ASSIGNMENT 2   **MATHEMATICS 2050**   WINTER 2026

Due: Friday, January 30th, 2026 at 6:00pm. See the Gradescope Handout for submission information.

> **Note:** You should complete the worksheet for Section 1.3 before you work on this assignment.

1. Find the equation of the plane spanned by the vectors $\begin{bmatrix} 3 \\ 0 \\ 1 \end{bmatrix}$ and $\begin{bmatrix} 0 \\ -2 \\ -3 \end{bmatrix}$ and which passes through the point $P(3, 0, 1)$.

2. Consider the line ℓ which passes through the points $P(4, 1, 1)$ and $Q(-2, 3, -7)$.

   (a) Find the vector equation of ℓ.

   (b) Determine whether the point $(-9, 11, -19)$ lies on ℓ.

3. Find the point of intersection of the lines with vector equations

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \\ -6 \end{bmatrix} + t \begin{bmatrix} 2 \\ 0 \\ -5 \end{bmatrix} \quad \text{and} \quad \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ -1 \\ 1 \end{bmatrix} + t \begin{bmatrix} 4 \\ -1 \\ -4 \end{bmatrix}.$$

4. Consider the planes with equations $-3x + 4y + z = 1$ and $5x - 3z = 5$.

   (a) Identify a point which lies on both planes.

   (b) Find the vector equation of the line of intersection of the two planes.