1. A curve has equation $y = x^3 + 2x - 4$.

   (a) Show that the line $y = 2x + 4$ intersects the curve at the point (2,8).
   (b) Show that there are no other points of intersection between the curve and the line.

2. The roots of $mx^2 + 4mx + 16 = 0$ are equal. Find the value of m.

3. Evaluate $\int_0^1 x^2 - 2x^{\frac{1}{2}} + 3 \ dx$

4. Solve ½ $\text{Log}_x 16 = 2$.

5. Prove that $\dfrac{\text{Sin } (A-B)}{\text{CosACosB}} = \text{TanA} - \text{TanB}$

6. By writing $225°$ as $180° + 45°$, simplify $\text{Sin } 135° + \text{Cos} 135°$

7. The line with equation $x - 3y = k$ is a tangent to the circle with equation
   $x^2 + y^2 - 6x + 8y + 15 = 0$. Find the possible value(s) of k.

8. A function f exists where f(x) = ¼ (3x + 1).

   a) Find the inverse of this function $f^{-1}(x)$.
   b) Hence evaluate $f^{-1}(4)$

9. Sketch the graphs of y = Sin 2x and y = Sin $(2x + \frac{\pi}{3})$ for $0 \le x \le 2\pi$.

10. The vectors $\mathbf{a} = 2\mathbf{i} + 3\mathbf{j} - \mathbf{k}$ and $\mathbf{b} = 3\mathbf{i} - \mathbf{j} + x\mathbf{k}$ are perpendicular. Find the value of x.