MATH 2050 – Linear Algebra I – Section 003   Assignment #3
Fall 2012

Instructions

- Answer each question completely; justify your answers.
- This assignment is due at 17:00 on Wednesday October 3rd in Assignment Box #42.

1. Find $\mathsf{u} \times \mathsf{v}$, given that $\mathsf{u} = \begin{bmatrix} -2 \\ 3 \\ 2 \end{bmatrix}$ and $\mathsf{v} = \begin{bmatrix} -3 \\ 4 \\ 7 \end{bmatrix}$

2. Find an equation for the plane containing the points $A(1, 2, 3)$, $B(-1, -4, -7)$ and $C(5, 2, 0)$.

3. Find an equation for the line containing the points $A(4, 3, -10)$ and $B(9, 4, 1)$.

4. Consider the line λ_1 with equation $\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ -2 \\ 7 \end{bmatrix} + t \begin{bmatrix} 1 \\ -3 \\ 5 \end{bmatrix}$ and the line λ_2 with equation

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ -5 \end{bmatrix} + t \begin{bmatrix} -1 \\ 1 \\ -4 \end{bmatrix}.$$

    (a) Are λ_1 and λ_2 parallel?

    (b) Do λ_1 and λ_2 intersect?

    (c) If λ_1 and λ_2 intersect then find the point(s) of intersection.

5. Consider the plane π with equation $5x - 2y + z = 17$ and the line λ with equation $\begin{bmatrix} x \\ y \\ z \end{bmatrix} =$

$$\begin{bmatrix} 6 \\ 1 \\ 2 \end{bmatrix} + t \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}.$$

    (a) Identify a normal to π.

    (b) Identify a direction vector for λ.

    (c) Do π and λ intersect?

    (d) If π and λ intersect then find the point(s) of intersection.