C and X are matrices, and that sss are vectors . Assume an inverse exists when needed.
 - AX = 3X + C
 - $X = (ABA^{-1})^3$