1 The point A has coordinates $(5, -4)$
The point B has coordinates $(13, 1)$

(a) Work out the coordinates of the midpoint of AB.

(..... , ...)

(2)

Line **L** has equation $y = 2 - 3x$

(b) Write down the gradient of line **L**.

.....

(1)

Line **L** has equation $y = 2 - 3x$

(c) Does the point with coordinates $(100, -302)$ lie on line **L**?
You must give a reason for your answer.

.....

.....

.....

(1)

(Total for Question 1 is 4 marks)

2 Point A has coordinates $(-3, 11)$
Point B has coordinates $(47, b)$
The midpoint of AB has coordinates $(a, -19)$

Find the value of a and the value of b.

$a =$ .....

$b =$ .....

(Total for Question 2 is 2 marks)

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3 Find the gradient of the straight line with equation $5x + 2y = 7$

.....

(Total for Question 3 is 2 marks)

---

4 The straight line **L** has equation $2y + 7x = 10$

(a) Find the gradient of **L**

.....

(2)

(b) Find the coordinates of the point where **L** crosses the y-axis.

(..... , ...)

(1)

(Total for Question 4 is 3 marks)

5 The straight line $\mathbf{L}_1$ has equation $x + 2y = 4$
The straight line $\mathbf{L}_2$ passes through the points $(-1, -7)$ and $(7, 9)$

Michael says that the lines $\mathbf{L}_1$ and $\mathbf{L}_2$ are perpendicular.

Is Michael correct?
You must show clearly how you get your answer.

(Total for Question 5 is 3 marks)

6 Point A has coordinates (5, 8)
Point B has coordinates (9, –4)

(a) Work out the gradient of AB.

.....

(2)

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

(b) Write down the gradient of a straight line that is perpendicular to **L**.

.....

(1)

(Total for Question 6 is 3 marks)

7 Two circles, C_1 and C_2, are drawn on a centimetre grid, with a scale of 1 cm for 1 unit on each axis.

The centre of circle C_1 is at the point with coordinates (–1, 3) and the radius of C_1 is 13 cm.

The centre of circle C_2 is at the point with coordinates (7, 18) and the radius of C_2 is 6 cm.

(a) Work out the distance between the centre of C_1 and the centre of C_2

..... cm

(3)

(b) Explain why circle C_1 intersects circle C_2

.....

.....

(1)

(Total for Question 7 is 4 marks)

8 The straight line $\mathbf{L}_1$ has equation $y = 6 - 2x$
The straight line $\mathbf{L}_2$ is perpendicular to $\mathbf{L}_1$ and passes through the point (4, 7)

Find the coordinates of the point where the line $\mathbf{L}_2$ crosses the x-axis.

(..... , ...)

(Total for Question 8 is 4 marks)

9 The straight line $\mathbf{L}_1$ has equation $2y = 6x - 5$

The straight line $\mathbf{L}_2$ is perpendicular to $\mathbf{L}_1$ and passes through the point $(9, -1)$

Find an equation for $\mathbf{L}_2$
Give your answer in the form $ay + bx = c$

.....

(Total for Question 9 is 4 marks)

10

The straight line **L** passes through the points (4, −1) and (6, 4)

The straight line **M** is perpendicular to **L** and intersects the *y*-axis at the point (0, 8)

Find the coordinates of the point where **M** intersects the *x*-axis.

(..... , ...)

(Total for Question 10 is 4 marks)

11 (a) Write down an equation of a line that is parallel to the line with equation $y = 7 - 4x$

.....

(1)

The line **L** passes through the points with coordinates (–3, 1) and (2, –2)

(b) Find an equation of the line that is perpendicular to **L** and passes through the point with coordinates (–6, 4)
Give your answer in the form $ax + by + c = 0$ where a, b and c are integers.

.....

(4)

(Total for Question 11 is 5 marks)

12 The centre O of a circle has coordinates (4, 7)

The point A, on the circle, has coordinates (6, 11) and AOP is a diameter of the circle.

Find an equation of the tangent to the circle at the point P

.....

(Total for Question 12 is 4 marks)

13 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 13 is 4 marks)

14 $ABCD$ is a rhombus.

The diagonals, AC and BD, intersect at the point M.
The coordinates of M are $(6, -11)$

The points A and C both lie on the line with equation $2y + 7x = 20$

Find the exact coordinates of the point where the line through B and D intersects the y-axis.

(..... , ...)

(Total for Question 14 is 4 marks)

15 ABC is an isosceles triangle with $AB = AC$.

B is the point with coordinates $(-1, 5)$
C is the point with coordinates $(2, 10)$
M is the midpoint of BC.

Find an equation of the line through the points A and M.
Give your answer in the form $py + qx = r$ where p, q and r are integers.

.....

(Total for Question 15 is 5 marks)

16 ABC is an isosceles triangle such that

$AB = AC$
A has coordinates (4, 37)
B and C lie on the line with equation $3y = 2x + 12$

Find an equation of the line of symmetry of triangle ABC.
Give your answer in the form $px + qy = r$ where p, q and r are integers.
Show clear algebraic working.

.....

(Total for Question 16 is 5 marks)