

Cambridge International AS & A Level

Mathematics 9709

Paper 1 Pure Mathematics 1

Topic 1-Quadratics

Question No (1)

<http://kingcambridgesolutions.com>

WhatsApp +923454231525

Rs:300/Paper

Question No (1)

Find the value of the constant c for which the line $y = 2x + c$ is a tangent to the curve

$$y^2 = 4x$$

Solution

Given equation

$$y = 2x + c \rightarrow \textcircled{1}$$

and

$$y^2 = 4x \rightarrow \textcircled{2}$$

put value of $\textcircled{1}$ in $\textcircled{2}$

$$(2x + c)^2 = 4x$$

$$4x^2 + 4xc + c^2 = 4x$$

$$4x^2 + 4xc - 4x + c^2 = 0$$

$$4x^2 + (4c - 4)x + c^2 = 0$$

As the line is tangent to the curve

$$\Rightarrow b^2 - 4ac = 0$$

$$a = 4, \quad b = 4c - 4, \quad c = c^2$$

$$(4c - 4)^2 - 4(4)(c^2) = 0$$

$$16c^2 - 32c + 16 - 16c^2 = 0$$

$$-32c + 16 = 0$$

$$-32c = -16$$

$$c = -\frac{16}{-32}$$

$$c = \frac{1}{2}$$

