

- 1** Find the coordinates of the midpoint of the straight line joining the points of intersection of the curve $2x^2 + x = 2y - 3y^2 + 8$ and the line $y = x - 2$. [5]

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$$\text{Sub } y = x - 2 \text{ into } 2x^2 + x = 2y - 3y^2 + 8$$

$$2x^2 + x = 2(x - 2) - 3(x - 2)^2 + 8$$

$$5x^2 - 13x + 8 = 0$$

$$x = \frac{8}{5} \quad \text{or} \quad x = 1$$

$$y = -\frac{2}{5} \quad \text{or} \quad y = 1$$

$$\left(\frac{8}{5}, -\frac{2}{5}\right) \quad (1, 1)$$

The coordinate of midpoint $\left(\frac{13}{10}, -\frac{7}{10}\right)$

