Equations of a Line (gradients, mid-points, perpendicular & parallel lines)

Question Paper 2

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Co-ordinate geometry
Sub-Topic	Equations of a Line
Booklet	Question Paper 2

Time Allowed: **65 minutes**

Score: **/54**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1 Find the equation of the line that

- is perpendicular to the line $y = 3x - 1$

and

- passes through the point (7, 4).

Answer ..... [3]

2 **(a)** A straight line joins the points (–1, –4) and (3, 8).

(i) Find the midpoint of this line.

Answer(a)(i) (..... , ...) [2]

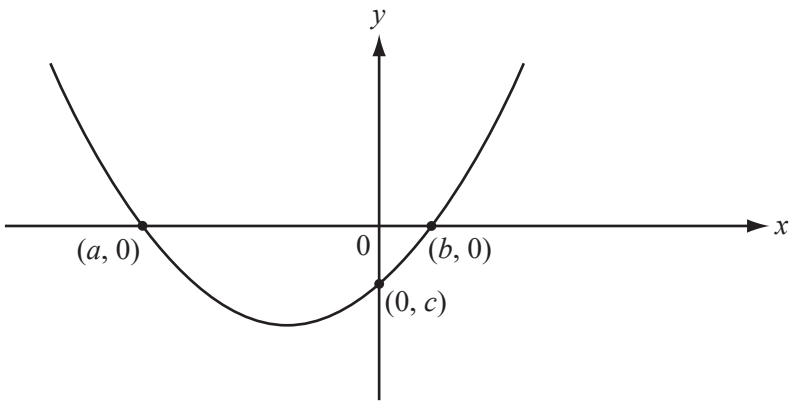
(ii) Find the equation of this line.
Give your answer in the form $y = mx + c$.

Answer(a)(ii) $y =$ ..... [3]

(b) Factorise $x^2 + 3x - 10$.

Answer(b)(i) ..... [2]

(ii) The graph of $y = x^2 + 3x - 10$ is sketched below.



NOT TO SCALE

Write down the values of a, b and c.

Answer(b)(ii) $a =$ .....

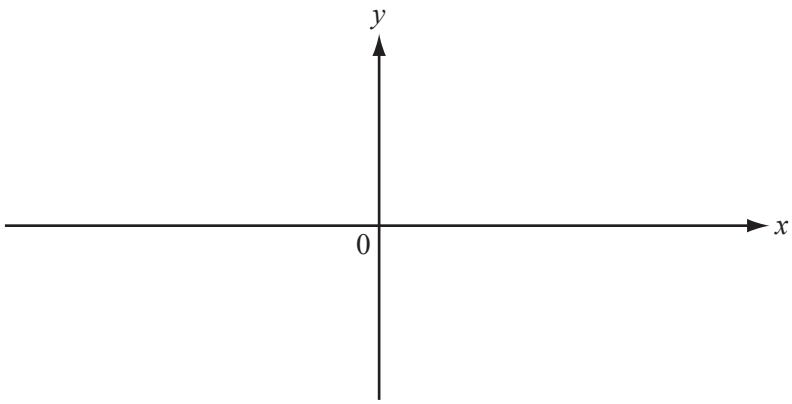
$b =$ .....

$c =$ ..... [3]

(iii) Write down the equation of the line of symmetry of the graph of $y = x^2 + 3x - 10$.

Answer(b)(iii) ..... [1]

(c) Sketch the graph of $y = 18 + 7x - x^2$ on the axes below.
Indicate clearly the values where the graph crosses the x and y axes.



NOT TO SCALE

[4]

(d) $x^2 + 12x - 7 = (x + p)^2 - q$

Find the value of p and the value of q.

Answer(d)(i) p = ...

q = ... [3]

(ii) Write down the minimum value of y for the graph of $y = x^2 + 12x - 7$.

Answer(d)(ii) ..... [1]

3 Find the equation of the line passing through the points with co-ordinates (5, 9) and (–3, 13).

Answer ..... [3]

4 $A(5, 23)$ and $B(-2, 2)$ are two points.

(a) Find the co-ordinates of the midpoint of the line AB.

Answer(a) (..... , ...) [2]

(b) Find the equation of the line AB.

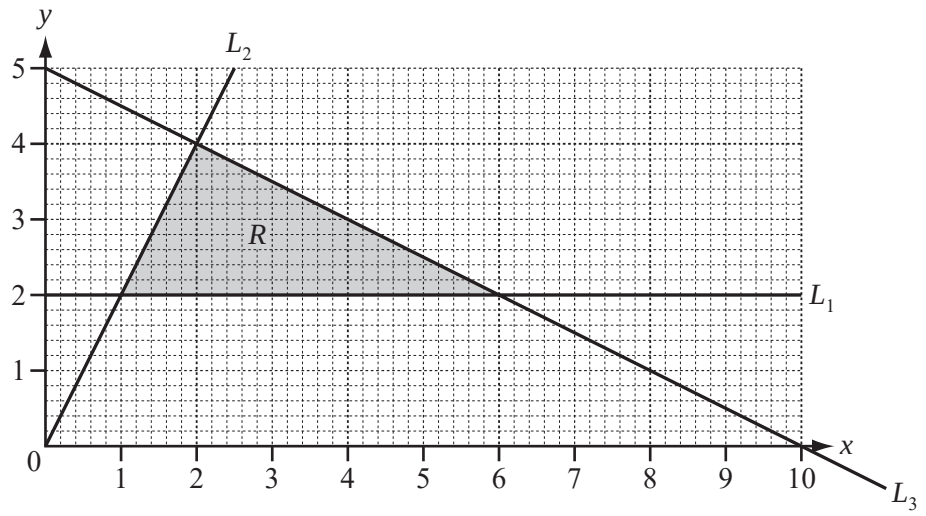
Answer(b) ..... [3]

(c) Show that the point (3, 17) lies on the line AB.

Answer(c)

[1]

5



(a) Find the equations of the lines L_1, L_2 and L_3.

Answer(a) L_1 .....

L_2 .....

L_3 ..... [5]

(b) Write down the three inequalities that define the shaded region, R.

Answer(b) .....

.....

..... [3]

(c) A gardener buys x bushes and y trees.
The cost of a bush is \$30 and the cost of a tree is \$200.
The shaded region R shows the only possible numbers of bushes and trees the gardener can buy.

(i) Find the number of bushes and the number of trees when the total cost is \$720.

Answer(c)(i) ..... bushes

..... trees [2]

(ii) Find the number of bushes and the number of trees which give the greatest possible total cost.
Write down this greatest possible total cost.

Answer(c)(ii) ..... bushes

..... trees

Greatest possible total cost = \$ ..... [3]

6 Find the equation of the line passing through the points (0, –1) and (3, 5).

Answer ..... [3]

7 **(a)** The two lines $y = 2x + 8$ and $y = 2x - 12$ intersect the x-axis at P and Q.

Work out the distance PQ.

Answer(a) $PQ =$ ..... [2]

(b) Write down the equation of the line with gradient -4 passing through (0, 5).

Answer(b) ..... [2]

(c) Find the equation of the line parallel to the line in **part (b)** passing through (5, 4).

Answer(c) ..... [3]