1 Find the coordinates of the points at which the straight line $y + 2x = 7$ intersects the curve $y^2 = xy - 1$. [4]

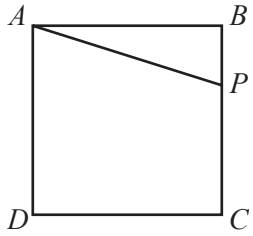
1 Find the values of k for which the line $y = kx - 2$ meets the curve $y^2 = 4x - x^2$. [4]

5 Find the distance between the points of intersection of the curve $y = 3 + \frac{4}{x}$ and the line $y = 4x + 9$. [6]

2 Find the x-coordinates of the three points of intersection of the curve $y = x^3$ with the line $y = 5x - 2$, expressing non-integer values in the form $a \pm \sqrt{b}$, where a and b are integers. [5]

5 The straight line $5y + 2x = 1$ meets the curve $xy + 24 = 0$ at the points A and B. Find the length of AB, correct to one decimal place. [6]

3



The diagram shows a square $ABCD$ of area $60\,\text{m}^2$. The point P lies on BC and the sum of the lengths of AP and BP is 12 m. Given that the lengths of AP and BP are x m and y m respectively, form two equations in x and y and hence find the length of BP. [5]

7 Solve, for x and y, the simultaneous equations

$$125^x = 25(5^y),$$

$$7^x \div 49^y = 1.$$

[6]

2 The line $y + 4x = 23$ intersects the curve $xy + x = 20$ at two points, A and B. Find the equation of the perpendicular bisector of the line AB. [6]

3 The line $y = 3x + k$ is a tangent to the curve $x^2 + xy + 16 = 0$.

(i) Find the possible values of k. [3]

(ii) For each of these values of k, find the coordinates of the point of contact of the tangent with the curve. [2]

3 Find the coordinates of the points where the straight line $y = 2x - 3$ intersects the curve $x^2 + y^2 + xy + x = 30$. [5]

2 The equation of a curve is $y = x^3 - 8$. Find the equation of the normal to the curve at the point where the curve crosses the x-axis. [4]

4 The line $y = 5x - 3$ is a tangent to the curve $y = kx^2 - 3x + 5$ at the point A. Find

(i) the value of k, [3]

(ii) the coordinates of A. [2]

10 The line $2x + y = 12$ intersects the curve $x^2 + 3xy + y^2 = 176$ at the points A and B. Find the equation of the perpendicular bisector of AB. [9]

1 Find the coordinates of the points of intersection of the curve $y^2 + y = 10x - 8x^2$ and the straight line $y + 4x + 1 = 0$. [5]

6 The line $y = x + 4$ intersects the curve $2x^2 + 3xy - y^2 + 1 = 0$ at the points A and B. Find the length of the line AB. [7]

where n is a positive integer and $\binom{n}{r} = \frac{n!}{(n-r)!r!}$.