1 **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.

eliminate y by substituting $y = 2x - 5$ into C.

$(2x-5)^2 = 6x^2 - 25x - 8$ (1)

$4x^2 - 20x + 25 = 6x^2 - 25x - 8$ (1)

$0 = 2x^2 - 5x - 33$

$0 = (2x - 11)(x + 3)$ (1)

so $x = \frac{11}{2}$ or $x = -3$

If $x = \frac{11}{2}$, $y = 2(\frac{11}{2}) - 5$

$= 11 - 5$

$= 6$

$(\frac{11}{2}, 6)$ (1)

If $x = -3$, $y = 2(-3) - 5$

$= -6 - 5$

$= -11$

$(-3, -11)$ (1)

(..-3.., ..-11..)

(..11/2.., ..6..)

(Total for Question 1 is 5 marks)

2 Solve the simultaneous equations

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

$5x+2y=11$ ①
$4x+3y=6$ ②

plan to eliminate y by making y coefficients the same, then subtracting.

① × 3: $15x + 6y = 33$
② × 2: $8x + 6y = 12$ −
$7x + 0y = 21$ ①

$33 - 12 = 21$

$7x = 21$
$x = \frac{21}{7} = 3$ ①

substitute $x=3$ into ①

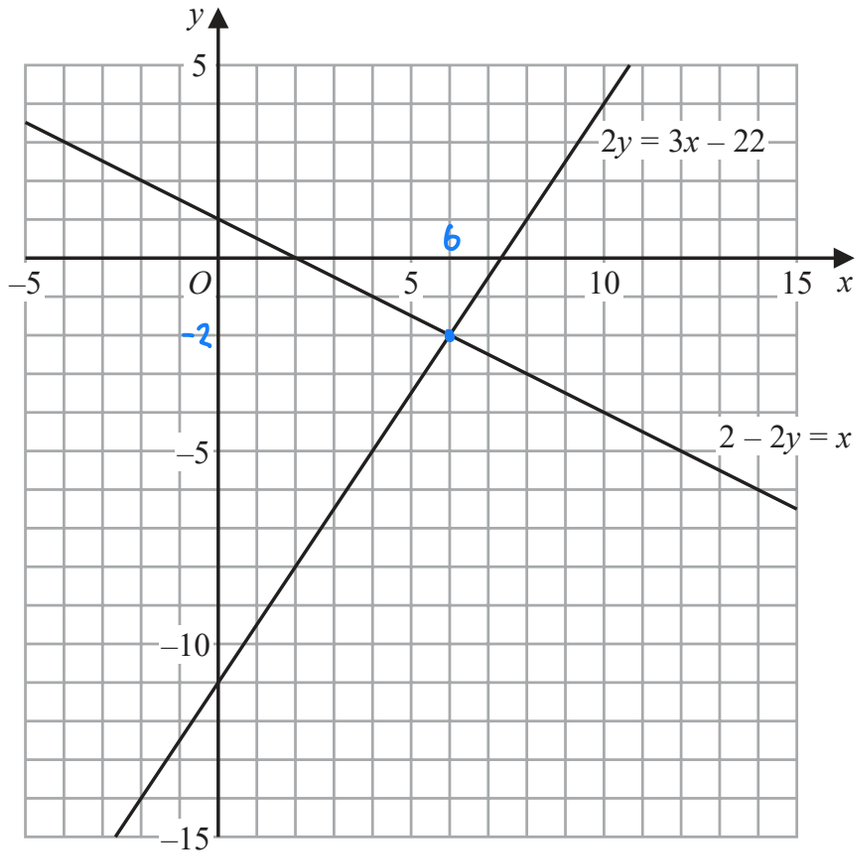
$5(3) + 2y = 11$ ①
$2y = 11 - 15$
$2y = -4$
$y = -2$ ①

$x =$ 3

$y =$ -2

(Total for Question 2 is 4 marks)

3



Use these graphs to solve the simultaneous equations where lines meet

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

6 across
2 down

$x =$ 6 ✓(1)

$y =$ -2

(Total for Question 3 is 1 mark)

4 Use algebra to solve the simultaneous equations

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

$2x + 6y = 5$

$2x = 5 - 6y$

$x = \frac{5-6y}{2}$ (1) (1)

$3x - 4y = -12$

$3x = -12 + 4y$

$x = \frac{-12+4y}{3}$ (2)

Substitute (2) into (1)

$\frac{5-6y}{2} = \frac{-12+4y}{3}$ (1)

$3(5-6y) = 2(-12+4y)$

$15 - 18y = -24 + 8y$

$15 + 24 = 8y + 18y$

$39 = 26y$

$y = \frac{3}{2}$

$= 1.5$ (1)

$x = \frac{5 - 6\left(\frac{3}{2}\right)}{2}$

$= -2$ (1)

$x =$ -2

$y =$ 1.5

(Total for Question 4 is 4 marks)

5 Solve the simultaneous equations

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

$5x - 2y = 23$ — (1)

$2x - 3y = 18$ — (2)

$5x - 2y (+2y) = 23 (+2y)$

$(\div 5)\ 5x = (23 + 2y)(\div 5)$

$x = \frac{23+2y}{5}$ — (3)

(1)

Substitute (3) into (2)

$2\left(\frac{23+2y}{5}\right) - 3y = 18$ (1)

$(5)\ \frac{46+4y}{5} - 3y\,(5) = 18\,(5)$

$46 + 4y - 15y = 90$

$4y - 15y = 90 - 46$

$-11y = 44$

$y = -4$ (1)

Substitute $y = -4$ into (1)

$5x - 2(-4) = 23$

$5x = 23 - 8 = 15$

$x = 3$ (1)

4
18
× 5
90

8 ~~9~~10
− 46
44

$x =$ 3

$y =$ −4

(Total for Question 5 is 4 marks)