1. **(15%)** Find the unit vector ($\vec{e}$) that is perpendicular to the plane determined by $\vec{A} = 2\vec{i} - 6\vec{j} - 3\vec{k}$ and $\vec{B} = 4\vec{i} + 3\vec{j} - \vec{k}$.

2. **(10%)** Find $\oint_C [(x+y)dx + (2x-z)dy + (y-z)dz]$, where C is the boundary of a triangle with vertices (2, 0, 0), (0, 3, 0), and (0, 0, 4).

3. **(15%)** If $A = \begin{bmatrix} 1 & 2 \\ 3 & -4 \end{bmatrix}$ and $p(x) = x^2 + 5x + 4$, compute $p(A)$.

4. **(10%)** Find the solution for $(1 - \cos\theta)dr = r\sin\theta d\theta$

5. **(15%)** Compute the area of the triangle with the following three vertices: P(2, 3, 5), Q(4, 2, -1), and R(3, 6, 4).

6. **(15%)** If $A = \begin{bmatrix} 1 & 2 & 4 \\ -1 & 0 & 3 \\ 3 & 1 & -2 \end{bmatrix}$, find A^{-1}

7. **(10%)** Find the solution for $(2x - 5y + 3)dx - (2x + 4y - 6)dy = 0$

8. **(10%)** Find the solution for $y'' + y' - 2y = 0$ with the initial conditions of $y(0) = 4$ and $y'(0) = 1$

試題隨卷繳回