You may use graphing calculators and a Table of Integrals. Each problem is worth 20 points. You MUST show your work. Just the correct answer is not sufficient for any points.

1. \( \mathbf{V} = 3\mathbf{i} - \mathbf{j}, \mathbf{W} = 2\mathbf{i} + 5\mathbf{j} \) are two vectors in the plane.
   a) Find the angle between \( \mathbf{V} \) and \( \mathbf{W} \).
   b) Find the vector which is orthogonal to \( \mathbf{V} \) and counterclockwise from \( \mathbf{W} \).
   c) Find the area of the parallelogram spanned by \( \mathbf{V} \) and \( \mathbf{W} \).

2. A particle moves in the plane according to the equation
   \[ \mathbf{X}(t) = \ln t \mathbf{i} + \frac{1}{t} \mathbf{j} \]

   Find the velocity, speed, acceleration, tangent and normal vectors, and normal acceleration of the particle at any time \( t \).

3. Find the equation of the plane through the point (0,-1,3) which is parallel to the vectors \( \mathbf{I} - 2\mathbf{J} + 2\mathbf{K} \) and \( 3\mathbf{I} - 2\mathbf{J} + \mathbf{K} \).

4. Find the distance of the point \( (2,0,1) \) from the line whose symmetric equations are
   \[ \frac{x - 2}{3} = \frac{y + 1}{4} = \frac{z - 1}{-2} \]

5. A particle moves in space according to the formula \( \mathbf{X}(t) = e^t \mathbf{i} + e^{2t} \mathbf{j} - t\mathbf{K} \). Find the normal acceleration at the point \( t = 0 \).