1 The curve **C** has equation $y = x^2 + 3x - 3$

The line **L** has equation $y - 5x + 4 = 0$

Show, algebraically, that **C** and **L** have exactly one point in common.

(Total for Question 1 is 4 marks)

2 The point P has coordinates (3, 4)
The point Q has coordinates (a, b)

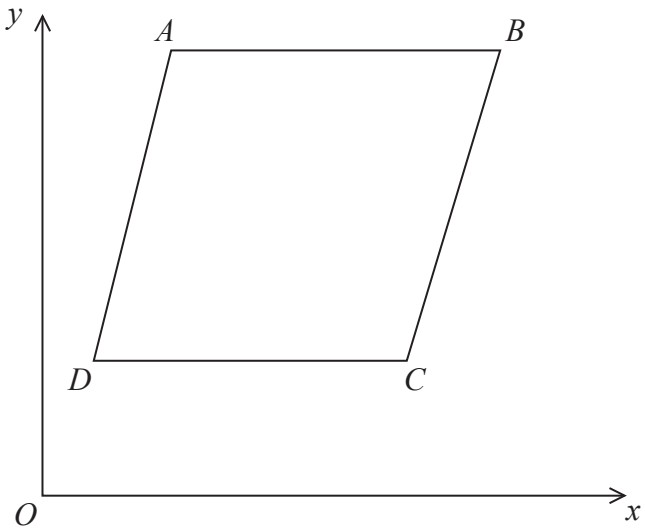
A line perpendicular to PQ is given by the equation $3x + 2y = 7$

Find an expression for b in terms of a.

.....

(Total for Question 2 is 5 marks)

3



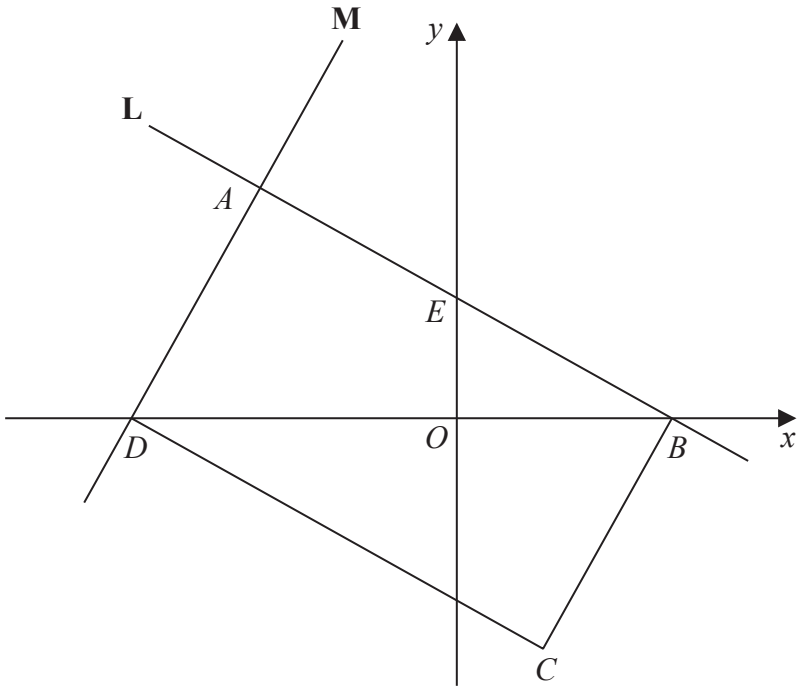
ABCD is a rhombus.
The coordinates of *A* are $(5, 11)$
The equation of the diagonal *DB* is $y = \frac{1}{2}x + 6$

Find an equation of the diagonal *AC*.

.....

(Total for Question 3 is 4 marks)

4



ABCD is a rectangle.

A, *E* and *B* are points on the straight line **L** with equation $x + 2y = 12$
A and *D* are points on the straight line **M**.

$AE = EB$

Find an equation for **M**.

.....

(Total for Question 4 is 4 marks)

5 Line **L** has equation $4y - 6x = 33$

Line **M** goes through the point A (5, 6) and the point B (−4, k)

L is perpendicular to **M**.

Work out the value of k.

(Total for Question 5 is 4 marks)

6 The straight line $\mathbf{L}_1$ passes through the points with coordinates (4, 6) and (12, 2)
The straight line $\mathbf{L}_2$ passes through the origin and has gradient -3

The lines $\mathbf{L}_1$ and $\mathbf{L}_2$ intersect at point P.

Find the coordinates of P.

(..... , ...)

(Total for Question 6 is 4 marks)

7 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 7 is 5 marks)

8 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 8 is 4 marks)

9 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.

.....

(Total for Question 9 is 4 marks)

10 The line l is a tangent to the circle $x^2 + y^2 = 40$ at the point A.
A is the point (2, 6).

The line l crosses the x-axis at the point P.

Work out the area of triangle OAP.

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(Total for Question 10 is 5 marks)

11 The straight line **L** has equation $3x + 2y = 17$

The point A has coordinates (0, 2)
The straight line **M** is perpendicular to **L** and passes through A.

Line **L** crosses the y-axis at the point B.
Lines **L** and **M** intersect at the point C.

Work out the area of triangle ABC.
You must show all your working.

.....

(Total for Question 11 is 5 marks)

12 $A(-2, 1)$, $B(6, 5)$ and $C(4, k)$ are the vertices of a right-angled triangle ABC.
Angle ABC is the right angle.

Find an equation of the line that passes through A and C.
Give your answer in the form $ay + bx = c$ where a, b and c are integers.

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(Total for Question 12 is 5 marks)