

1 Solve the simultaneous equations

$$\begin{aligned}3xy - y^2 &= 8 \\ x - 2y &= 1\end{aligned}$$

Show clear algebraic working.

(Total for Question 1 is 5 marks)

2 Solve the simultaneous equations

$$\begin{aligned}x - 6y &= 5 \\ xy - 2y^2 &= 6\end{aligned}$$

Show clear algebraic working.

(Total for Question 2 is 5 marks)

3 Solve the simultaneous equations

$$2x^2 + 3y^2 = 14$$

$$x = 2y - 3$$

Show clear algebraic working.

(Total for Question 3 is 5 marks)

4 Solve the simultaneous equations

$$\begin{aligned}y &= 3 - 2x \\ x^2 + y^2 &= 18\end{aligned}$$

Show clear algebraic working.

(Total for Question 4 is 5 marks)

5 Solve the simultaneous equations

$$\begin{aligned}3x^2 + y^2 - xy &= 5 \\ y &= 2x - 3\end{aligned}$$

Show clear algebraic working.

(Total for Question 5 is 5 marks)

6 Solve the simultaneous equations

$$x^2 - 9y - x = 2y^2 - 12$$

$$x + 2y - 1 = 0$$

Show clear algebraic working.

(Total for Question 6 is 5 marks)

7 Solve the simultaneous equations

$$\begin{aligned}x - 2y &= 3 \\ x^2 - y^2 + 2x &= 10\end{aligned}$$

Show clear algebraic working.

(Total for Question 7 is 5 marks)

8 Solve the simultaneous equations

$$2x^2 + 3y^2 = 5$$

$$y = 2x + 1$$

Show clear algebraic working.

(Total for Question 8 is 5 marks)

9 The centre of a circle is the point with coordinates $(-1, 3)$

The point A with coordinates $(6, 8)$ lies on the circle.

Find an equation of the tangent to the circle at A .

Give your answer in the form $ax + by + c = 0$ where a , b and c are integers.

(Total for Question 9 is 4 marks)

10 A circle has equation $x^2 + y^2 = 12.25$

The point P lies on the circle.

The coordinates of P are $(2.1, 2.8)$

The line L is the tangent to the circle at point P .

Find an equation of L .

Give your answer in the form $ax + by = c$, where a , b and c are integers.

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(Total for Question 10 is 4 marks)

11 **L** is the circle with equation $x^2 + y^2 = 4$

$P\left(\frac{3}{2}, \frac{\sqrt{7}}{2}\right)$ is a point on **L**.

Find an equation of the tangent to **L** at the point P .

(Total for Question 11 is 3 marks)

- 12** Prove algebraically that the straight line with equation $x - 2y = 10$ is a tangent to the circle with equation $x^2 + y^2 = 20$

(Total for Question 12 is 5 marks)

- 13** The line with equation $2y = x + 1$ intersects the curve with equation $3y^2 + 7y + 16 = x^2 - x$ at the points A and B

Find the coordinates of A and the coordinates of B
Show clear algebraic working.

(.....,) and (.....,)

(Total for Question 13 is 5 marks)

- 14** The line with equation $y = x + 2$ intersects the curve with equation $x^2 + y^2 - 2y = 24$ at the points A and B .

Find the coordinates of A and B .

Show clear algebraic working.

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(..... ,)

(Total for Question 14 is 5 marks)

15

The curve with equation $y = (10x - 3)(x + 1)$ and the line with equation $y - 6x = 0$ intersect at the points A and B .

Find the coordinates of the midpoint of AB .

Show your working clearly.

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(Total for Question 15 is 6 marks)

- 16** The curve with equation $x^2 - x + y^2 = 10$ and the straight line with equation $x - y = -4$ intersect at the points A and B .

Work out the exact length of AB .

Show your working clearly and give your answer in the form $\frac{\sqrt{a}}{2}$ where a is an integer.

(Total for Question 16 is 6 marks)

- 17** The equation of the line **L** is $y = 9 - x$
The equation of the curve **C** is $x^2 - 3xy + 2y^2 = 0$

L and **C** intersect at two points.

Find the coordinates of these two points.
Show clear algebraic working.

(..... ,) and (..... ,)

(Total for Question 17 is 5 marks)

- 18** The straight line **L** has equation $x - y = 3$
The curve **C** has equation $3x^2 - y^2 + xy = 9$

L and **C** intersect at the points *P* and *Q*.

Find the coordinates of the midpoint of *PQ*.
Show clear algebraic working.

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(Total for Question 18 is 6 marks)