

Math 1210 Assignment 3 - Due: Friday, November 24, 2017

Attempt all questions and show your work. Attach to Honesty Declaration Form.

1. Find the symmetric equations for the line $2x - 3y + z = 2, x + 2y - 2z = 4$.

2.

(a) Find the equation of the plane through the points $(2, -1, 5)$ and $(1, 1, -1)$ and parallel to the line

$$x = 3 - t, y = 2 + 2t, z = 3t.$$

(b) Find the equation of the plane containing the intersecting lines $x - 2 = \frac{y-1}{2} = \frac{z-1}{3}$ and $\frac{x+1}{3} = y = -z + 2$.

3. Find all solutions of the systems of linear equations.

	$2x_1 + 3x_2 = 2$		$3x_1 + 2x_2 + 4x_3 = 4$
(a)	$3x_1 - 2x_2 = 1$	(b)	$2x_1 - 5x_2 + x_3 = 3$
	$4x_1 + 3x_2 = 2$		$2x_1 - 2x_2 + 4x_3 = -6$

4. Find all basic solutions of the homogeneous system:

$$\begin{aligned} 4x_1 - 4x_2 + 2x_3 + 4x_4 - 12x_5 &= 0 \\ 3x_1 - 3x_2 + 2x_3 - 2x_4 - 9x_5 &= 0 \end{aligned}$$

5. Let $A = \begin{bmatrix} 2 & 3 & -1 \\ 1 & -1 & -2 \end{bmatrix}$ and calculate $\det((A^T A)^{10})$.

6. Use Cramer's rule to find the solution of the system

$$\begin{aligned} 3x_1 - 2x_2 + x_3 &= 0 \\ 2x_1 + 4x_2 - x_3 &= 1 \\ 5x_1 - 3x_2 + 2x_3 &= -1 \end{aligned}$$

7. Determine whether the following sets of vectors are linearly dependent or linearly independent. If they are linearly dependent then express one of the vectors as a linear combination of the others.

(a) $\langle 2, 3, -1, -2 \rangle, \langle 7, 2, -3, 10 \rangle, \langle -1, 0, 3, 4 \rangle$

(b) $\langle 2, 2, -1 \rangle, \langle 2, 1, -2 \rangle, \langle 5, -3, 0 \rangle, \langle 3, 1, 1 \rangle$