**Differentiation – AS Mathematics P1**

**1.** June/2022/Paper_7356/01/No.8

A curve has equation

$$y = x^3 - 6x + \frac{9}{x}$$

**(a)** Show that the $x$ coordinates of the stationary points of the curve satisfy the equation

$$x^4 - 2x^2 - 3 = 0$$

**[3 marks]**

**(b)** Deduce that the curve has exactly two stationary points.

**[3 marks]**

**(c)** Find the coordinates and nature of the two stationary points.

Fully justify your answer.

**[4 marks]**

**(d)** Write down the equation of a line which is a tangent to the curve in two places.

**[1 mark]**

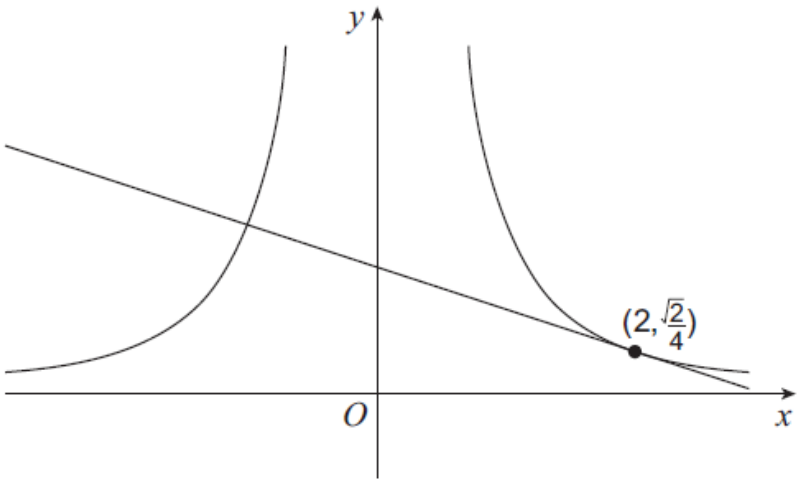
**2.** June/2022/Paper_7356/01/No.10

Curve $C$ has equation $y = \frac{\sqrt{2}}{x^2}$

**(a)** Find an equation of the tangent to $C$ at the point $\left(2, \frac{\sqrt{2}}{4}\right)$

**[4 marks]**

**(b)** Show that the tangent to $C$ at the point $\left(2, \frac{\sqrt{2}}{4}\right)$ is also a normal to the curve at a different point.




**[5 marks]**