

Maths Assignment

Question 1

$$\frac{d^2y}{dx^2} = x^2(x-1)^3(x-3)$$

For inflexion points $\frac{d^2y}{dx^2} = 0$

$$x^2(x-1)^3(x-3) = 0$$

$$x^2 = 0$$

$$x = \sqrt{0}$$

$$x = 0$$

$$(x-1)^3 = 0$$

$$x-1 = \sqrt[3]{0}$$

$$x-1 = 0$$

$$x = 1$$

$$x-3 = 0$$

$$x = 3$$

Points of inflexion at $x = 3, x = 1, x = 0$

When $x = \frac{1}{2}, y'' = \frac{5}{64}$

$$x = 2, y'' = -4$$

$$x = 4, y'' = 432$$

$$x = -1, y'' = -32$$

Range of concave up: $0 < x < 1, x > 3$

Range of concave down: $1 < x < 3, x < 0$