HOME EXERCISE 4

Set out carefully all appropriate working. Do not use a calculator.

1.
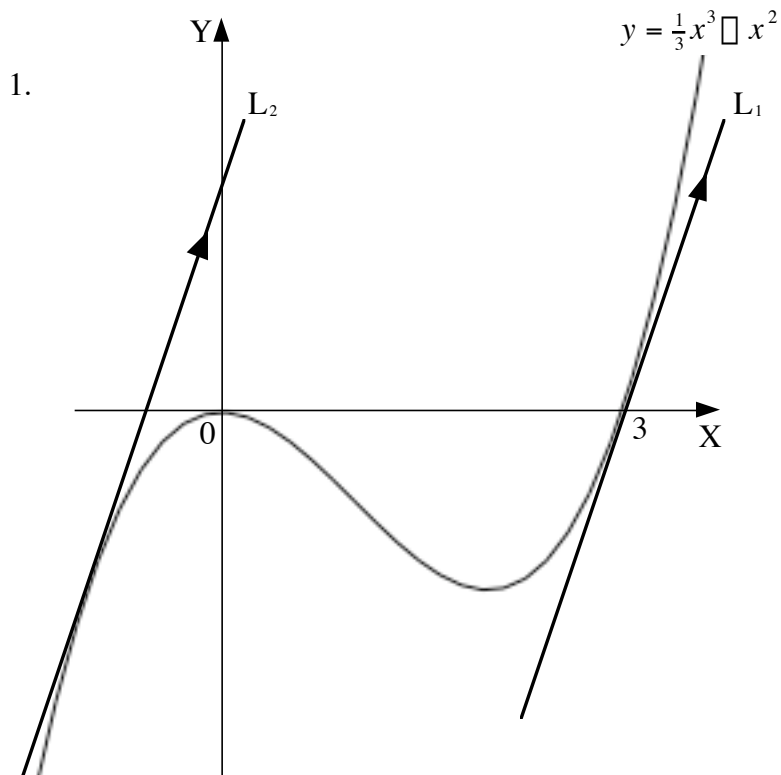
$$y = \tfrac{1}{3}x^3 - x^2$$

The graph with equation $y = \tfrac{1}{3}x^3 - x^2$ is shown.

(a) Line L_1 is a tangent to the graph at the point $(3,0)$.

Find the equation of line L_1. (3)

(b) Line L_2 is also a tangent to the graph and is parallel to line L_1.

Find the x-coordinate of the point where line L_2 meets the curve. (2)

2. (a) Write $3x^2 + 12x + 20$ the form $a(x + b)^2 + c$. (3)

(b) Hence state the minimum value of $3x^2 + 12x + 20$ and the corresponding value of x. (2)

3. (a) Solve the equation $2\sin x° + \sqrt{3} = 0$, $0 \le x \le 360$. (3)

(b) Hence solve the equation $2\sin(2x - 10)° + \sqrt{3} = 0$, $0 \le x \le 180$. (2)

4. If $f(x) = x^2 - 1$ and $g(x) = \sqrt{x + 1}$, $x \ge -1$

(a) write in simplest form: (i) $f(g(x))$ (2)

                             (ii) $g(f(x))$. (2)

(b) Comment on the results of part (a) regarding functions f and g. (1)

Total 20 marks