National 5 & Int. 2   Straight Line
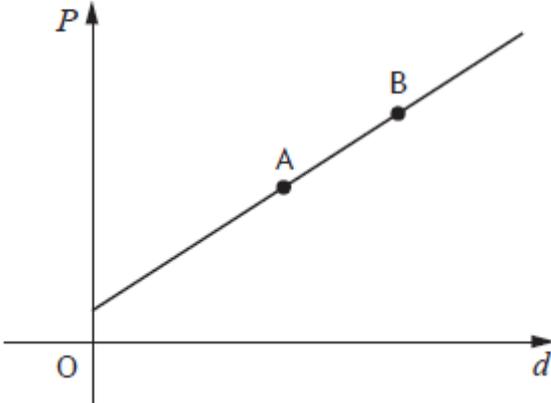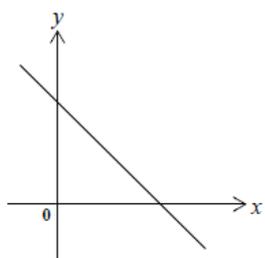
The cost of a journey with Tom's Taxis depends on the distance travelled.

The graph below shows the cost, P pounds, of a journey with Tom's Taxis against the distance travelled, d miles.

Point A represents a journey of 8 miles which costs £14.

Point B represents a journey of 12 miles which costs £20.

(a) Find the equation of the line in terms of P and d.   3

   Give the equation in its simplest form.

(b) Calculate the cost of a journey of 5 miles.   1

Ans   (a) $P = \dfrac{3}{2}d + 2$ (b)£9·50

A straight line has equation $2x - 5y = 20$.

Find the coordinates of the point where this line crosses the y-axis.   2

Ans   (0,-4)

The diagram below shows the straight line joining points A and B.

Find the equation of the line AB.

Give the equation in its simplest form.

3

Ans | $y = -2x + 4$

A straight line has equation $3x - 5y - 10 = 0$.

Find the gradient of this line.

2

Ans | $\dfrac{3}{5}$

A cattle farmer records the weight of some of his calves.

The scattergraph shows the relationship between the age, A months, and the weight, W kilograms, of the calves.

A line of best fit is drawn.

Point D represents a 3 month old calf which weighs 100 kilograms.

Point E represents a 15 month old calf which weighs 340 kilograms.

(a) Find the equation of the line of best fit in terms of A and W.

Give the equation in its simplest form.

3

(b) Use your equation from part (a) to estimate the weight of a one **year** old calf.

Show your working.

1

Ans	(a) W = 20A + 40 (b) 280 kg

Find the equation of the line joining the points (−2, 5) and (3, 15).

Give the equation in its simplest form.

3

Ans	y = 2x + 9

A straight line is represented by the equation $y = mx + c$.

Sketch a possible straight line graph to illustrate this equation when $m < 0$ and $c > 0$.

2

| Ans | |

The marks of a group of students in the Unit 1 and Unit 2 tests of their Intermediate 2 Mathematics course are shown in the scattergraph below.
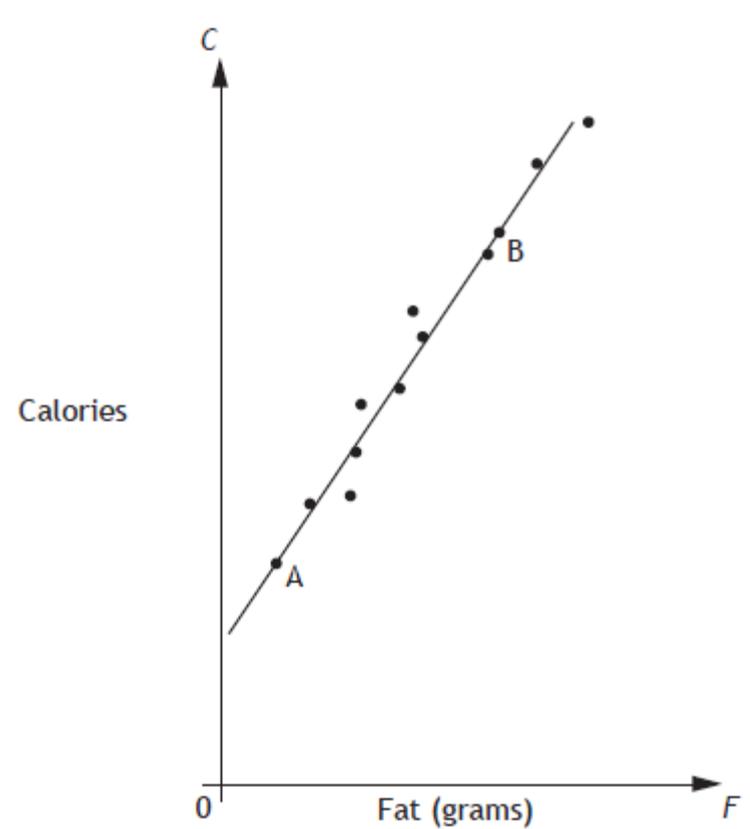A line of best fit has been drawn.
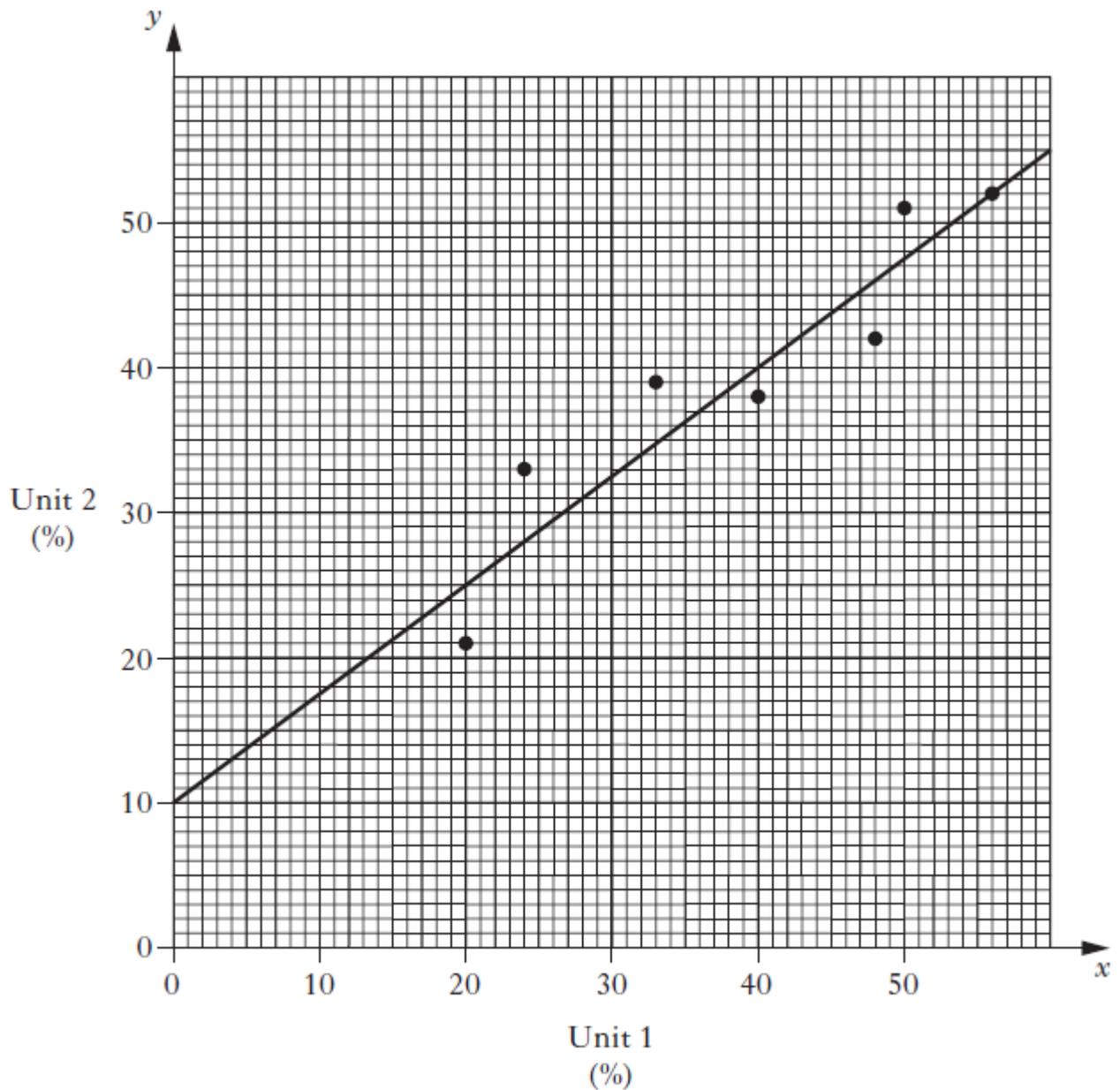
(a) Find the equation of this line of best fit.

3

(b) Another student scored 80% in the Unit 1 test.
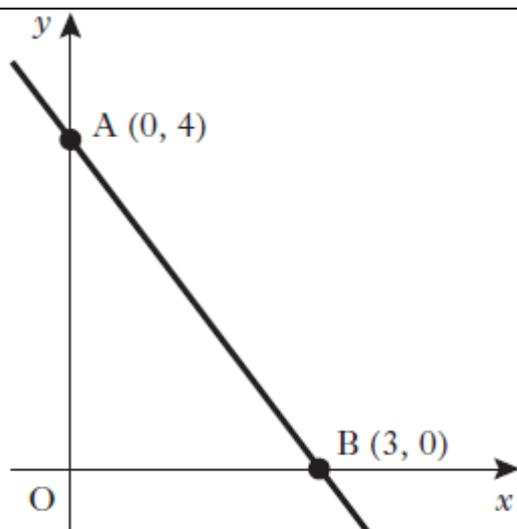**Use your answer to part (a)** to predict her mark in the Unit 2 test.

1

| Ans | (a) y = 0·75x + 10   (b) 70% |

A straight line has equation $2y + 3x = 12$.

(a) Find the gradient of this line.

2

(b) The line crosses the y-axis at $(0, c)$.

Find the value of c.

1

Ans | (a) -1·5 or equivalent   (b) 6

McGregor's Burgers sells fast food.

The graph shows the relationship between the amount of fat, F grams, and the number of calories, C, in some of their sandwiches.

A line of best fit has been drawn.

Point A represents a sandwich which has 5 grams of fat and 200 calories.

Point B represents a sandwich which has 25 grams of fat and 500 calories.

(a) Find the equation of the line of best fit in terms of F and C.

3

(b) A Super Deluxe sandwich contains 40 grams of fat.

Use your answer to part (a) to estimate the number of calories this sandwich contains.

1

Show your working.

Ans | (a) C = 15F + 125   (b) 725 calories

(a) A straight line has equation $4x+3y=12$.

Find the gradient of this line.

2

(b) Find the coordinates of the point where this line crosses the x-axis.

2

Ans   (a) $-\dfrac{4}{3}$ (b) $(3, 0)$
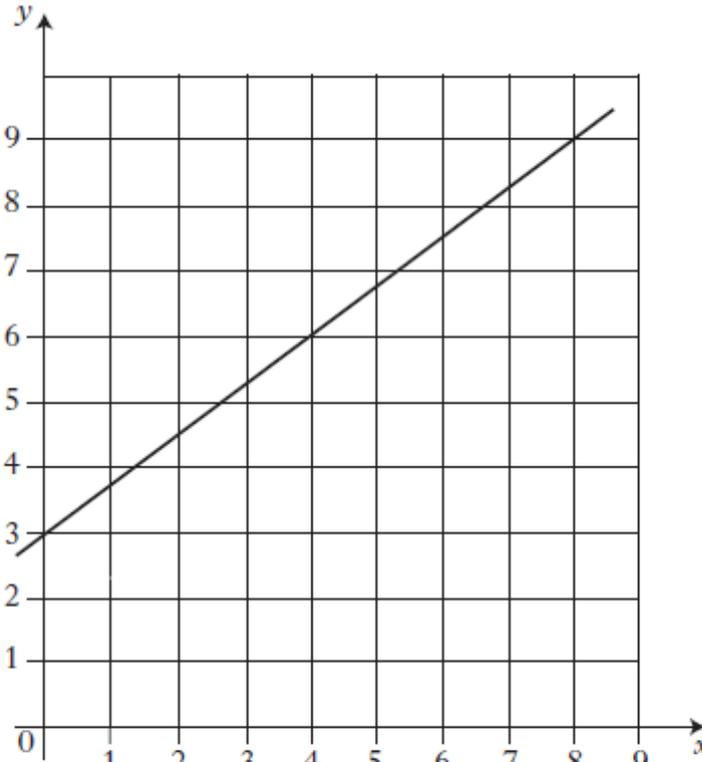
Find the equation of the straight line shown in the diagram above.
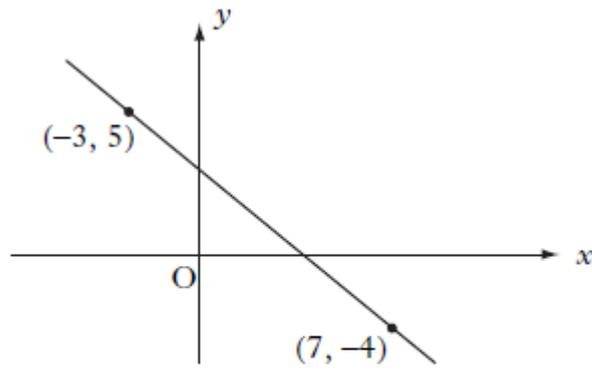
3

Ans $y=\dfrac{3}{4}x+3$

Find the equation of the straight line AB.

| Ans | $y = -\dfrac{4}{3}x + 4$ |

The straight line with equation $4x + 3y = 36$ cuts the y-axis at A.

(a) Find the coordinates of A.

This line meets the line through B (0, 8), parallel to the x-axis, at C as shown above.

(b) Find the coordinates of C.

1

2

Ans *(a) A(0,12)   (b) C(3,8)*

A straight line is represented by the equation $y = mx + c$.

Sketch a possible straight line graph to illustrate this equation when $m > 0$ and $c < 0$.

2

Ans

Calculate the gradient of the straight line passing through the points (−3, 5) and (7, −4).

1

Ans $-\dfrac{9}{10}$
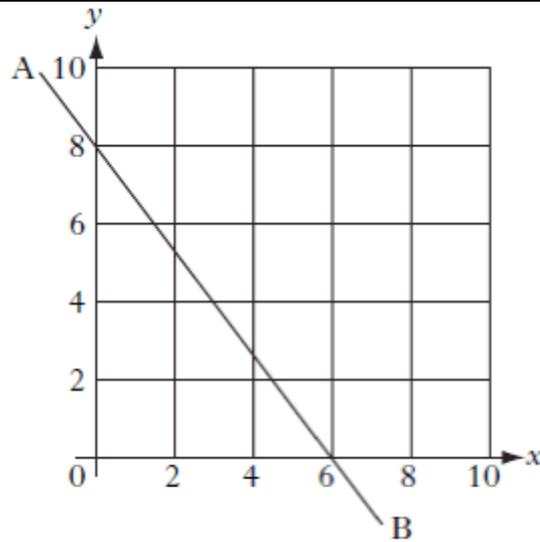
Find the equation of the straight line AB shown in the diagram.

3

Ans $y = \dfrac{-4}{3}x + 8$

The scattergraph shows the taxi fare, p pounds, plotted against the distance travelled, m miles. A line of best fit has been drawn.

Taxi fare
(pounds)

Distance travelled (miles)
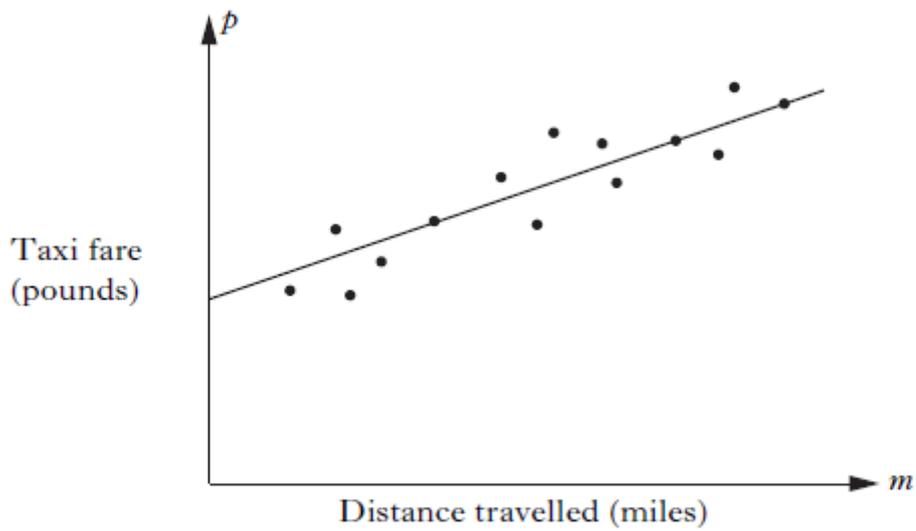
The equation of the line of best fit is $p = 2 + 1·5\,m$.

Use this equation to predict the taxi fare for a journey of 6 miles.

1

Ans   £11

Find the equation of the straight line shown in the diagram.

3

| Ans | $y = 3x - 1$ |

A straight line is represented by the equation $x + y = 5$.

Find the gradient of this line.

2

| Ans | -1 |

A straight line has equation $y = 4x + 5$.

State the gradient of this line.

1

| Ans | 4 |

Find the equation of the straight line passing through the points (0, −3) and (−2, −11).

3

Ans | *y = 4x - 3*

A straight line is represented by the equation $y = ax + b$.

Sketch a possible straight line graph to illustrate this equation when $a = 0$ and $b > 0$.

2

Ans
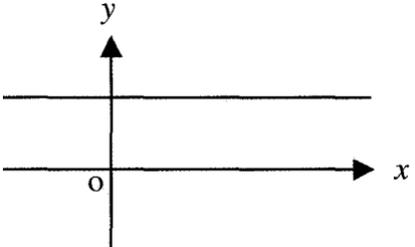
The temperature, in degrees Celsius, at mid-day in a seaside town and the sales, in pounds, of umbrellas are shown in the scattergraph below.
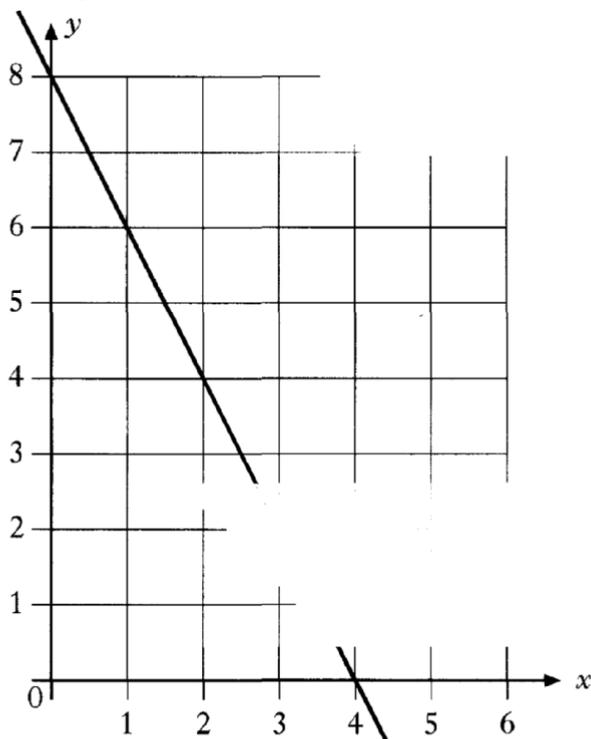A line of best fit has been drawn.
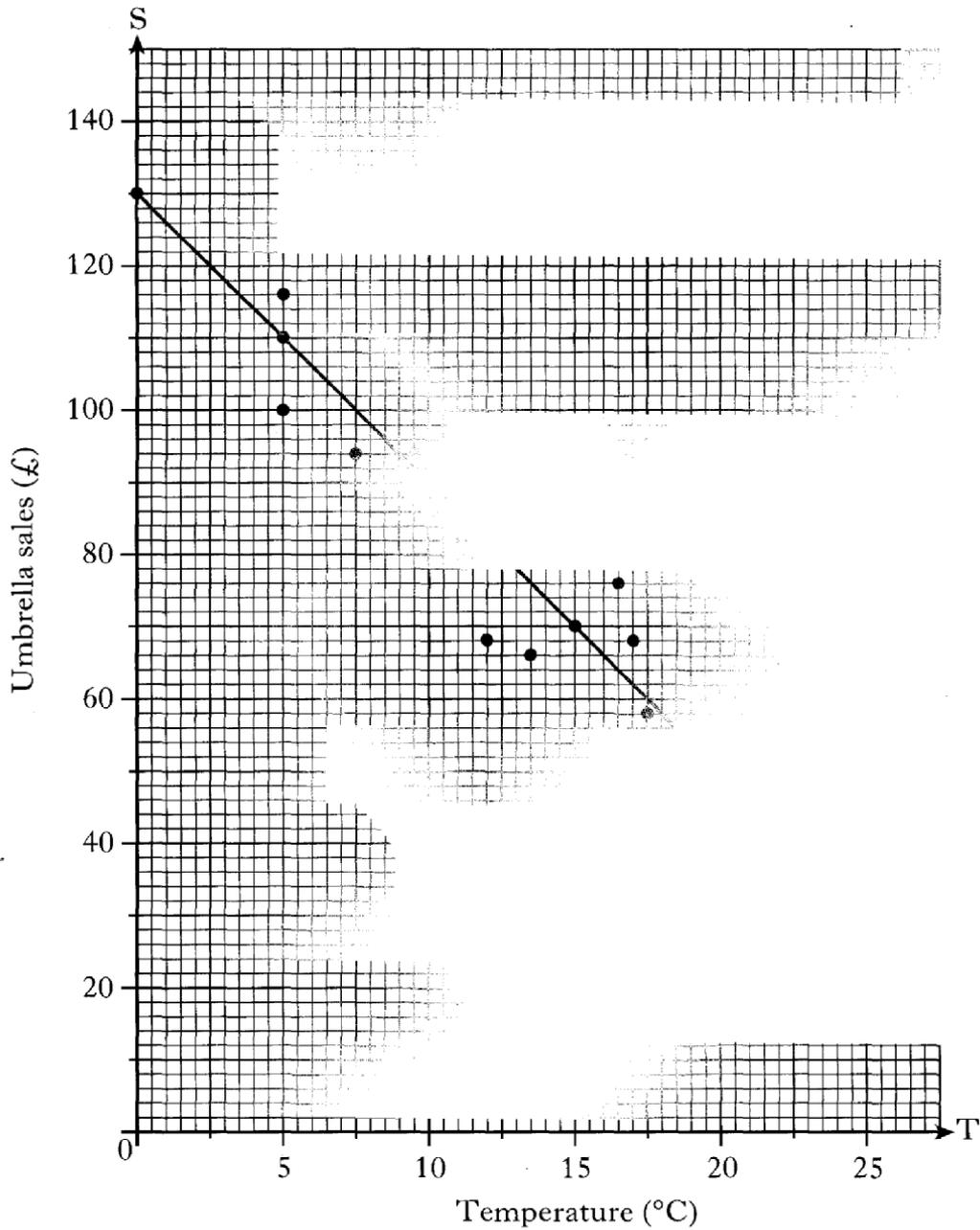
(a) Find the equation of the line of best fit.   3

(b) **Use your answer to part (a)** to predict the sales for a day when the temperature is 30 degrees Celsius.   1

| Ans | (a) S = -4T + 130   (b) £10   Must have evidence of substitution. |

A straight line is represented by the equation $2y + x = 6$.

(a) Find the gradient of this line.

2

(b) This line crosses the y-axis at $(0, c)$.
Find the value of c.

1

Ans (a) -0·5   (b) 3

(a) Find the equation of the straight line shown in the diagram.

3

(b) Find the coordinates of the point where the line $y = 2x$ meets this line.

2

Ans (a) $y = -2x + 8$ (b) $(2, 4)$

Á straight line has equation $3y = 12 - 4x$.
Find the coordinates of the point where it crosses the x-axis.

2

Ans $(3, 0)$
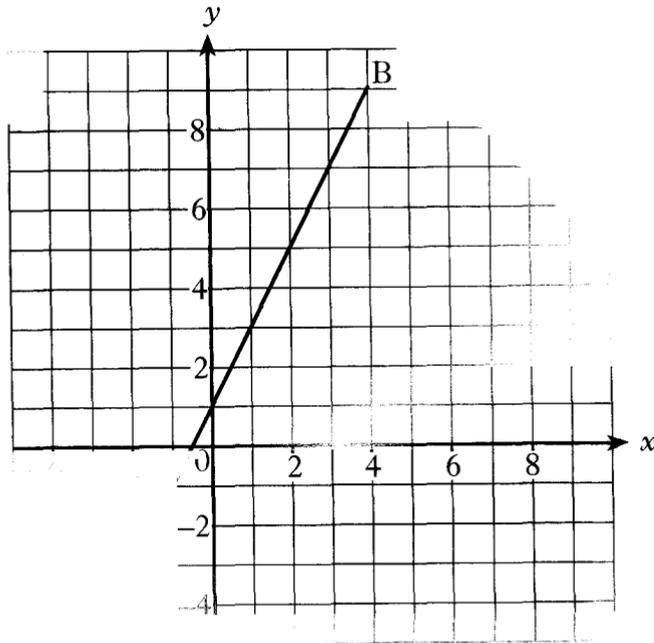
Find the equation of the straight line AB.

3

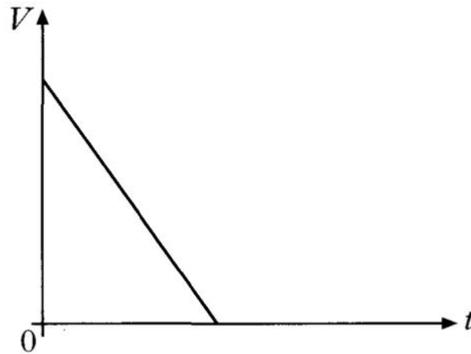*Ans* | $y = 2x + 1$

A bath contains 150 litres of water.

Water is drained from the bath at a steady rate of 30 litres per minute.

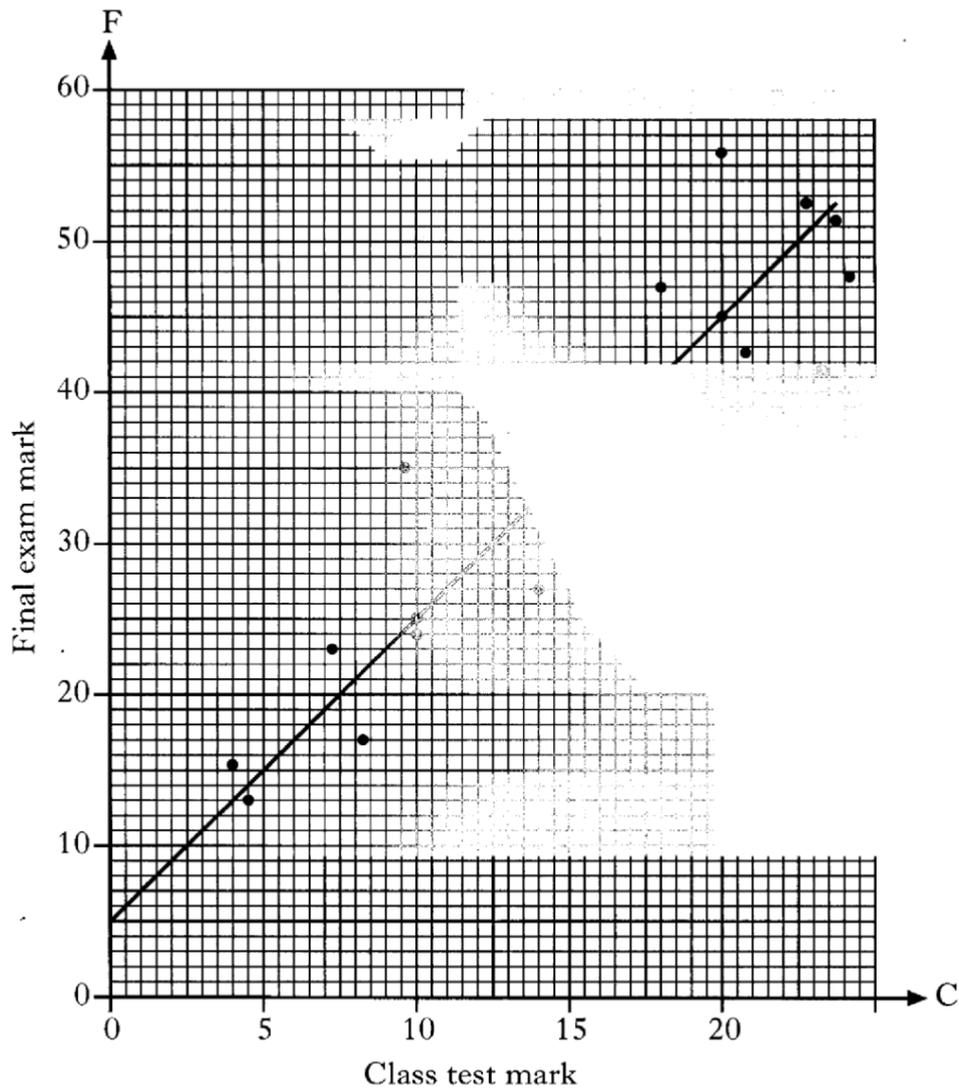The graph of the volume, V litres, of water in the bath against the time, t minutes, is shown below.

Write down an equation connecting V and t.

3

Ans | $V = -30t + 150$

The marks of a group of students in a class test and in the final exam are shown in the scattergraph below.

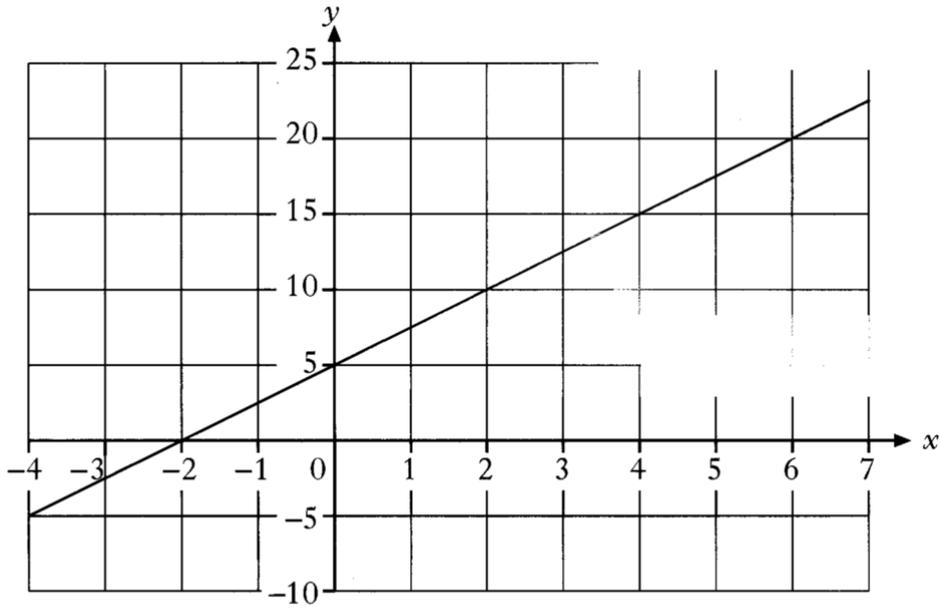A line of best fit has been drawn.

(a) Find the equation of the line of best fit.

3

(b) **Use your answer to part (a)** to predict the final exam mark for a student who achieved a mark of 12 in the class test.

1

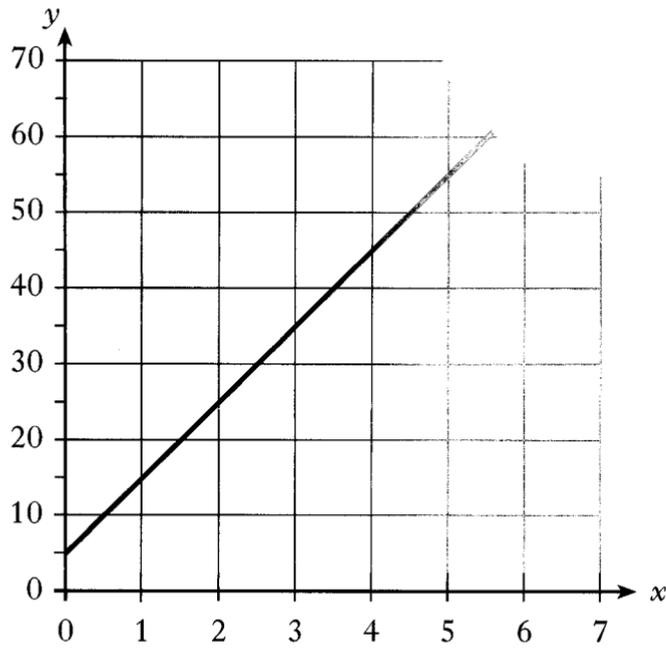Ans | (a) F = 2C + 5   (b)   mark = 29, must have evidence of substitution

Find the equation of the straight line shown in the diagram.

3

Ans | $y = 2 \cdot 5x + 5$

Find the equation of the straight line.

3

Ans | $y = 10x + 5$