Write your name here

Surname	Other Names

AS/A Level Mathematics

The Equation of a Line

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled..
- Answer the questions in the spaces provided
– there may be more space than you need.
- You should show sufficient working to make your methods clear.
Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.

Information

- The marks for **each** question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

1 The line l passes through the coordinates (2, 1) and (4, –5).

Find an equation for l.

(Total for question 1 is 3 marks)

---

2 The line l_1 has the equation $2x + 3y + 5 = 0$
The line l_2 passes through the coordinates (1, 7) and (5, 1).

Determine, giving full reasons for your answer, whether l_1 and l_2 are parallel, perpendicular or neither.

(Total for question 2 is 4 marks)

---

3 (a) Find an equation of the straight line passing through the points (–2, 5) and (5, –1).
Give your answer in the form $ax + by + c = 0$, where a, b and c are integers. **(3)**

The line crosses the x axis at point A, the y axis at point B and O is the origin.

(b) Find the area of triangle AOB. **(3)**

(Total for question 3 is 6 marks)

---

4 The points A and B have coordinates $(-1, k + 2)$ and $(2k - 3, 8)$ where k is a constant.

Given the gradient of AB is $\frac{1}{3}$

(a) Show that $k = 4$ **(2)**

(b) Find the equation of the line the passes through A and B. **(3)**

(c) Find the equation of the perpendicular bisector of A and B. **(4)**
Give your answer in the form $ax + by + c = 0$

(Total for question 4 is 9 marks)

---

5 The straight line l has equation $2x - 3y + 24 = 0$ and meets the coordinate axis at the points A and B.

Find the distance of the midpoint of AB from the origin.

Give your answer in the form $k\sqrt{13}$

(Total for question 5 is 4 marks)

---

6 The line l_1 has gradient 2 and passes through (5, 7).

(a) Find an equation for l_1 in the form $y = mx + c$ **(2)**

l_2 is perpendicular to l_1 and passes through (0, 1)

(b) Find an equation for l_2. **(2)**

(Total for question 6 is 4 marks)

7 The line l_1 has the equation $5x + 2y - 4 = 0$
The line l_2 has the equation $x - 4y + 1 = 0$

Find the coordinates of the point where l_1 and l_2 intersect.

(Total for question 7 is 3 marks)

---

8 The line l_1 has the equation $2x - 3y - 4 = 0$
The line l_2 is perpendicular to l_1 and passes through the point $(4, -1)$

Find an equation for l_2 in the form $ax + by + c = 0$

(Total for question 8 is 5 marks)

---

9 The line l passes through the points $A(1, 4)$ and $B(-2, 13)$.

(a) Find an equation for l. **(3)**

(b) Find the exact length of AB **(2)**

(Total for question 9 is 5 marks)

---

10 The line l_1 has gradient 3 and passes through (-2, 5).

(a) Find an equation for l_1 in the form $y = mx + c$ **(2)**

l_2 is perpendicular to l_1 and passes through (0, 4)

(b) Find an equation for l_2. **(2)**

(c) Find the coordinates of the point where l_1 and l_2 intersect. **(3)**

(Total for question 10 is 7 marks)

---

11 The line l_1 has the equation $5y - 10 = 2x$
The point P with x coordinate 4 lies on l_1.
The line l_2 is perpendicular to l_1 and passes through the point P.

(a) Find an equation for l_2 in the form $ax + by + c = 0$ **(4)**

The lines l_1 and l_2 cross the x axis at the points Q and R respectively.

(b) Calculate the area of the triangle QPR. **(4)**

(Total for question 11 is 8 marks)