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GCSE MATHS

Algebra

Edexcel 1MA1 | Subtopic collection Topic 20

Simultaneous equations

Higher tier

Past paper question booklet

51	2003-2025	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

11. Solve the simultaneous equations

$$2x + 3y = -3$$

$$3x - 2y = 28$$

$x =$ .....

$y =$ .....

(4)

20. Solve the simultaneous equations

$$x^2 + y^2 = 29$$

$$y - x = 3$$

.....

(7)

blank

11. Solve the simultaneous equations

$$3x - 4y = 13$$
$$2x + 3y = 3$$

$x =$ .....

$y =$ .....

Q11

(Total 4 marks)

blank

23. By eliminating y, find the solutions to the simultaneous equations

$$x^2 + y^2 = 25$$
$$y = x - 7$$

$x =$ ..... $y =$ .....

or $x =$ ..... $y =$ **Q23**

(Total 6 marks)

Blank

14. Solve the simultaneous equations

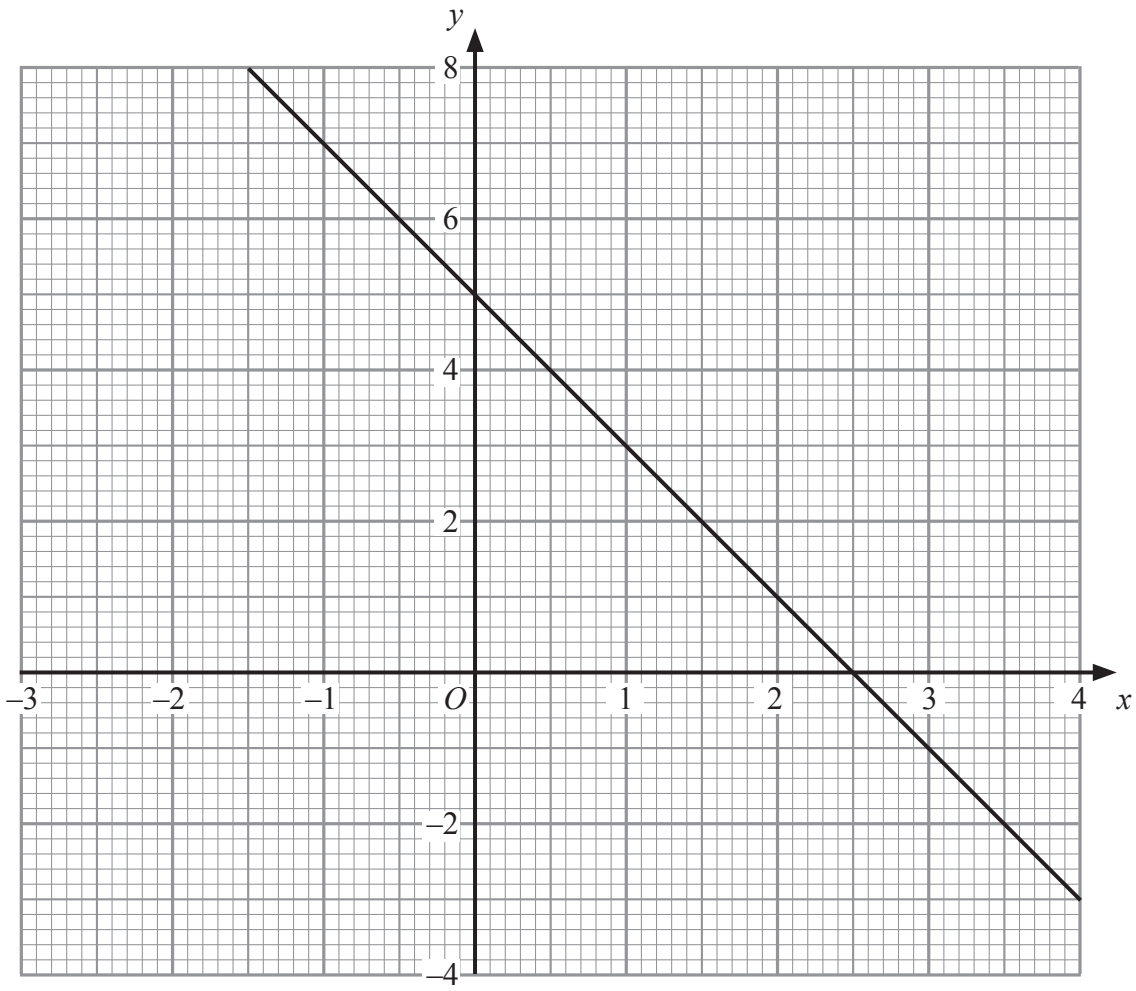
$$4x + 2y = 8$$
$$2x - 5y = 10$$

Q14

$x =$ ..... , $y =$ .....

(Total 3 marks)

8. The straight line $y + 2x = 5$ has been drawn on the grid.



(a) Complete this table of values for $y = 2x - 1$

x	–1	0	1	2	3	4
y		–1		3	5	

(2)

(b) On the grid, draw the graph of $y = 2x - 1$

(2)

(c) Use your diagram to solve the simultaneous equations

$y + 2x = 5$

$y = 2x - 1$

$x =$ .....

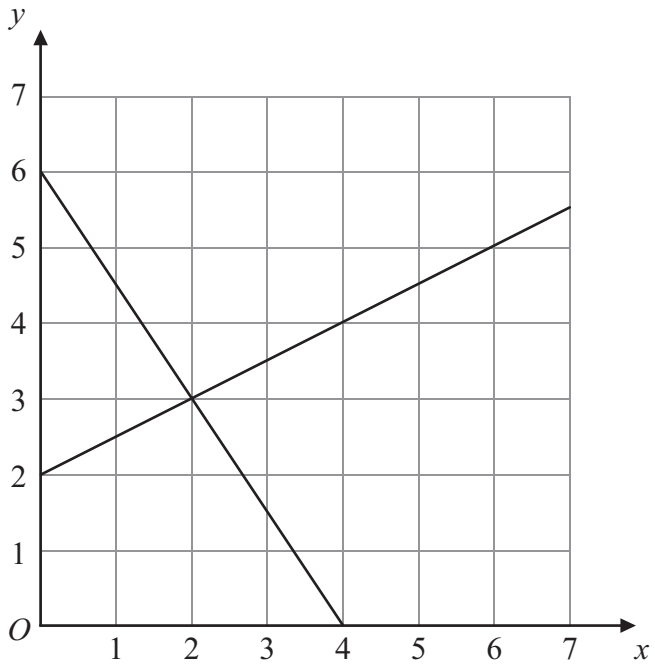
$y =$ .....

(2)

(Total 6 marks)

Q8

19.



The diagram shows graphs of $y = \frac{1}{2}x + 2$

and $2y + 3x = 12$

(a) Use the diagram to solve the simultaneous equations

$$y = \frac{1}{2}x + 2$$

$$2y + 3x = 12$$

$x =$ ..... $y =$ .....

(1)

(b) Find an equation of the straight line which is parallel to the line $y = \frac{1}{2}x + 2$ and passes through the point (0, 4).

.....

(2)

(Total 3 marks)

Q19

20. Solve the simultaneous equations

$$4x + y = -1$$

$$4x - 3y = 7$$

$x =$ ..... $y =$ .....

(Total 3 marks)

Q20

Blank

21. Solve the simultaneous equations

$$3x + 2y = 8$$
$$2x + 5y = -2$$

$x =$ .....

$y =$ .....

Q21

(Total 4 marks)

Blank

21. Solve the simultaneous equations

$$6x + 2y = -3$$
$$4x - 3y = 11$$

$x =$ ....., $y =$ .....

Q21

(Total 4 marks)

19. Solve the simultaneous equations

$$4x + y = 10$$
$$2x - 3y = 19$$

$x =$ .....

$y =$ .....

(Total 3 marks)

Q19

12. Solve the simultaneous equations

$$3x + 4y = 200$$
$$2x + 3y = 144$$

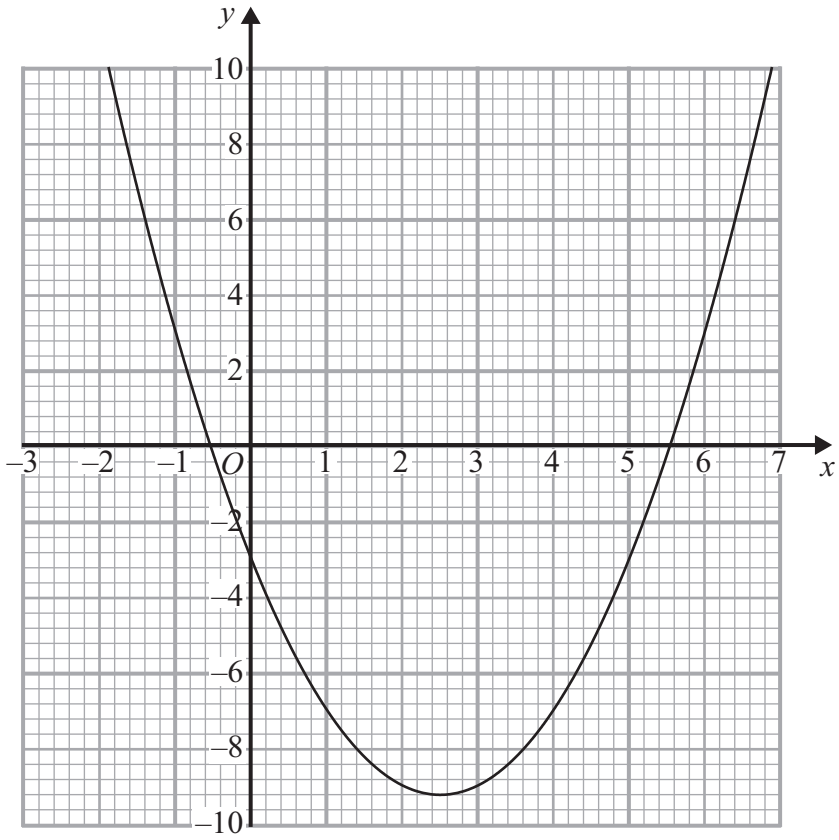
$x =$ .....

$y =$ .....

(Total 4 marks)

Q12

14. The diagram shows the graph of $y = x^2 - 5x - 3$



(a) Use the graph to find estimates for the solutions of

(i) $x^2 - 5x - 3 = 0$

.....

(ii) $x^2 - 5x - 3 = 6$

.....

(3)

(b) Use the graph to find estimates for the solutions of the simultaneous equations

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

$$y = x - 4$$

.....

(3) **Q14**

(Total 6 marks)

20 Solve the simultaneous equations

$$5x + 2y = 11$$
$$4x - 3y = 18$$

$x =$ .....

$y =$ .....

(Total for Question 20 is 4 marks)

16 (a) Make t the subject of the formula

$$2(a + t) = 5t + 7$$

$t =$ .....

(3)

(b) Solve the simultaneous equations

$$3x - 4y = 8$$

$$9x + 5y = -1.5$$

$x =$ .....

$y =$ .....

(3)

(Total for Question 16 is 6 marks)

22 Solve the simultaneous equations

$$3x + 2y = 4$$
$$4x + 5y = 17$$

$x =$ .....

$y =$ .....

(Total for Question 22 is 4 marks)

21 Solve the simultaneous equations

$$x^2 + y^2 = 25$$
$$y = 2x + 5$$

$x =$ ..... and $y =$ .....

or

$x =$ ..... and $y =$ .....

(Total for Question 21 is 6 marks)

14 Solve the simultaneous equations

$$3x - 2y = 7$$
$$7x + 2y = 13$$

.....

(Total for Question 14 is 3 marks)

18 Solve the simultaneous equations

$$4x + 7y = 1$$
$$3x + 10y = 15$$

$x =$ .....

$y =$ .....

(Total for Question 18 is 4 marks)

25 Solve the simultaneous equations $x^2 + y^2 = 9$
$x + y = 2$

Give your answers correct to 2 decimal places.

$x =$ ..... $y =$ .....

or $x =$ ..... $y =$ .....

(Total for Question 25 is 6 marks)

13 Solve the simultaneous equations

$$3x + 10y = 7$$
$$x - 4y = 6$$

$x =$ .....

$y =$ .....

(Total for Question 13 is 3 marks)

15 Solve the simultaneous equations

$$3x + 4y = 5$$
$$2x - 3y = 9$$

$x =$ .....

$y =$ .....

(Total for Question 15 is 4 marks)

14 Solve the simultaneous equations

$$4x - 5y = 33$$
$$3x + y = 1$$

$x =$ .....

$y =$ .....

(Total for Question 14 is 3 marks)

14 Solve the simultaneous equations

$$4x - 5y = 33$$
$$3x + y = 1$$

$x =$ .....

$y =$ .....

(Total for Question 14 is 3 marks)

18 Solve the simultaneous equations

$$4x + y = 25$$
$$x - 3y = 16$$

$x =$ .....

$y =$ .....

(Total for Question 18 is 3 marks)

***17** Paper clips are sold in small boxes and in large boxes.

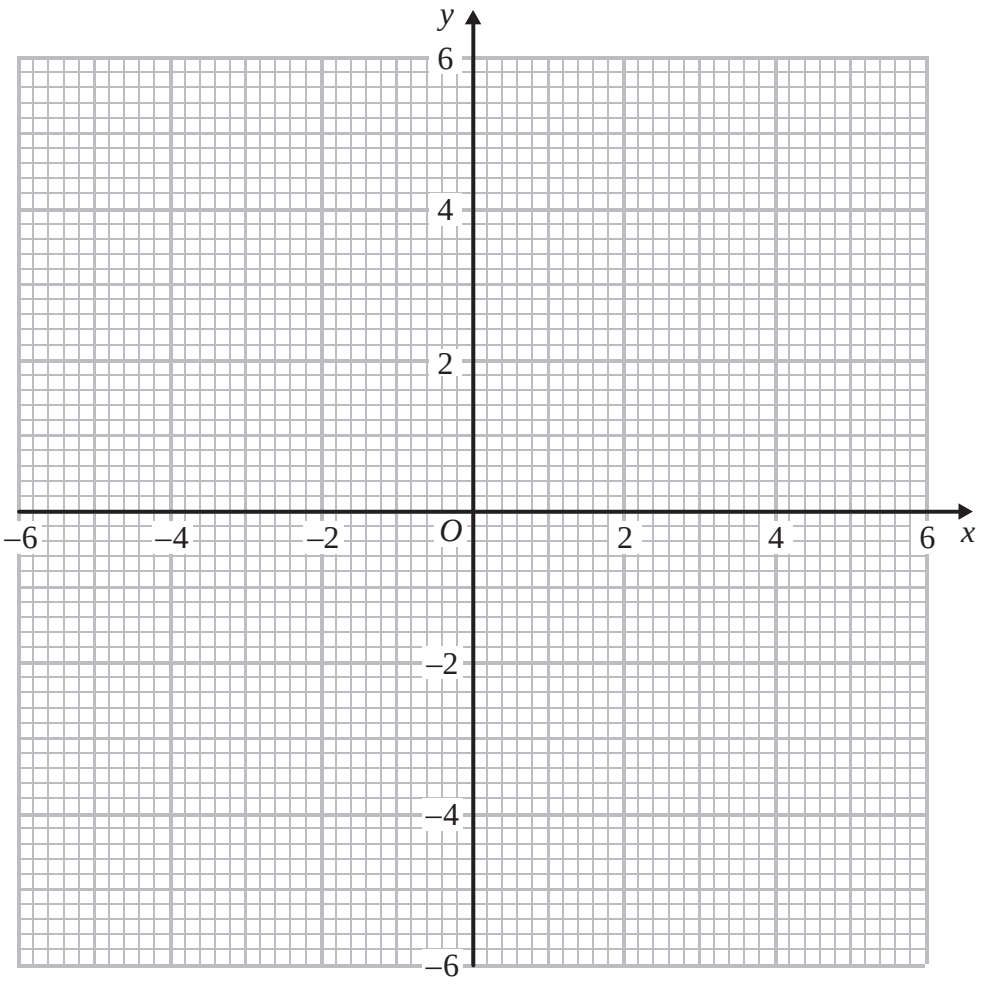
There is a total of 1115 paper clips in 4 small boxes and 5 large boxes.

There is a total of 530 paper clips in 3 small boxes and 2 large boxes.

Work out the number of paper clips in each small box and in each large box.

(Total for Question 17 is 5 marks)

28 (a) On the grid, construct the graph of $x^2 + y^2 = 16$



(2)

(b) Find estimates for the solutions of the simultaneous equations

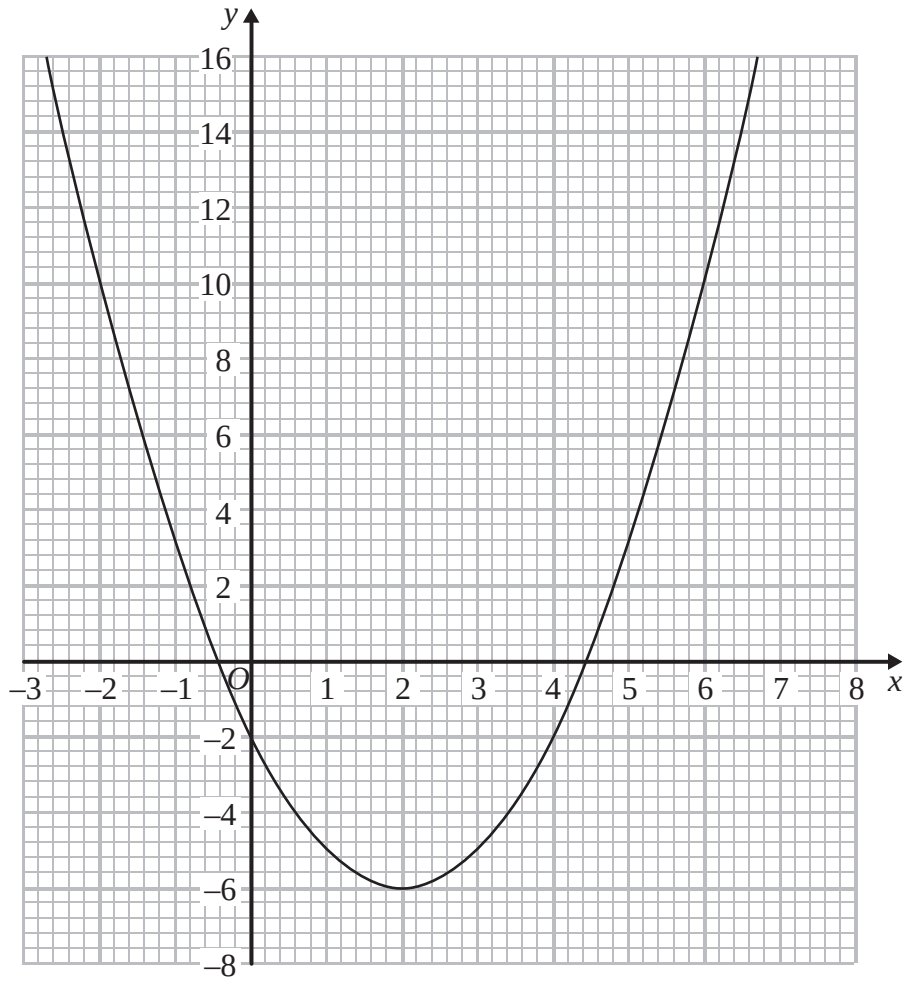
$$x^2 + y^2 = 16$$
$$y = 2x + 1$$

.....

(3)

(Total for Question 28 is 5 marks)

19 The diagram shows the graph of $y = x^2 - 4x - 2$



(a) Use the graph to find estimates for the solutions of

(i) $x^2 - 4x - 2 = 0$

.....

(ii) $x^2 - 4x - 6 = 0$

.....

(3)

(b) Use the graph to find estimates for the values of x that satisfy the simultaneous equations

$$y = x^2 - 4x - 2$$

$$x + y = 6$$

.....

(3)

(Total for Question 19 is 6 marks)

15 Solve the simultaneous equations

$$4x + 2y = 7$$
$$3x - 5y = -24$$

x = ...

y = ...

(Total for Question 15 is 4 marks)

19 Solve the simultaneous equations

$2x - y = 13$

$x - 2y = 11$

$x =$ .....

$y =$ .....

(Total for Question 19 is 3 marks)

14 Solve the simultaneous equations

$$5x + 2y = -2$$
$$3x - 5y = 11.2$$

$x =$ .....

$y =$ .....

(Total for Question 14 is 4 marks)

20 Solve algebraically the simultaneous equations

$$x^2 + y^2 = 25$$
$$y - 3x = 13$$

.....

(Total for Question 20 is 5 marks)

Question 33

2 Solve the simultaneous equations

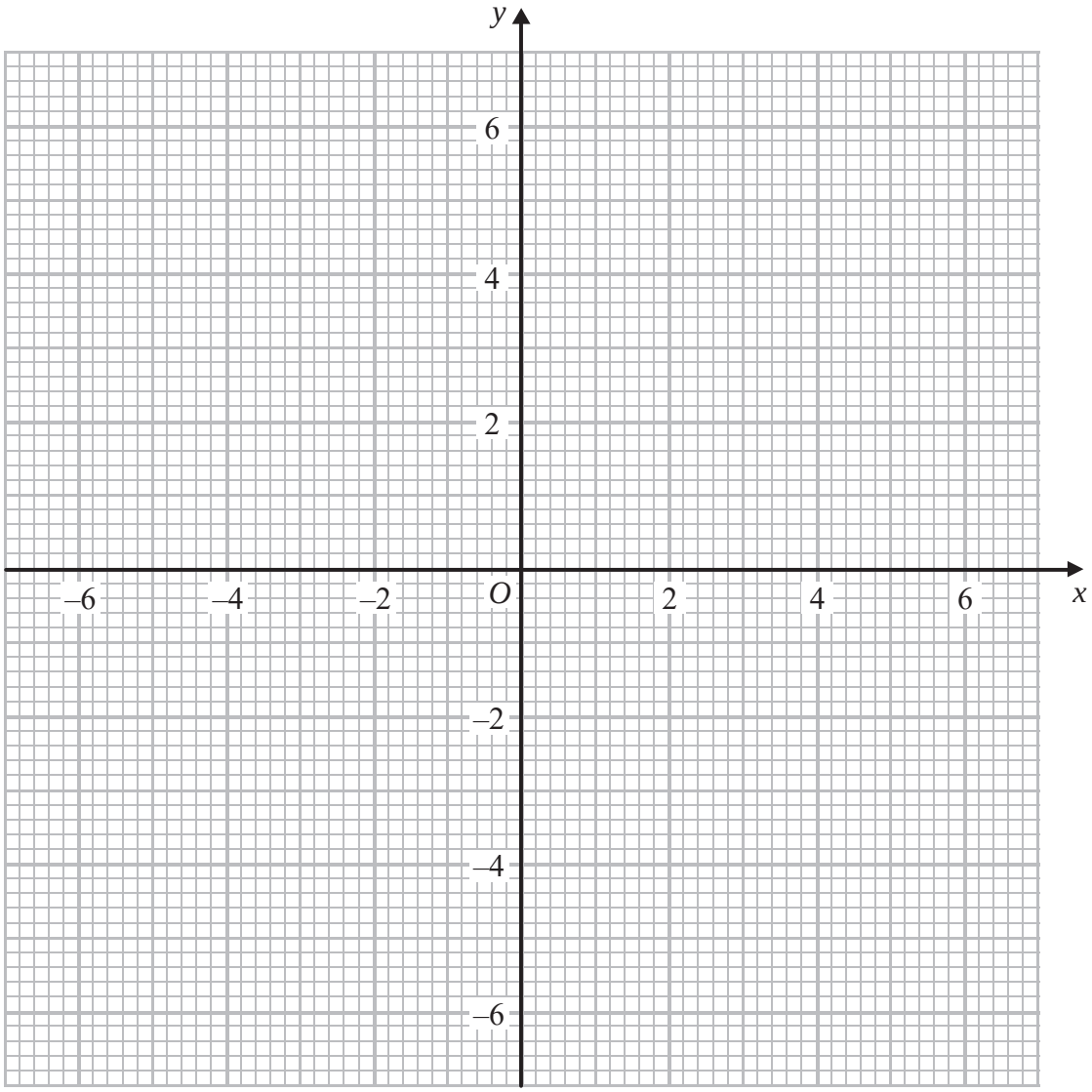
$$3x + y = -4$$
$$3x - 4y = 6$$

$x =$ .....

$y =$ .....

(Total for Question 2 is 3 marks)

16 (a) On the grid, draw the graph of $x^2 + y^2 = 12.25$



(2)

(b) Hence find estimates for the solutions of the simultaneous equations

$$x^2 + y^2 = 12.25$$
$$2x + y = 1$$

.....

(3)

(Total for Question 16 is 5 marks)

Question 35

November 2018 | 1MA1/1H | Original Q6

6 Solve the simultaneous equations

$$5x + y = 21$$
$$x - 3y = 9$$

$x =$ .....

$y =$ .....

(Total for Question 6 is 3 marks)

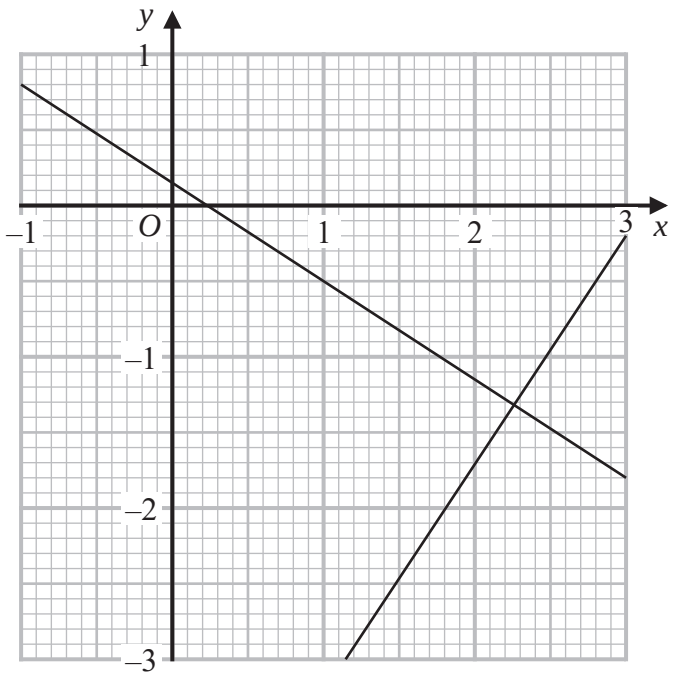
19 Solve algebraically the simultaneous equations

$$2x^2 - y^2 = 17$$
$$x + 2y = 1$$

.....

(Total for Question 19 is 5 marks)

10 The graphs with equations $3y + 2x = \frac{1}{2}$ and $2y - 3x = -\frac{113}{12}$ have been drawn on the grid below.



Using the graphs, find estimates of the solutions of the simultaneous equations

$$3y + 2x = \frac{1}{2}$$

$$2y - 3x = -\frac{113}{12}$$

$x =$ .....

$y =$ .....

(Total for Question 10 is 2 marks)

20 Solve algebraically the simultaneous equations

$$x^2 - 4y^2 = 9$$
$$3x + 4y = 7$$

.....

(Total for Question 20 is 5 marks)

25 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.

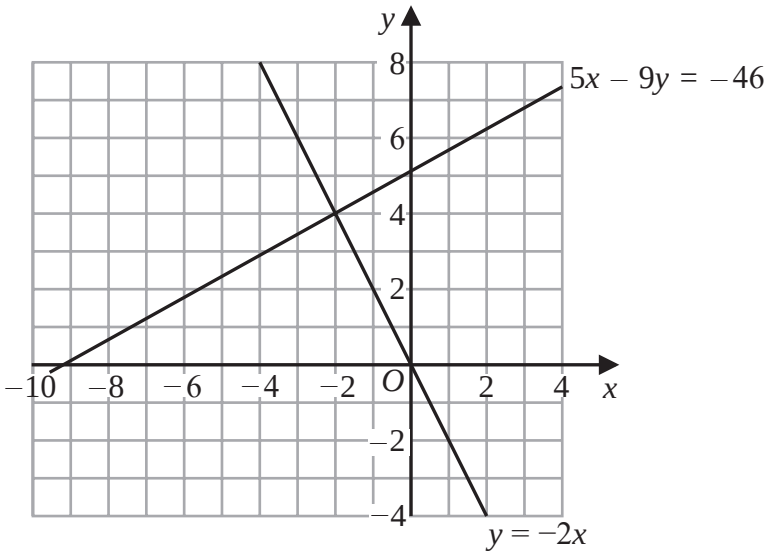
Line **L** crosses the y-axis at the point B.
Lines **L** and **M** intersect at the point C.

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

.....

(Total for Question 25 is 5 marks)

6



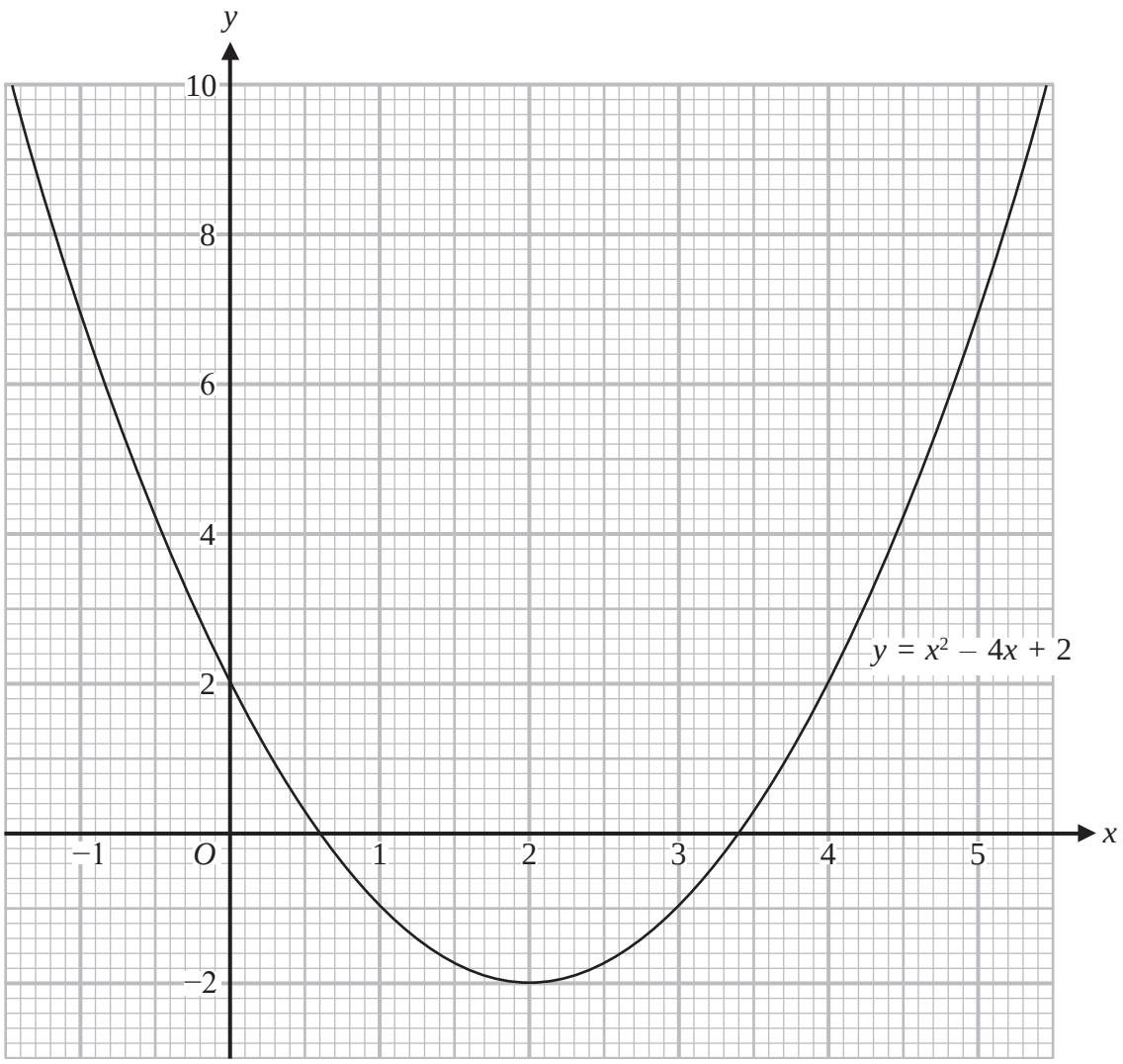
(a) Use these graphs to solve the simultaneous equations

$$5x - 9y = -46$$
$$y = -2x$$

$x =$ .....

$y =$ .....

(1)



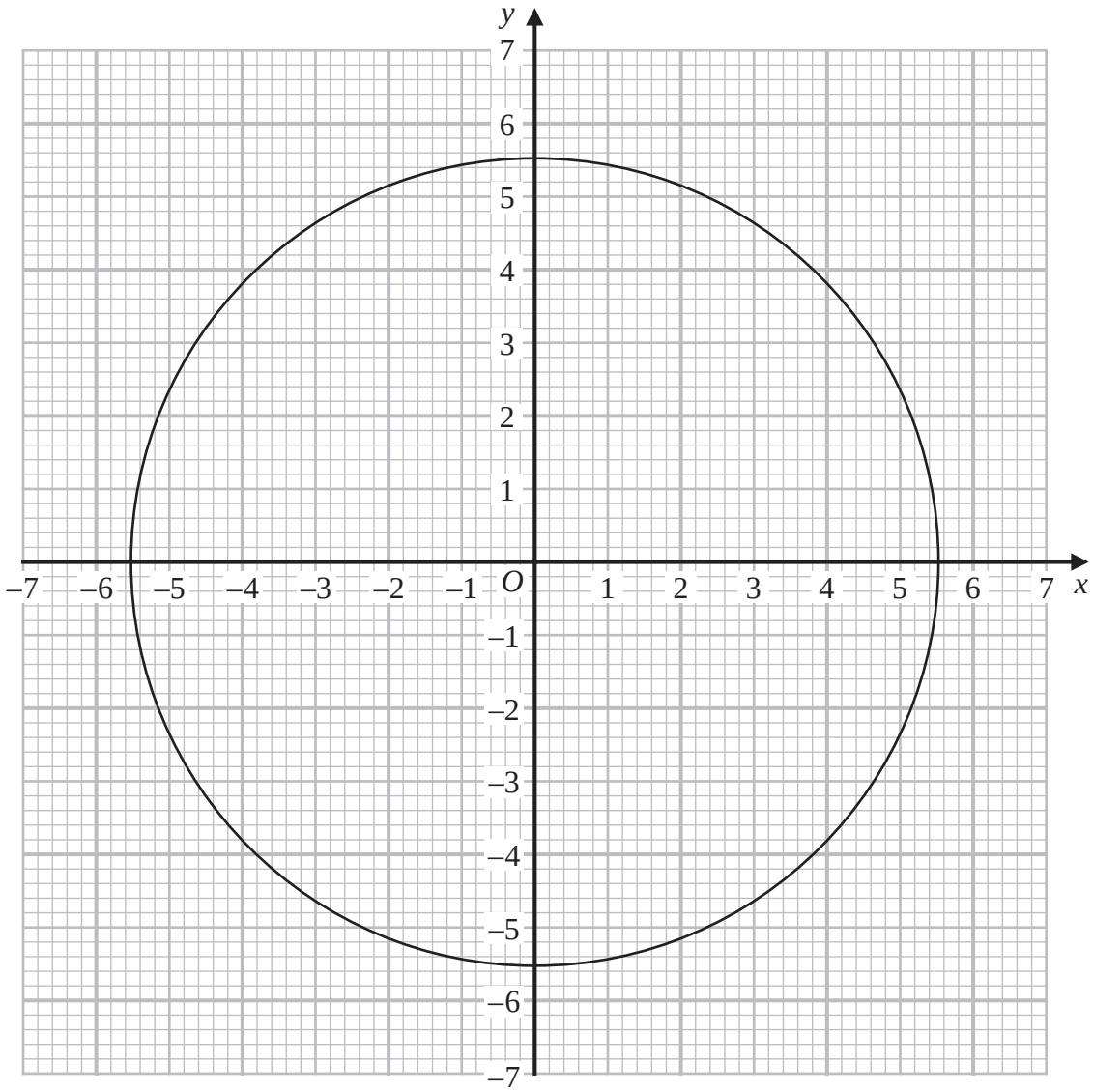
(b) Use this graph to find estimates for the solutions of the quadratic equation $x^2 - 4x + 2 = 0$

.....

(2)

(Total for Question 6 is 3 marks)

20 The diagram shows the graph of $x^2 + y^2 = 30.25$



Use the graph to find estimates for the solutions of the simultaneous equations

$$x^2 + y^2 = 30.25$$
$$y - 2x = 1$$

.....

(Total for Question 20 is 3 marks)

16 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 16 is 4 marks)

22 **L** is the straight line with equation $y = 2x - 5$

C is a graph with equation $y^2 = 6x^2 - 25x - 8$

Using algebra, find the coordinates of the points of intersection of **L** and **C**.
You must show all your working.

(..... , ...)

(..... , ...)

(Total for Question 22 is 5 marks)

12 Solve the simultaneous equations

$$5x + 2y = 11$$
$$4x + 3y = 6$$

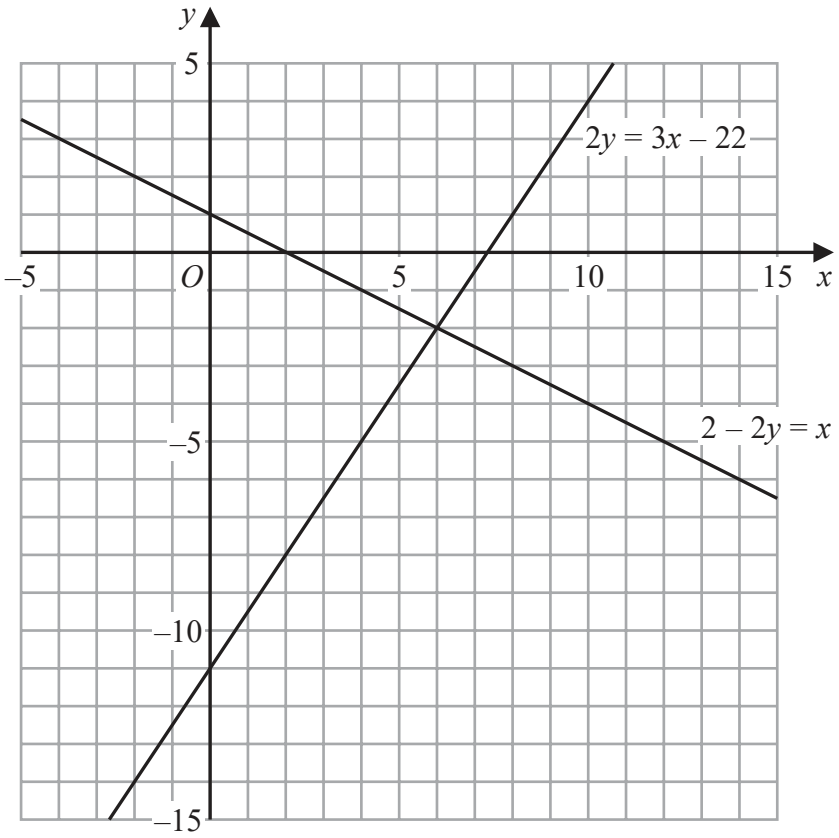
$x =$ .....

$y =$ .....

(Total for Question 12 is 4 marks)

Question 45

9



Use these graphs to solve the simultaneous equations

$$2 - 2y = x$$
$$2y = 3x - 22$$

$x =$ .....

$y =$ .....

(Total for Question 9 is 1 mark)

Question 46

June 2023 | 1MA1/2H | Original Q11

11 Use algebra to solve the simultaneous equations

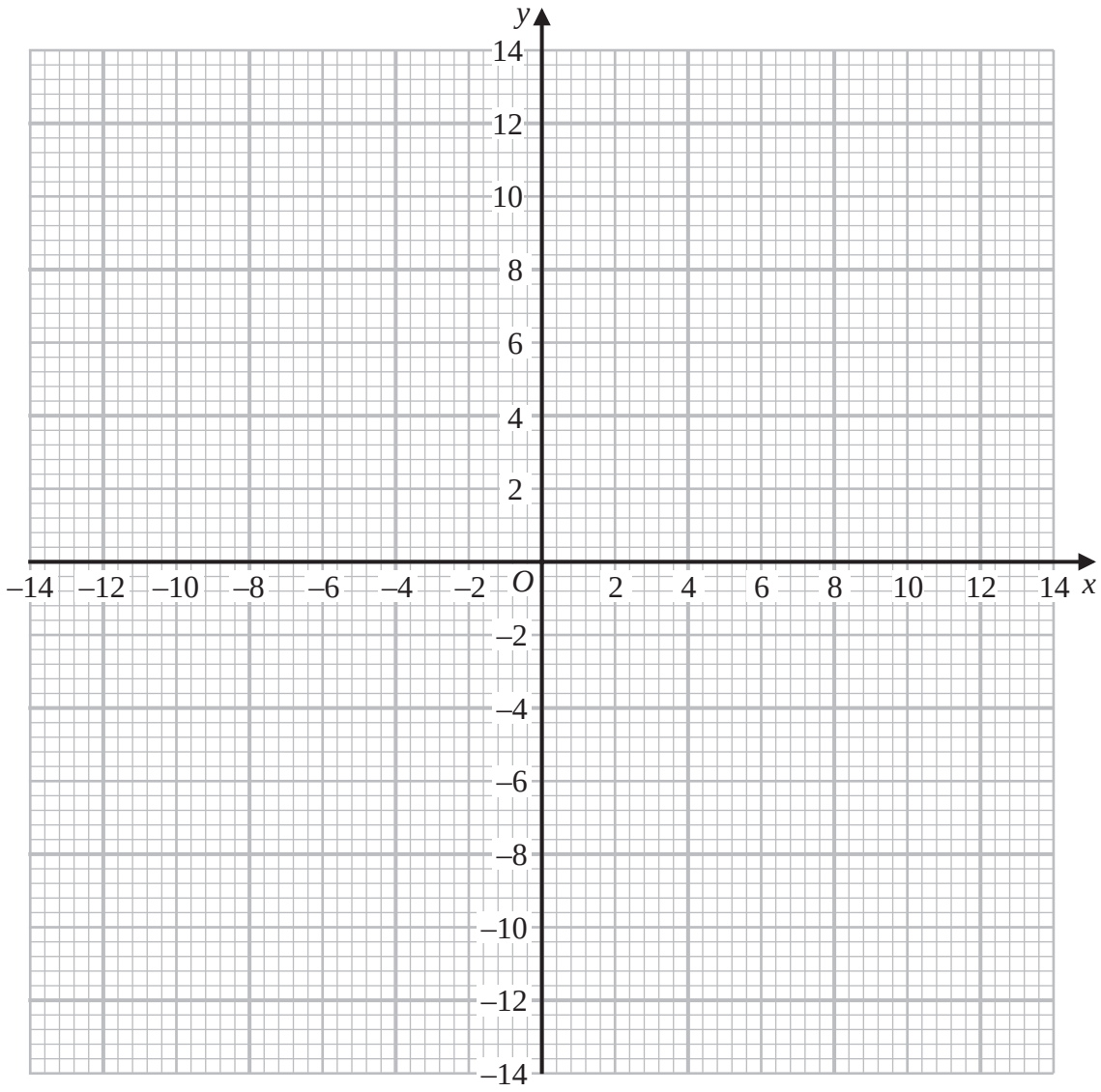
$$2x + 6y = 5$$
$$3x - 4y = -12$$

x = ...

y = ...

(Total for Question 11 is 4 marks)

21 (a) On the grid, draw the graph of $x^2 + y^2 = 169$



(2)

(b) Use your graph to find estimates for the solutions of the simultaneous equations

$$x^2 + y^2 = 169$$
$$2y = 3x$$

.....

(3)

(Total for Question 21 is 5 marks)

10 Solve the simultaneous equations

$$5x - 2y = 23$$
$$2x - 3y = 18$$

$x =$ .....

$y =$ .....

(Total for Question 10 is 4 marks)

10 Use algebra to solve the simultaneous equations

$$4x - 5y = 20$$
$$6x + 7y = -57$$

You must show all your working.

$x =$ .....

$y =$ .....

(Total for Question 10 is 4 marks)

20 Solve the simultaneous equations

$$y^2 = 3x^2 + 4$$
$$y + 2x = 7$$

Give your solutions correct to 3 significant figures.

.....

(Total for Question 20 is 4 marks)

21 Solve algebraically the simultaneous equations

$$3x^2 + 2y^2 = 44$$
$$3x + y = 2$$

.....

(Total for Question 21 is 5 marks)