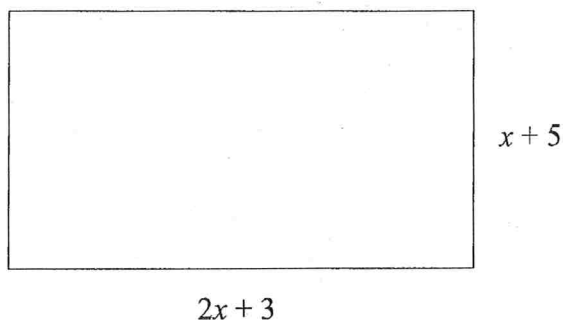


2

A rectangle has a length of  $(2x + 3)$  cm and a width of  $(x + 5)$  cm.



(a) Find an expression for the perimeter of the rectangle.

$$2(2x + 3) + 2(x + 5)$$

$$4x + 6 + 2x + 10$$

$$6x + 16$$

$$\underline{6x + 16} \text{ cm}$$

(2)

(b) Given the rectangle has a perimeter of 43 cm find the value of  $x$ .

$$6x + 16 = 43$$

$$6x = 27$$

$$x = \frac{27}{6} = \frac{9}{2} = 4.5$$

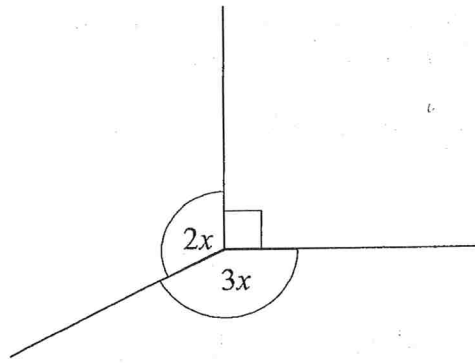
$$\underline{4.5 \text{ [cm]}}$$

(2)

(Total for question 2 is 4 marks)

$$\left( \text{or } \frac{9}{2} \right)$$

3



Find the value of  $x$ .

$$2x + 3x + 90 = 360$$

$$5x + 90 = 360$$

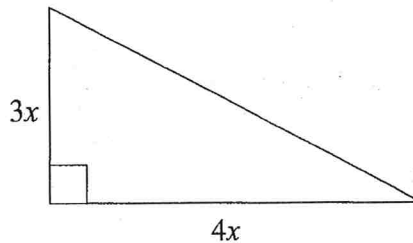
$$5x = 270$$

$$x = 54$$

54°

(Total for question 3 is 3 marks)

4 The diagram shows a right angled triangle.



The area of the triangle is  $294 \text{ cm}^2$

Work out the value of  $x$ .

$$\frac{1}{2} \times 4x \times 3x = 294$$

$$\frac{1}{2} \times 12x^2 = 294$$

$$6x^2 = 294$$

$$x^2 = \frac{294}{6} = \frac{147}{3} = 49$$

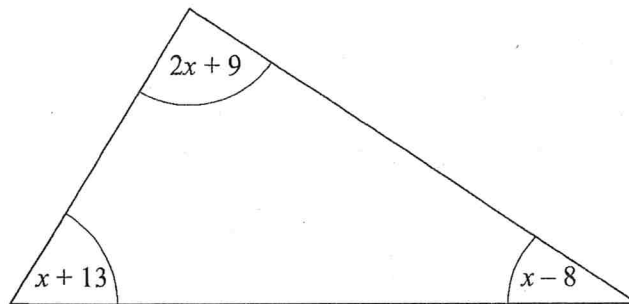
$$x = \sqrt{49}$$

$$= 7$$

7 [cm]

(Total for question 4 is 3 marks)

- 5 The sizes of the angles, in degrees, of a triangle are  $2x + 9$ ,  $x + 13$  and  $x - 8$



Work out the value of  $x$ .

$$2x + 9 + x - 8 + x + 13 = 180$$

$$4x + 14 = 180$$

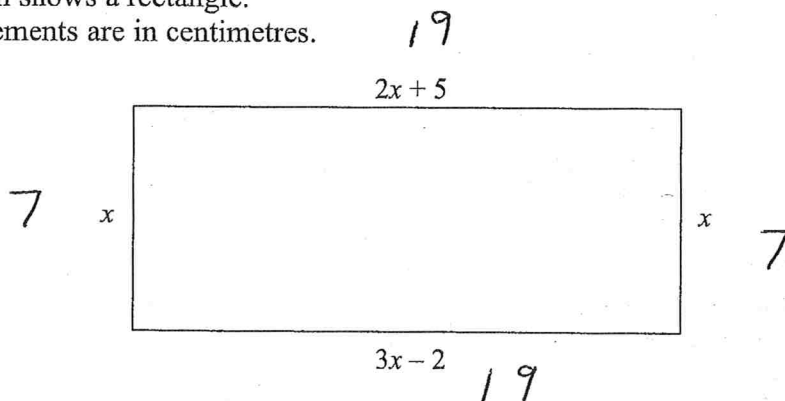
$$4x = 166$$

$$x = \frac{166}{4} = \frac{83}{2} = 41.5$$

$$41.5 \text{ or } \frac{83}{2}$$

(Total for question 5 is 3 marks)

- 6 The diagram shows a rectangle.  
All measurements are in centimetres.



Find the perimeter of the rectangle.

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

$$5 = x - 2$$

$$\underline{7 = x}$$

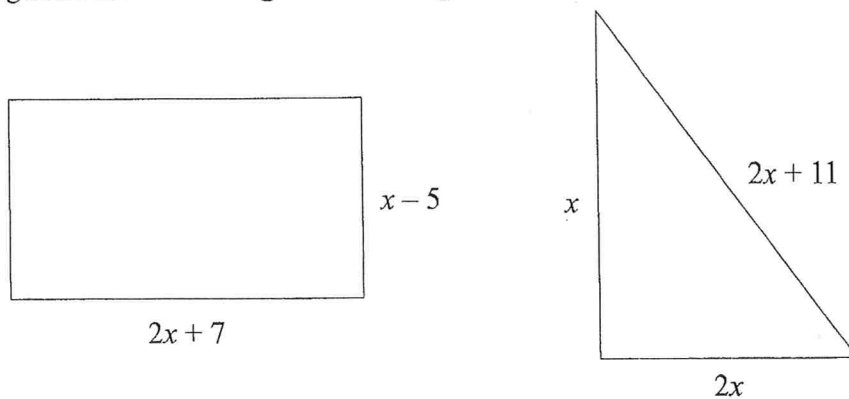
$$2(7) + 5 = 19$$

$$2(19) + 2(7) \\ 38 + 14$$

$$52 \text{ cm}$$

(Total for question 6 is 3 marks)

- 7 The diagram shows a rectangle and a triangle.



The perimeter of the rectangle is equal to the perimeter of the triangle.

Find the value of  $x$ .

$$2(x-5) + 2(2x+7) = x + 2x + 2x + 11$$

$$2x - 10 + 4x + 14 = 5x + 11$$

$$6x + 4 = 5x + 11$$

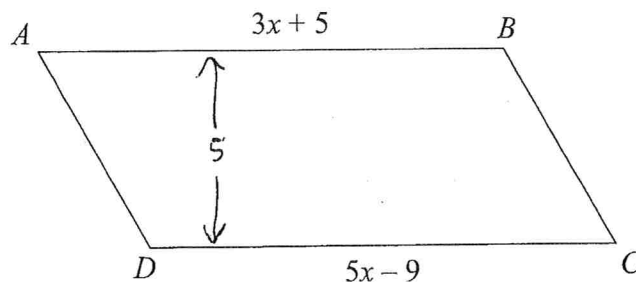
$$x + 4 = 11$$

$$x = 7$$

7

(Total for question 7 is 3 marks)

8



$ABCD$  is a parallelogram

All measurements are in centimetres.

The perpendicular height of the parallelogram is 5 cm.

Find the area of  $ABCD$

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

$$5 = 2x - 9$$

$$14 = 2x$$

$$x = 7$$

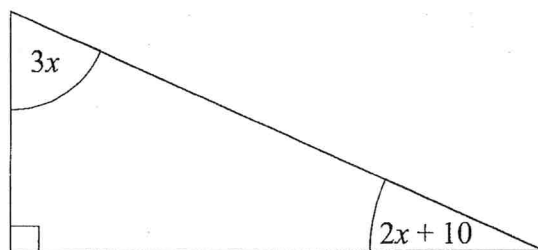
$$3(7) + 5 = 26$$

$$26 \times 5$$

$$130 \text{ cm}^2$$

(Total for question 8 is 4 marks)

- 9 The diagram shows a right-angled triangle.  
All of the angles are in degrees.



Find the value of size of the smallest angle in the triangle.

$$3x + 2x + 10 + 90 = 180$$

$$5x + 100 = 180$$

$$5x = 80$$

$$x = 16$$

$$3(16) = 48 \quad 2(16) + 10 = 42$$

42

(Total for question 9 is 3 marks)

- 10 Adam has some marbles.  
Bradley has twice as many marbles as Adam.  
Chris has 5 more marbles than Bradley.

In total they have 55 marbles.

How many marbles does Chris have?

$$\text{Adam} = x$$

$$\text{Bradley} = 2x$$

$$\text{Chris} = 2x + 5$$

$$x + 2x + 2x + 5 = 55$$

$$5x + 5 = 55$$

$$5x = 50$$

$$x = 10$$

$$2(10) + 5 = 25$$

25

(Total for question 10 is 3 marks)

- 11 The size of the largest angle in a triangle is three times the size of the smallest angle. The other angle is  $35^\circ$  more than the smallest angle.

Work out, in degrees, the size of each angle in the triangle.  
You must show your working.

$$3x + x + x + 35 = 180$$

$$5x + 35 = 180$$

$$5x = 145$$

$$x = 29$$

$$29 + 35 = 64$$

$$3(29) = 87$$

$$29^\circ, 64^\circ, 87^\circ$$

(Total for question 11 is 5 marks)

- 12 Lucy is three times as old as Alex.  
Lucy is 7 years older than Megan.  
The sum of their ages is 126.

Find the ratio of Alex's age to Lucy's age to Megan's age.

$$\text{Alex} = x$$

$$\text{Lucy} = 3x$$

$$\text{Megan} = 3x - 7$$

$$x + 3x + 3x - 7 = 126$$

$$7x - 7 = 126$$

$$7x = 133$$

$$x = \underline{\underline{19}}$$

$$3(19) = \underline{\underline{57}}$$

$$57 - 7 = \underline{\underline{50}}$$

$$19:57:50$$

(Total for question 12 is 4 marks)

7 Solve  $x^2 + 2x - 7 = 0$

Give your answers in the form  $a \pm b\sqrt{c}$ .

$$a = 1 \quad b = 2 \quad c = -7$$

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(-7)}}{2(1)}$$

$$= -1 \pm 2\sqrt{2}$$

$$-1 \pm 2\sqrt{2}$$

(Total for question 7 is 4 marks)

8 Solve  $x^2 - 4x - 1 = 0$

Give your answers in the form  $a \pm \sqrt{b}$ .

$$a = 1 \quad b = -4 \quad c = -1$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-1)}}{2(1)}$$

$$= 2 \pm \sqrt{5}$$

$$2 \pm \sqrt{5}$$

(Total for question 8 is 4 marks)

9 Solve  $x^2 + 6x - 11 = 0$

Give your answers in the form  $a \pm b\sqrt{c}$ .

$$a = 1 \quad b = 6 \quad c = -11$$

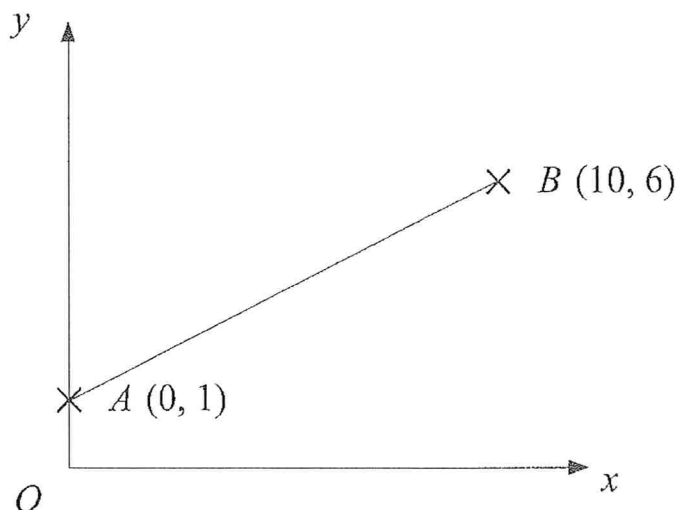
$$x = \frac{-(6) \pm \sqrt{(6)^2 - 4(1)(-11)}}{2(1)}$$

$$= -3 \pm 2\sqrt{5}$$

$$-3 \pm 2\sqrt{5}$$

(Total for question 9 is 4 marks)

1.



A is the point (0, 1)

B is the point (10, 6)

The equation of the straight line through A and B is  $y = \frac{1}{2}x + 1$

a) Write down the equation of another straight line parallel to  $y = \frac{1}{2}x + 1$

$$y = \frac{1}{2}x \quad (1)$$

b) Write down the equation of another straight line that passes through the point (0, 1)

$$y = 5x + 1 \quad (1)$$

c) Find the equation of the line perpendicular to AB passing through B.

$$AB \text{ Gradient} = \frac{1}{2}$$

$$\text{Perp. gradient} = -2$$

$$\begin{pmatrix} 10 \\ 6 \end{pmatrix}$$

$$y = -2x + c$$

$$6 = -2(10) + c$$

$$6 = -20 + c$$

$$c = 26$$

$$y = -2x + 26 \quad (3)$$



2.

A straight line, L, passes through the point with coordinates (4, 7) and is perpendicular to the line with equation  $y = 2x + 3$ .

$$m=2$$

Find an equation of the straight line L.

$$\text{perp. gradient} = -\frac{1}{2}$$

$$\begin{array}{l} (4, 7) \\ x \quad y \end{array} \quad \begin{array}{l} y = -\frac{1}{2}x + c \\ 7 = -\frac{1}{2}(4) + c \\ 7 = -2 + c \\ c = 9 \end{array}$$

$$y = -\frac{1}{2}x + 9 \quad (3)$$

3.

A straight line passes through the points (0, 5) and (3, 17).

Find the equation of the straight line.  $x_1 \quad y_1 \quad x_2 \quad y_2$

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{17 - 5}{3 - 0} \\ &= \frac{12}{3} \\ &= 4 \end{aligned}$$

$$\begin{array}{l} (0, 5) \\ x \quad y \end{array} \quad \begin{array}{l} y = 4x + c \\ 5 = 4(0) + c \\ c = 5 \end{array}$$

$$y = 4x + 5 \quad (3)$$

4. Show that line  $3y = 4x - 14$  is perpendicular to line  $4y = -3x + 48$ .

$$3y = 4x - 14 \quad (\div 3)$$

$$y = \frac{4}{3}x - \frac{14}{3}$$

$$m = \frac{4}{3}$$

$$4y = -3x + 48 \quad (\div 4)$$

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

$$m = -\frac{3}{4}$$

$$\frac{4}{3} \times -\frac{3}{4} = -1$$


---

..... (4)

5. Here are the equations of 5 straight lines.

$$P: y = 2x + 5$$

$$Q: y = -2x + 5$$

$$R: y = x + 5$$

$$S: y = -\frac{1}{2}x + 6$$

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

- a) Write down the letter of the line that is parallel to  $y = x + 6$

..... R ..... (1)

- b) Write down the letter of the line that is perpendicular to  $y = 2x - 1$

..... S ..... (1)

6. The point A has the coordinates (2,5)  
The point B has the coordinates (6,7)

a) Find the mid point of AB

$$(4, 6) \dots (2)$$

b) Find the gradient of the line that passes through AB

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \begin{matrix} (2, 5) & (6, 7) \\ x_1 & y_1 & x_2 & y_2 \end{matrix}$$

$$= \frac{7 - 5}{6 - 2}$$

$$= \frac{2}{4} = \frac{1}{2}$$

$$\dots \frac{1}{2} \dots (2)$$

c) Find the equation of the perpendicular bisector to AB

$$\text{perpendicular gradient} = -2$$

$$y = -2x + c \quad \begin{matrix} (4, 6) \\ x & y \end{matrix}$$

$$6 = -2(4) + c$$

$$6 = -8 + c$$

$$c = 14$$

$$y = -2x + 14 \dots (3)$$

7. A circle C has centre  $(x_1, y_1)$  (2,5)  
 The point A  $(x_2, y_2)$  (11, 8) lies on the circumference of the circle

Find the equation of the tangent to the circle at A

Gradient of radius:  $\frac{y_2 - y_1}{x_2 - x_1}$

$$= \frac{8 - 5}{11 - 2}$$

$$= \frac{3}{9}$$

$$= \frac{1}{3}$$

perpendicular gradient = -3

$$y = -3x + c \quad \begin{matrix} (11, 8) \\ x \quad y \end{matrix}$$

$$8 = -3(11) + c$$

$$8 = -33 + c$$

$$c = 41$$

$$y = -3x + 41 \quad (5)$$

8. A circle has the equation  $x^2 + y^2 = 5$

a) Write down the centre of the circle

$$(0, 0) \dots (1)$$

b) Write down the exact length of the radius of the circle

$$\sqrt{5} \dots (1)$$

P is the point (1, 2) on the circle  $x^2 + y^2 = 5$

c) Work out the equation of the tangent to the circle at P

$$\begin{array}{cc} (0, 0) & (1, 2) \\ x_1, y_1 & x_2, y_2 \end{array} \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{2 - 0}{1 - 0}$$
$$= 2$$

perpendicular gradient =  $-\frac{1}{2}$

$$y = -\frac{1}{2}x + c \quad \begin{array}{c} (1, 2) \\ x \quad y \end{array}$$

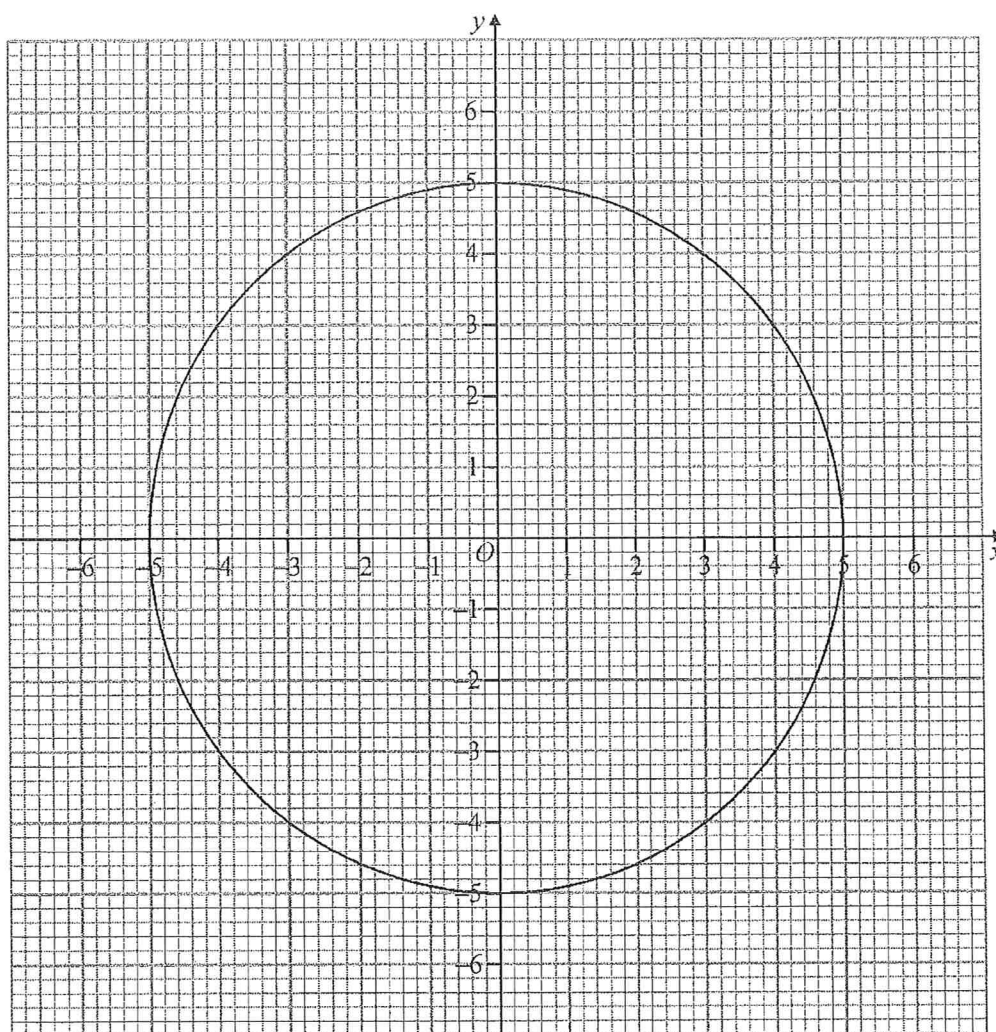
$$2 = -\frac{1}{2}(1) + c$$

$$2 = -\frac{1}{2} + c$$

$$2\frac{1}{2} = c$$

$$y = -\frac{1}{2}x + \frac{5}{2} \dots (4)$$

9. The diagram shows a circle of radius 5 cm, centre the origin.



Find the equation of the tangent to the circle at  $(3,4)$   
 $\begin{matrix} x & y \end{matrix}$

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{4 - 0}{3 - 0} \\ &= \frac{4}{3} \end{aligned}$$

perpendicular gradient =  $-\frac{3}{4}$

$$y = -\frac{3}{4}x + c$$

$$4 = -\frac{3}{4}(3) + c$$

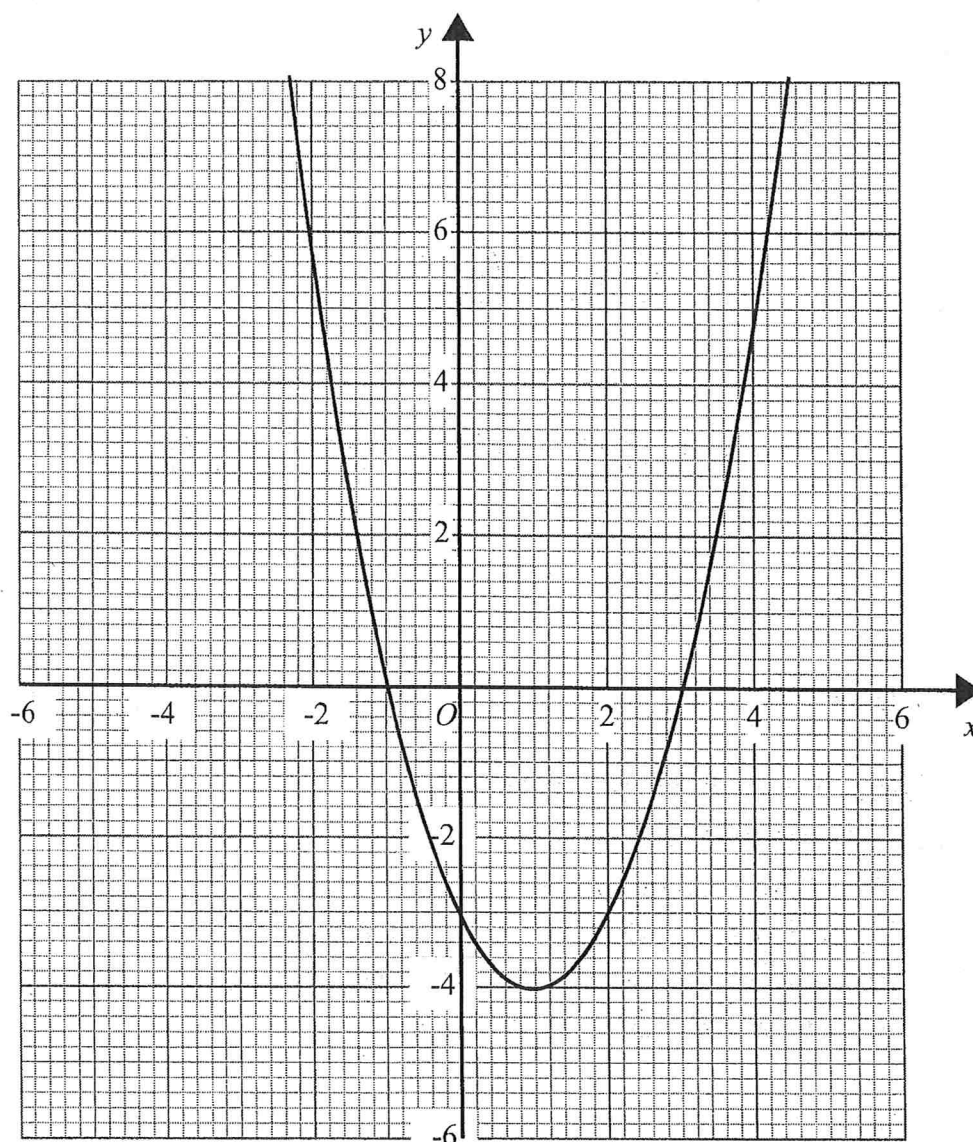
$$4 = -\frac{9}{4} + c$$

$$c = \frac{25}{4}$$

$$y = -\frac{3}{4}x + \frac{25}{4} \quad (5)$$

$$\boxed{4 = \frac{16}{4}}$$

- 1 Here is the graph of  $y = x^2 - 2x - 3$



- (a) Write down the turning point of the graph  $y = x^2 - 2x - 3$

(.....1....., .....-4.....)  
(1)

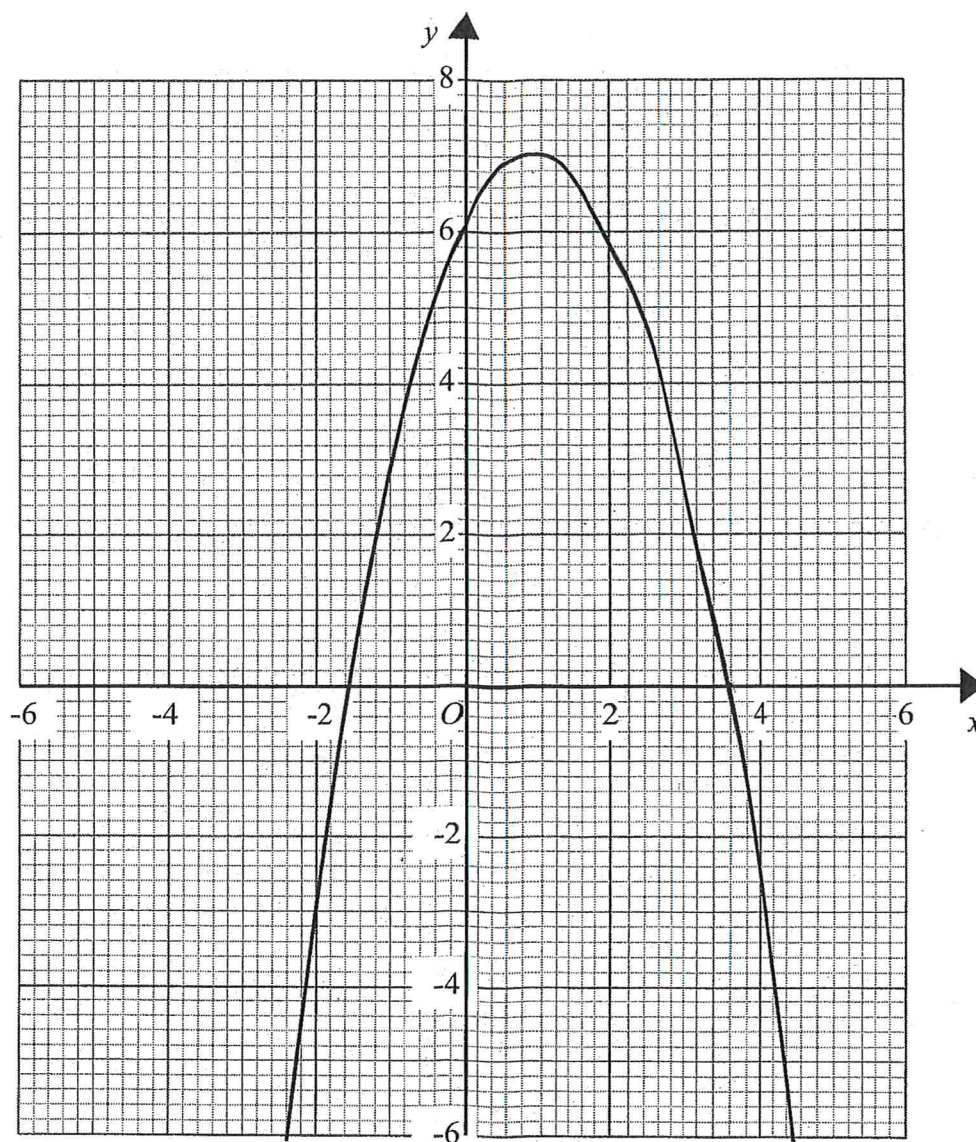
- (b) Use the graph to find the roots of the equation  $x^2 - 2x - 3 = 0$

.....-1 and 3.....  
(2)

(Total for question 1 is 3 marks)



2 Here is the graph of  $y = 2x + 6 - x^2$



(a) Write down the turning point of the graph  $y = 2x + 6 - x^2$

(.....1....., .....7.....)  
(1)

(b) Use the graph to find the roots of the equation  $x^2 = 2x + 6$

-1.6 and 3.6

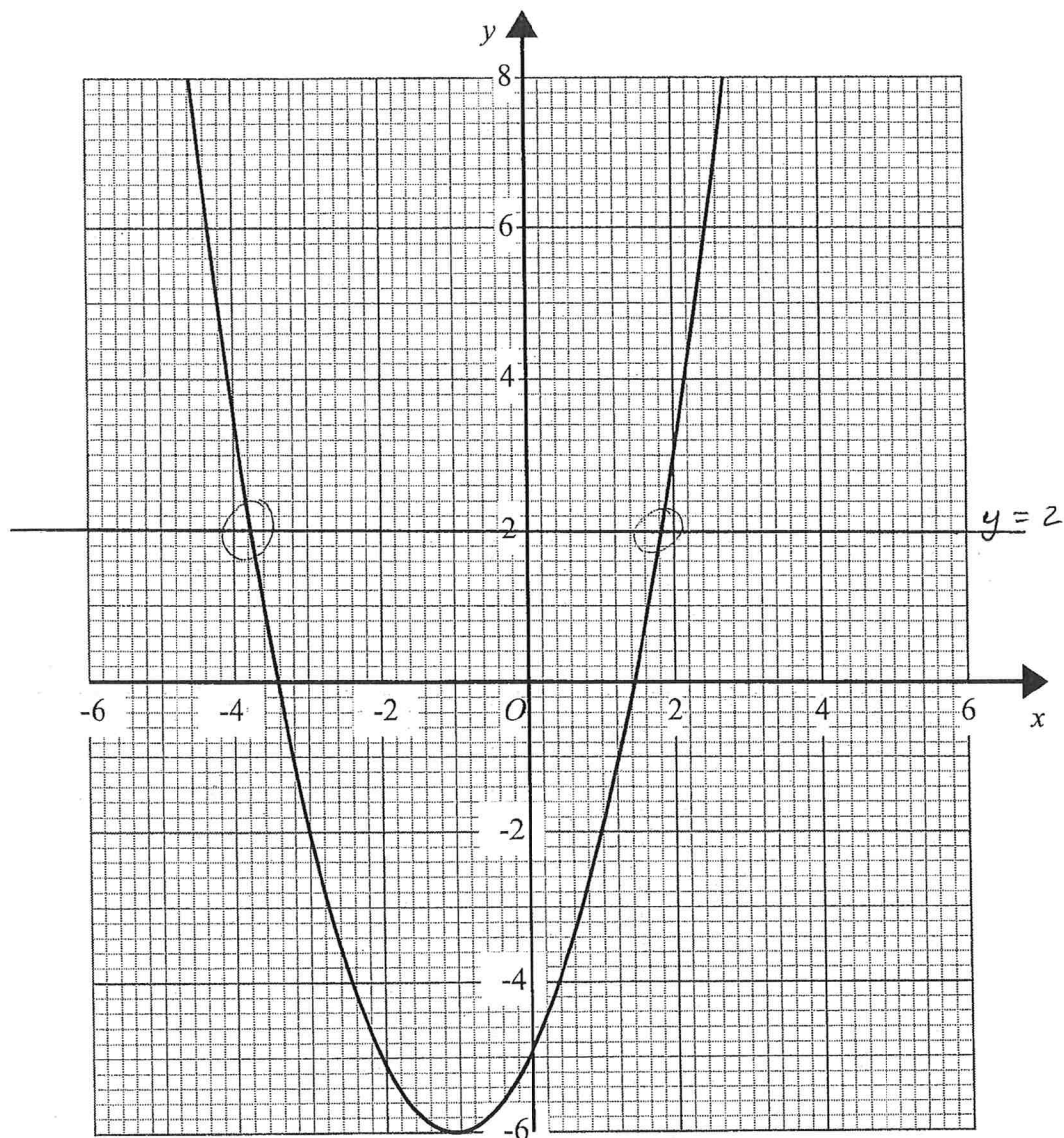
(2)

(Total for question 2 is 3 marks)

accept -1.6 to -1.5  
3.5 to 3.6



3 Here is the graph of  $y = x^2 + 2x - 5$



(a) Write down the turning point of the graph  $y = x^2 + 2x - 5$

(-1, -6)  
(1)

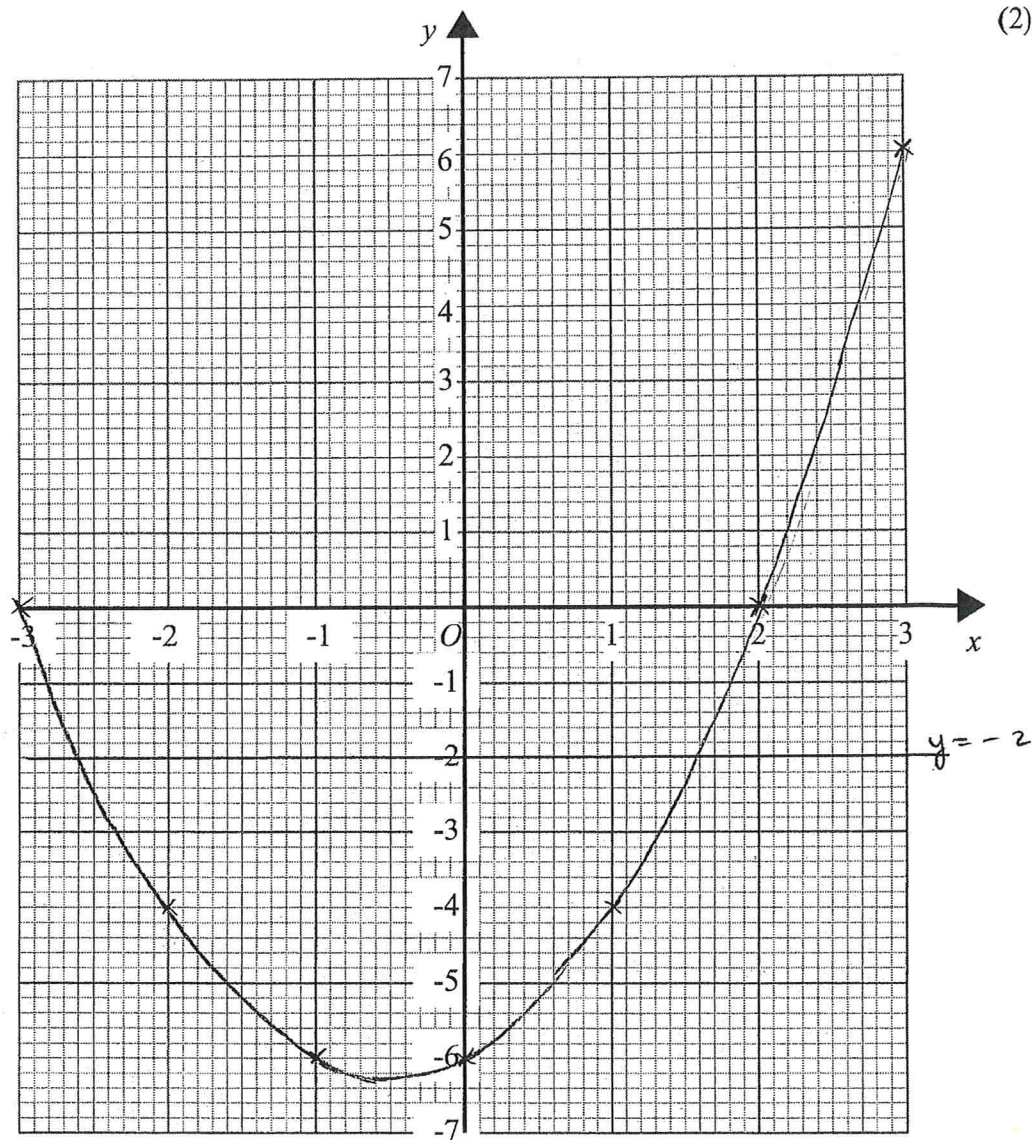
(b) Use the graph to find the roots of the equation  $x^2 + 2x - 5 = 2$

-3.8 and 1.8  
(2)

(Total for question 3 is 3 marks)

4 Complete the table of values for  $y = x^2 + x - 6$

$x$	-3	-2	-1	0	1	2	3
$y$	0	-4	-6	-6	-4	0	6



(a) On the grid draw the graph of  $y = x^2 + x - 6$  for values of  $x$  from  $-3$  to  $3$  (2)

(b) Use the graph to find estimates of the solutions to the equation  $x^2 + x - 6 = -2$

$-2.6$  and  $1.6$

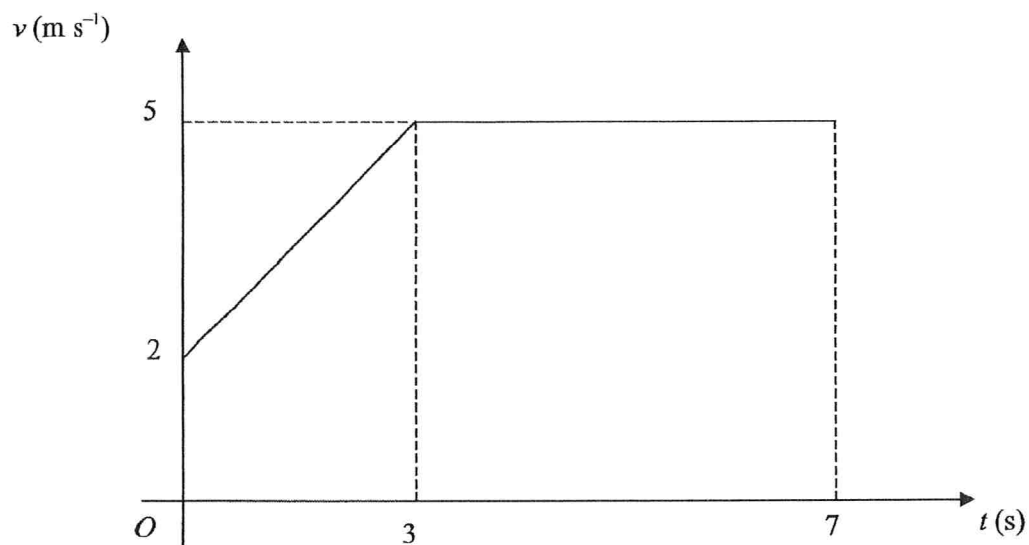
(2)

(Total for question 4 is 6 marks)

$-2.6$  to  $-2.5$

$1.5$  to  $1.6$

- 1 Below is the sketch of a speed time graph for a cyclist moving on a straight road for 7 seconds.



- (a) Work out the acceleration for the first 3 seconds.

*acceleration = gradient*

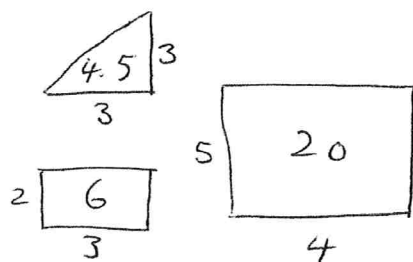
$$\frac{\text{change in } y}{\text{change in } x} = \frac{5-2}{3-0} = \frac{3}{3} = 1$$

$$\frac{1}{\dots} \text{ms}^{-2}$$

(2)

- (b) Calculate the total distance covered by the cyclist.

*total distance = area under graph*

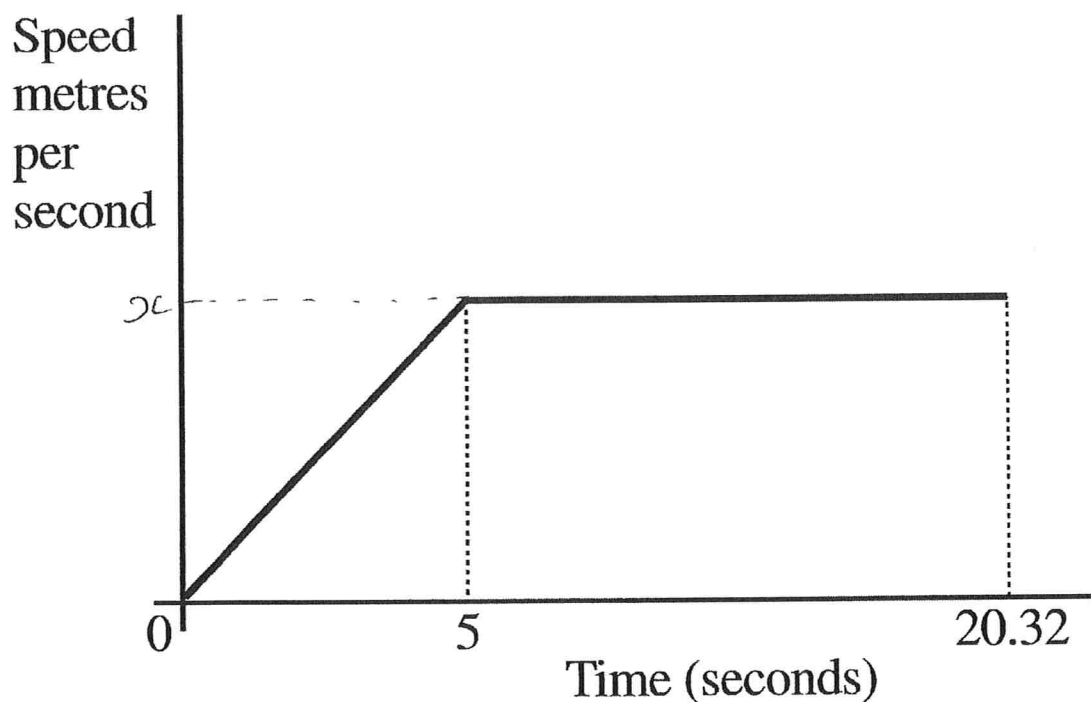


$$\frac{30.5}{\dots} \text{m}$$

(2)

(Total for question 1 is 4 marks)

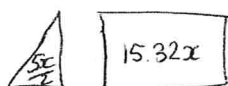
- 2 A sprinter runs a race of 200 m.  
His total time for running the race is 20.32s.  
Below is a sketch of the speed-time graph for the motion of the sprinter.



- (a) Work out the maximum speed of the sprinter during the race.

$$\text{Total area} = 200 \text{ m}$$

$$\text{Total area} = \text{distance under graph}$$



$$\frac{5x}{2} + 15.32x = 200$$

$$2.5x + 15.32x = 200$$

$$17.82x = 200$$

$$x = \frac{200}{17.82} = 11.2 \text{ ms}^{-1} \quad (3 \text{ sf})$$

$$\underline{\underline{11.2 \text{ ms}^{-1}}} \quad (4)$$

- (b) Calculate the distance covered by the sprinter in the first 5 seconds of the race.

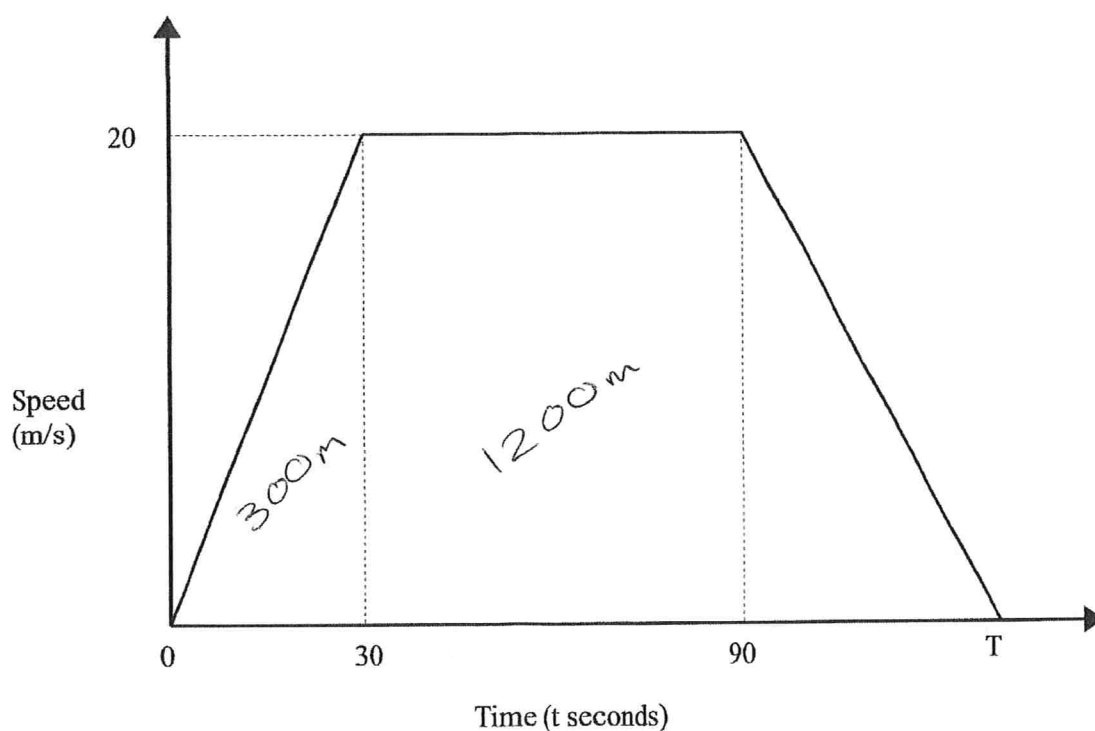
$$\frac{5(11.2)}{2} = 28.1 \text{ m} \quad (3 \text{ sf})$$

$$\underline{\underline{28.1 \text{ m}}} \quad (2)$$

(Total for question 2 is 6 marks)



3 Here is a speed-time graph for a train journey between 2 stations.



The train travelled 2km in T seconds.

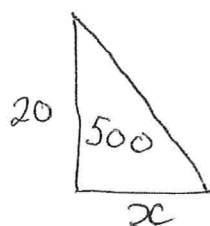
Work out the value of T.

→ 2000m

Total distance = area under graph

1500m in 90 seconds.

$2000 - 1500 = 500\text{m}$  (left)



$$\frac{20x}{2} = 500$$

$$10x = 500$$

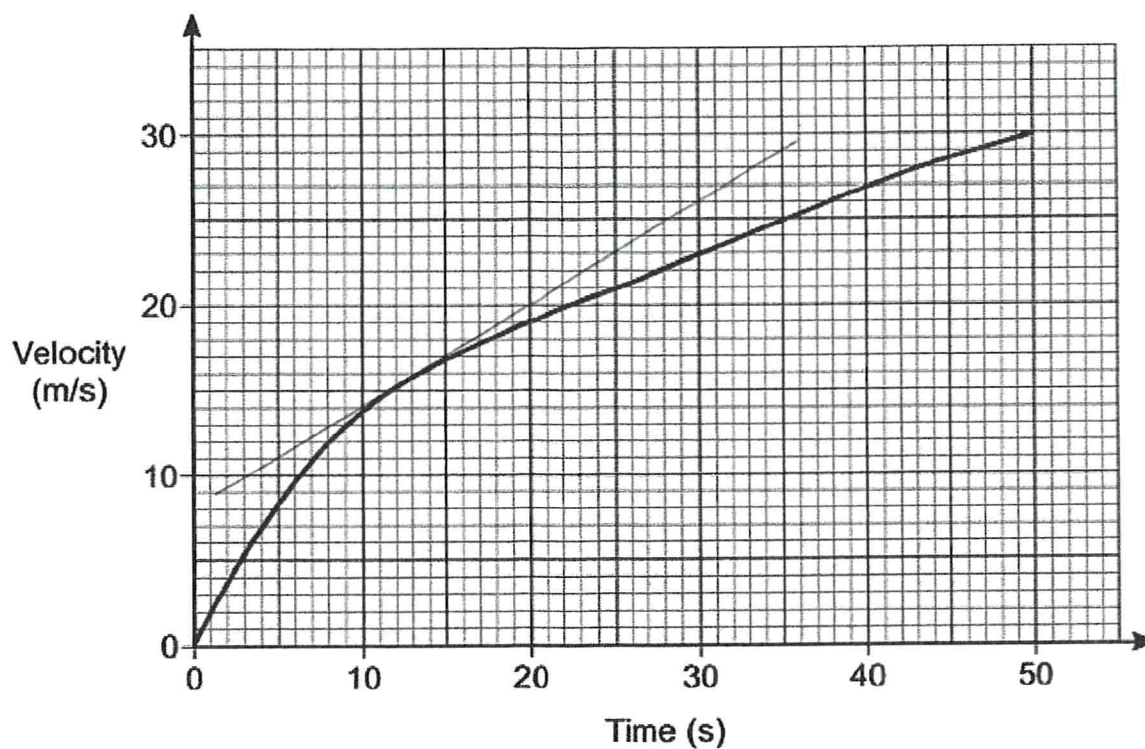
$$x = 50$$

$$90 + 50 = 140$$

140

(Total for question 3 is 3 marks)

- 4 Here is the velocity-time graph of a car for 50 seconds.



- (a) Work out the average acceleration during the 50 seconds.

Give the units of your answer.

$$\frac{30}{50} = 0.6 \text{ m s}^{-2}$$

$$\underline{0.6 \text{ m s}^{-2}}$$

(2)

- (b) Estimate the time during the 50 seconds when the instantaneous acceleration = the average acceleration.

You must show your working on the graph.

$$\underline{12 \text{ seconds}}$$

(2)

(11-13 seconds)

(Total for question 4 is 4 marks)

- 1 Write down the equation of a line parallel to  $y = 3x + 2$

$$\begin{aligned} & [y = 3x \pm \text{Anything}] \\ & y = 3x + 1 \end{aligned}$$

(Total for question 1 is 1 mark)

- 2 Write down the equation of the line parallel to  $y = \frac{1}{2}x + 5$  which passes through (0,2)

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

(Total for question 2 is 2 marks)

- 3 Write down the equation of the line parallel to  $y = -x + 1$  which passes through (0,-4)

$$y = -x - 4$$

(Total for question 3 is 2 marks)

- 4 Write down the equation of a line perpendicular to  $y = 3x + 3$

$$m = -\frac{1}{3}$$

$$\begin{aligned} & [y = -\frac{1}{3}x \pm \text{Anything}] \\ & y = -\frac{1}{3}x + 1 \end{aligned}$$

(Total for question 4 is 1 mark)

- 5 Write down the equation of the line perpendicular to  $y = \frac{1}{2}x - 4$  which passes through (0,7)

$$m = -2$$

$$y = -2x + 7$$

(Total for question 5 is 2 marks)

- 6 Write down the equation of the line perpendicular to  $y = -\frac{3}{2}x - 1$  which passes through (0,-8)

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

$$y = \frac{2}{3}x - 8$$

(Total for question 6 is 2 marks)

- 7 Find the equation of the line parallel to  $2y - 3x + 2 = 0$  which passes through  $(0,4)$

$$\begin{aligned}2y &= 3x - 2 \\ y &= \frac{3}{2}x - 1 \\ m &= \frac{3}{2}\end{aligned}$$

$$y = \frac{3}{2}x + 4$$

(Total for question 7 is 2 marks)

- 8 Find the equation of the line parallel to  $2x + 5y = 10$  which passes through  $(0,-3)$

$$\begin{aligned}5y &= -2x + 10 \\ y &= -\frac{2}{5}x + 2 \\ m &= -\frac{2}{5}\end{aligned}$$

$$y = -\frac{2}{5}x - 3$$

(Total for question 8 is 2 marks)

- 9 Find the equation of the line perpendicular to  $5y = 2x - 4$  which passes through  $(0,7)$

$$y = \frac{2}{5}x - \frac{4}{5}$$

perpendicular  $m = -\frac{5}{2}$

$$y = -\frac{5}{2}x + 7$$

(Total for question 9 is 2 marks)



10 Here are the equations of five straight lines.

Line A  $y = 2x - 3$

Line B  $2y = x + 3$

Line C  $4y = 3x - 2$

Line D  $2y = 4x - 1$

Line E  $3y = 2x - 2$

A:  $m = 2$

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

C:  $y = \frac{3}{4}x - \frac{1}{2}$   $m = \frac{3}{4}$

D:  $y = 2x - \frac{1}{2}$   $m = 2$

Two of these lines are parallel.

Write down the two parallel lines.

Line A and Line D  
(Total for question 10 is 1 mark)

11 Here are the equations of five straight lines.

Line A  $y + 3x = 4$

Line B  $2y = x + 1$

Line C  $y + 2x = 3$

Line D  $y = 4x - 2$

Line E  $2y = 2x - 1$

A:  $y = -3x + 4$   $m = -3$

B:  $y = \frac{1}{2}x + \frac{1}{2}$   $m = \frac{1}{2}$

C:  $y = -2x + 3$   $m = -2$

Two of these lines are perpendicular.

Write down the two perpendicular lines.

Line B and Line C  
(Total for question 11 is 1 mark)

- 12 Line A passes through the points  $x_1, y_1$  and  $x_2, y_2$  (2, 1) and (5, 10)  
Find the equation of the line parallel to A that passes through (2,5)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{10 - 1}{5 - 2} = \frac{9}{3} = \underline{\underline{3}}$$

$$y = 3x + c \quad \begin{matrix} (2, 5) \\ x \quad y \end{matrix}$$

$$5 = 3(2) + c$$

$$5 = 6 + c$$

$$\underline{\underline{c = -1}}$$

$$y = 3x - 1$$

(Total for question 12 is 3 marks)

- 13 Line A passes through the points  $x_1, y_1$  and  $x_2, y_2$  (1, 5) and (5, 7)  
Find the equation of the line perpendicular to A that passes through (-1,7)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{7 - 5}{5 - 1} = \frac{2}{4} = \frac{1}{2}$$

perp.  $m = -2$

$$y = -2x + c \quad (-1, 7)$$

$$7 = -2(-1) + c$$

$$7 = 2 + c$$

$$\underline{\underline{c = 5}}$$

$$y = -2x + 5$$

(Total for question 13 is 2 marks)

- 14 Line A passes through the points  $(-2, 1)$  and  $(4, 10)$   
Find the equation of the line parallel to A that passes through  $(2, 7)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{10 - 1}{4 - (-2)} = \frac{9}{6} = \frac{3}{2}$$

$$y = \frac{3}{2}x + c \quad (2, 7)$$

$$7 = \frac{3}{2}(2) + c$$

$$7 = 3 + c$$

$$\underline{\underline{c = 4}}$$

$$y = \frac{3}{2}x + 4$$

(Total for question 14 is 3 marks)

- 15 Line A passes through the points  $(2, -5)$  and  $(10, -1)$   
Find the equation of the line perpendicular to A that passes through  $(4, 3)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{-1 - (-5)}{10 - 2} = \frac{4}{8} = \frac{1}{2}$$

$$\text{perp } m = -2$$

$$y = -2x + c \quad (4, 3)$$

$$3 = -2(4) + c$$

$$3 = -8 + c$$

$$c = 11$$

$$y = -2x + 11$$

(Total for question 15 is 2 marks)

- 16 Line A passes through the points  $(x_1, y_1)$  and  $(x_2, y_2)$   
 Line B passes through the points  $(4, 7)$  and  $(2, 1)$   
 Show that Line A and Line B are parallel.

$$A: m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{10 - 1}{5 - 2} = \frac{9}{3} = 3$$

$$\underline{\underline{m = 3}}$$

$$B: m = \frac{1 - 7}{2 - 4} = \frac{-6}{-2} = 3$$

$$\underline{\underline{m = 3}}$$

Same gradient  $\therefore$  parallel.

(Total for question 16 is 4 marks)

- 17 Line A passes through the points  $(x_1, y_1)$  and  $(x_2, y_2)$   
 Line B passes through the points  $(-1, 7)$  and  $(2, 1)$   
 Show that Line A and Line B are perpendicular.

$$A: m = \frac{7 - 5}{5 - 1} = \frac{2}{4} = \underline{\underline{\frac{1}{2}}}$$

$$B: m = \frac{1 - 7}{2 - -1} = \frac{-6}{3} = \underline{\underline{-2}}$$

$$\frac{1}{2} \times -2 = -1$$

$\therefore$  A and B are perpendicular.

(Total for question 17 is 4 marks)

- 18  $x_1 \ y_1 \ x_2 \ y_2$   
Line A passes through the points (3, 6) and (5, -2)  
Line B passes through the points (2, 5) and (8, k)

Line A and Line B are parallel.

Find the value of k.

$$A: m = \frac{-2 - 6}{5 - 3} = \frac{-8}{2} = -4$$

B's gradient is -4

$$-4 = \frac{k - 5}{8 - 2}$$

$$-4 = \frac{k - 5}{6}$$

$$-24 = k - 5$$

$$\underline{\underline{-19 = k}}$$

$$k = \underline{\underline{-19}}$$

(Total for question 18 is 4 marks)

- 19  $x_1 \ y_1 \ x_2 \ y_2$   
Line A passes through the points (-3, -1) and (-1, 9)  
Line B passes through the points (-2, 1) and (k, 4)

Line A and Line B are perpendicular.

Find the value of k.

$$A: m = \frac{9 - -1}{-1 - -3} = \frac{10}{2} = 5$$

$$\text{perp } m = -\frac{1}{5}$$

$$B: -\frac{1}{5} = \frac{4 - 1}{k - -2}$$

$$-\frac{1}{5} = \frac{3}{k + 2}$$

$$-(k + 2) = 15$$

$$-k - 2 = 15$$

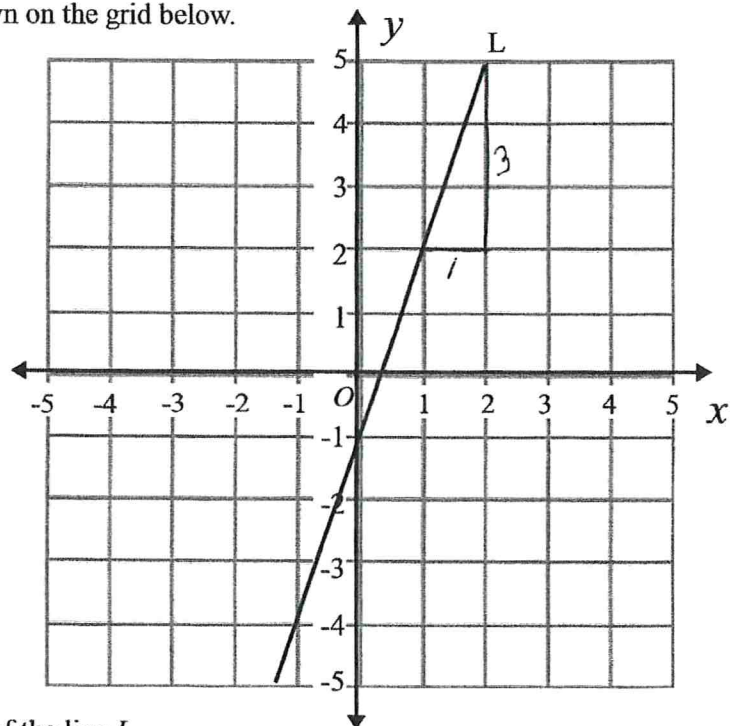
$$-2 = 15 + k$$

$$\underline{\underline{k = -17}}$$

$$k = \underline{\underline{-17}}$$

(Total for question 19 is 4 marks)

- 1 The line  $L$  is drawn on the grid below.

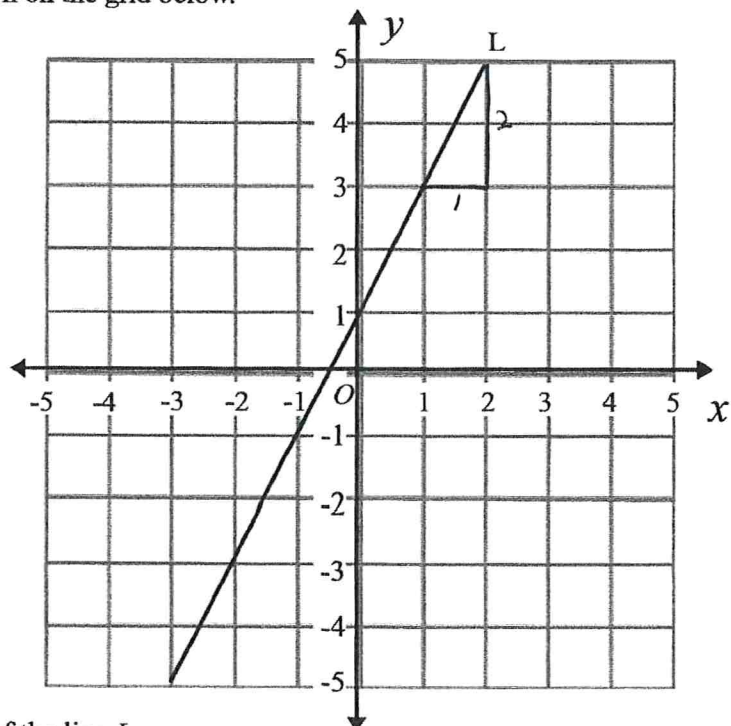


Find the gradient of the line  $L$ .

3

(Total for question 1 is 1 mark)

- 2 The line  $L$  is drawn on the grid below.

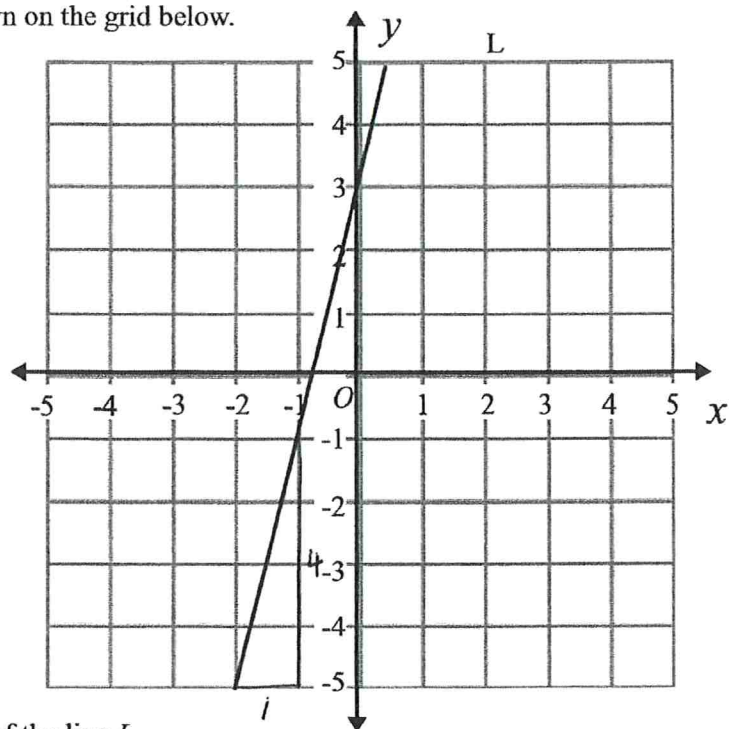


Find the gradient of the line  $L$ .

2

(Total for question 2 is 1 mark)

- 3 The line  $L$  is drawn on the grid below.

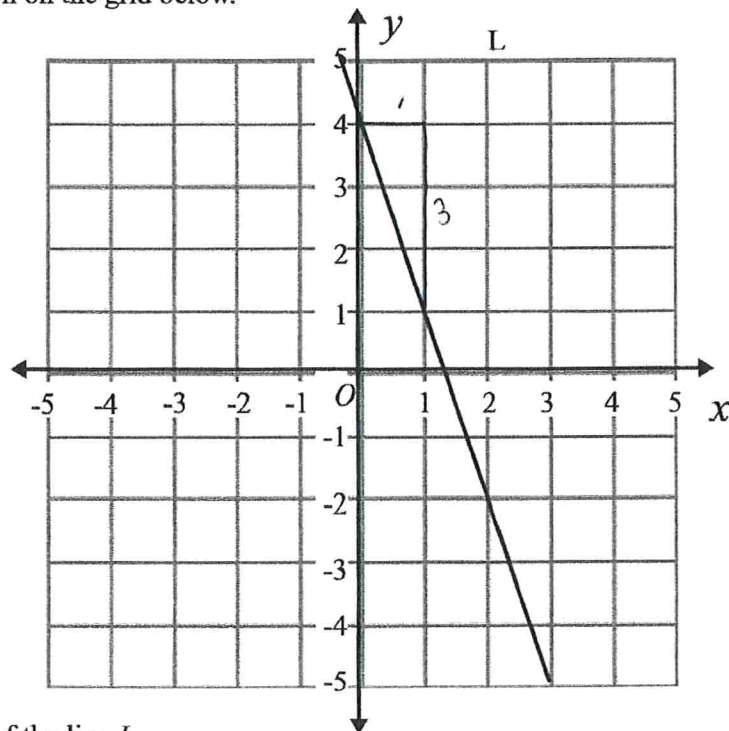


Find the gradient of the line  $L$ .

4

(Total for question 3 is 1 mark)

- 4 The line  $L$  is drawn on the grid below.



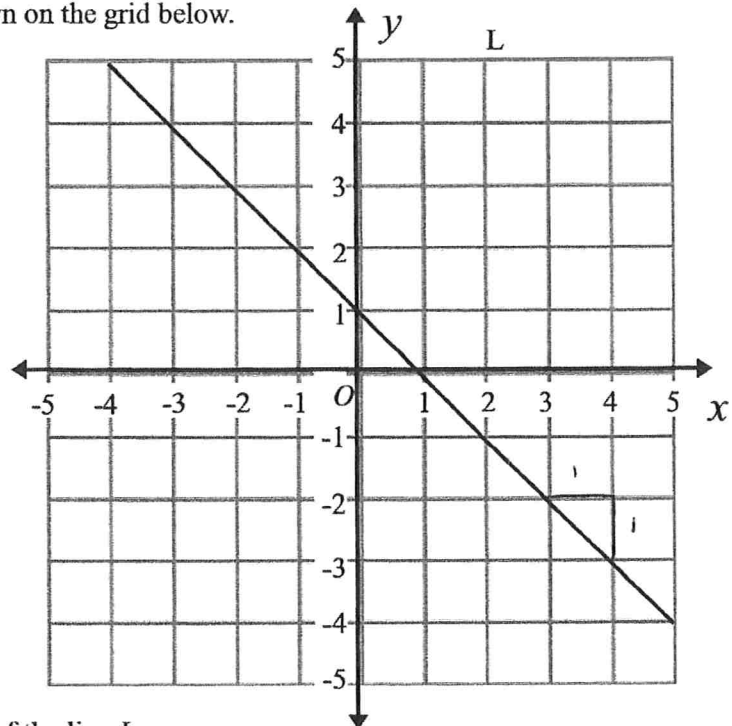
Find the gradient of the line  $L$ .

-3

(Total for question 4 is 1 mark)



- 5 The line  $L$  is drawn on the grid below.

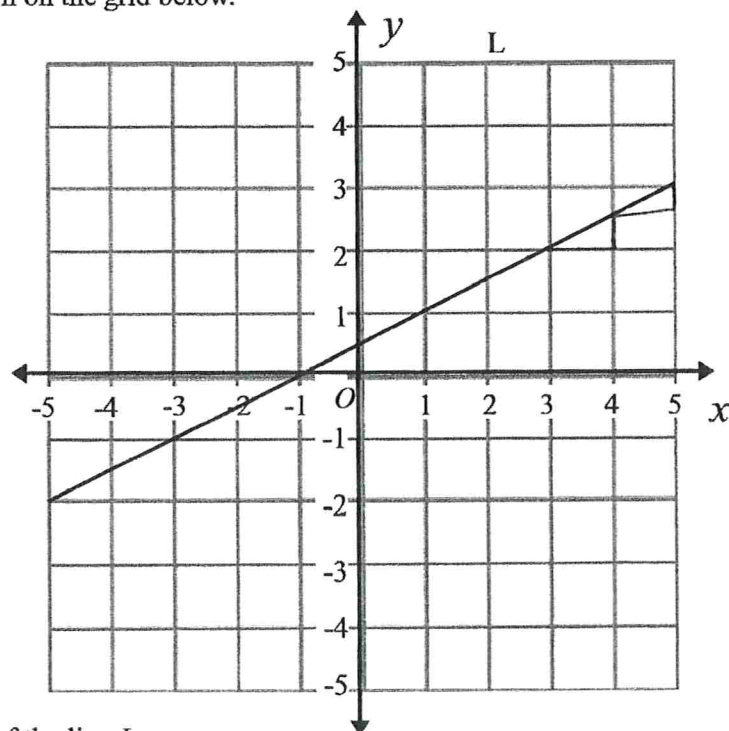


Find the gradient of the line  $L$ .

.....  $-1$  .....

(Total for question 5 is 1 mark)

- 6 The line  $L$  is drawn on the grid below.



Find the gradient of the line  $L$ .

.....  $\frac{1}{2}$  .....

(Total for question 6 is 1 mark)



- 7 Find the gradient of the line that passes through (2, 1) and (5, 10).

$x_1 \ y_1 \ x_2 \ y_2$

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{10 - 1}{5 - 2} \\ &= \frac{9}{3} \end{aligned}$$

3

(Total for question 7 is 2 marks)

- 8 Find the gradient of the line that passes through (5, 4) and (7, 0).

$x_1 \ y_1 \ x_2 \ y_2$

$$\begin{aligned} m &= \frac{0 - 4}{7 - 5} \\ &= \frac{-4}{2} \\ &= -2 \end{aligned}$$

-2

(Total for question 8 is 2 marks)

- 9 Find the gradient of the line that passes through (-3, 4) and (5, 8).

$x_1 \ y_1 \ x_2 \ y_2$

$$\begin{aligned} m &= \frac{8 - 4}{5 - (-3)} \\ &= \frac{4}{8} \\ &= \frac{1}{2} \end{aligned}$$

$\frac{1}{2}$

(Total for question 9 is 2 marks)

- 10 Find the gradient of the line that passes through (3, 7) and (1, 10).

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{10 - 7}{1 - 3}$$

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

$$= -1.5$$

$$-1.5$$

(Total for question 10 is 2 marks)

- 11 Find the gradient of the line that passes through (1, -1) and (-3, -9).

$$x_1 \ y_1 \ x_2 \ y_2$$

$$m = \frac{-9 - -1}{-3 - 1}$$

$$= \frac{-8}{-4}$$

$$= 2$$

$$2$$

(Total for question 11 is 2 marks)

- 12 Find the gradient of the line that passes through (8, 1) and (3, -3).

$$x_1 \ y_1 \ x_2 \ y_2$$

$$m = \frac{-3 - 1}{3 - 8}$$

$$= \frac{-4}{-5}$$

$$= \frac{4}{5}$$

$$\frac{4}{5}$$

(Total for question 12 is 2 marks)

- 13 Find the gradient of the line that passes through (3, -1) and (-2, 9).

$$x_1 \quad y_1 \quad x_2 \quad y_2$$

$$\begin{aligned} m &= \frac{9 - -1}{-2 - 3} \\ &= \frac{10}{-5} \\ &= -2 \end{aligned}$$

-2

(Total for question 13 is 2 marks)

- 14 Find the gradient of the line that passes through (-1, -2) and (-3, 10).

$$x_1 \quad y_1 \quad x_2 \quad y_2$$

$$\begin{aligned} m &= \frac{10 - -2}{-3 - -1} \\ &= \frac{12}{-2} \\ &= -6 \end{aligned}$$

-6

(Total for question 14 is 2 marks)

- 15 Find the gradient of the line that passes through (-3, 4) and (-5, 7).

$$x_1 \quad y_1 \quad x_2 \quad y_2$$

$$\begin{aligned} m &= \frac{7 - 4}{-5 - -3} \\ &= \frac{3}{-2} \\ &= -1.5 \end{aligned}$$

-1.5

(Total for question 15 is 2 marks)

- 16 The line  $AB$  passes through the points  $A(2, -1)$  and  $(6, k)$ .

The gradient of  $AB$  is 5.

$$x_1 \ y_1 \ x_2 \ y_2$$

Work out the value of  $k$ .

$$5 = \frac{k - -1}{6 - 2}$$

$$5 = \frac{k + 1}{4}$$

$$20 = k + 1$$

$$k = 19$$

$$k = 19$$

(Total for question 16 is 3 marks)

- 17 The line  $AB$  passes through the points  $A(-3, 4)$  and  $(k, 12)$ .

The gradient of  $AB$  is 4.

$$x_1 \ y_1 \ x_2 \ y_2$$

Work out the value of  $k$ .

$$4 = \frac{12 - 4}{k - -3}$$

$$4 = \frac{8}{k + 3}$$

$$4(k + 3) = 8$$

$$k + 3 = 2$$

$$k = -1$$

$$k = -1$$

(Total for question 17 is 3 marks)

- 18 The line  $AB$  passes through the points  $A(-2, k)$  and  $(4, 8)$ .

The gradient of  $AB$  is -2.

$$x_1 \ y_1 \ x_2 \ y_2$$

Work out the value of  $k$ .

$$-2 = \frac{8 - k}{4 - -2}$$

$$-2 = \frac{8 - k}{6}$$

$$-12 = 8 - k$$

$$-12 + k = 8$$

$$k = 20$$

$$k = 20$$

(Total for question 18 is 3 marks)

- 1 Work out 10% of £95

$$\frac{95}{10}$$

£ 9.50

(Total for question 1 is 1 mark)

- 2 Work out 50% of 1200 grams

$$\frac{1200}{2}$$

600

grams

(Total for question 2 is 1 mark)

- 3 Work out 1% of 200 litres

$$\frac{200}{100}$$

2

litres

(Total for question 3 is 1 mark)

- 4 Find 21% of £160

$$\frac{160}{10} = 16$$

$$16 \times 2 = 32 \text{ (20\%)}$$

$$\frac{160}{100} = 1.6 \text{ (1\%)}$$

$$32 + 1.6$$

£ 33.60

(Total for question 4 is 2 marks)

- 5 Find 45% of 820

$$\frac{820}{2} = 410 \text{ (50\%)}$$

$$\frac{410}{10} = 41 \text{ (5\%)}$$

$$\begin{array}{r} 410 \\ - 41 \\ \hline \end{array}$$

369

(Total for question 5 is 2 marks)

- 6 Find 36% of 2500

$$\frac{2500}{10} = 250$$

$$\frac{250}{2} = 125 \text{ (5\%)}$$

$$250 \times 3 = 750 \text{ (30\%)}$$

$$\frac{2500}{100} = 25 \text{ (1\%)}$$

900

$$750 + 125 + 25$$

(Total for question 6 is 2 marks)

7 Work out 252% of 120.

$$\begin{aligned}100\% &= 120 \\120 \times 2 &= 240 \text{ (200\%)} \\ \frac{120}{2} &= 60 \text{ (50\%)} \\ \frac{120}{100} &= 1.2 \text{ (1\%)} \\1.2 \times 2 &= 2.4 \text{ (2\%)}\end{aligned}$$

$$\begin{array}{r}240 \\60 \\+ 2.4 \\ \hline\end{array}$$

302.4  
(Total for question 7 is 2 marks)

8 Which is greater

25% of 90 or 28% of 82

You must show your working.

$$\begin{aligned}\frac{90}{2} &= 45 \text{ (50\%)} \\ \frac{45}{2} &= \underline{\underline{22.5}} \text{ (25\%)}\end{aligned}$$

$$\begin{aligned}\frac{82}{10} &= 8.2 \\8.2 \times 3 &= 24.6 \text{ (30\%)} \\ \frac{82}{100} &= 0.82 \\0.82 \times 2 &= 1.64 \text{ (2\%)} \\24.6 - 1.64 &= \underline{\underline{22.96}} \\ \dots 28\% \text{ of } 82 &\end{aligned}$$

(Total for question 8 is 3 marks)

9 Which is greater

30% of 105 or 32% of 98

You must show your working.

$$\begin{aligned}\frac{105}{10} &= 10.5 \\10.5 \times 3 &= \underline{\underline{31.5}}\end{aligned}$$

$$\begin{aligned}\frac{98}{10} &= 9.8 \\9.8 \times 3 &= 29.4 \text{ (30\%)} \\ \frac{98}{100} &= 0.98 \\0.98 \times 2 &= 1.96 \text{ (2\%)} \\29.4 + 1.96 &= \underline{\underline{31.36}} \\ \dots 32\% \text{ of } 98 &\end{aligned}$$

(Total for question 9 is 3 marks)

- 10 Richard gets a bonus of 30% of £130  
Connor gets a bonus of £40

Work out the difference between the bonus Richard gets and the bonus Connor gets

$$\frac{130}{10} = 13$$

$$13 \times 3 = \underline{\underline{39}}$$

$$40 - 39 = 1$$

£...../

(Total for question 10 is 3 mark)

- 11 There are adults and children in a cinema.  
There are 48 adults.  
25% of the people at the cinema are children.

Work out the total number of people at the cinema.

$$48 = 75\%$$

$$\div 3 \quad \div 3$$

$$16 = 25\%$$

$$\times 4 \quad \times 4$$

$$64 = 100\%$$

64

(Total for question 11 is 3 marks)

- 12 David is paid £34000 per year.  
He is going to get a 3% increase in the amount of money he is paid.

Work out how much money David will be paid per year after the increase

$$\frac{34000}{100} = 340 \quad (1\%)$$

$$340 \times 3 = 1020$$

$$\begin{array}{r} 34000 \\ + 1020 \\ \hline 35020 \end{array}$$

£ 35020

(Total for question 12 is 2 marks)

- 13 Abbie buys a sofa for £540  
She pays a deposit of 15% and the rest of the money in monthly payments of £17.

How many monthly payments will Abbie need to pay?

$$\frac{540}{10} = 54 \quad (10\%)$$

$$\frac{54}{2} = 27 \quad (5\%)$$

$$54 + 27 = 81 \quad (15\%)$$

$$\begin{array}{r} 540 \\ - 81 \\ \hline 459 \end{array} \quad \text{left to pay}$$

$$\begin{array}{r} 27 \\ 17 \overline{) 459} \end{array}$$

27

(Total for question 13 is 3 marks)



- 14 Dermot bakes 420 cakes.  
He bakes only vanilla cakes, banana cakes and lemon cakes.  
120 of the cakes are vanilla cakes.  
35% of the cakes are banana cakes.

Work out the number of lemon cakes Dermot bakes.

$$\frac{420}{10} = 42 \quad (10\%)$$

$$\frac{42}{2} = 21 \quad (5\%)$$

$$42 \times 3 = 126 \quad (30\%)$$

$$126 + 21 = 147$$

$$\begin{array}{r} 420 \\ - 120 \\ \hline 300 \end{array}$$

$$\begin{array}{r} 300 \\ - 147 \\ \hline 153 \end{array}$$

153

(Total for question 14 is 3 marks)

- 15 Amelia and Sophie did a test.  
The total for the test was 75 marks.

Amelia got 56% of the 75 marks.  
Sophie got 43 out of 75

Who got the highest mark?  
You must show all your working.

$$\frac{75}{2} = 37.5 \quad (50\%)$$

$$\frac{37.5}{10} = 3.75 \quad (5\%)$$

$$\frac{75}{100} = 0.75 \quad (1\%)$$

$$\begin{array}{r} 37.5 \\ 3.75 \\ + 0.75 \\ \hline 42.00 \end{array}$$

$\frac{42}{75}$  Amelia

Sophie

(Total for question 15 is 2 marks)

- 16 Zoe wants to buy 6 tins of beans for the cheapest possible price.

Shop A and Shop B both have a special offer.

**Shop A**

5% off the normal price of 48p  
(each)

**Shop B**

65p each  
Buy 2 get 1 free

Which shop should Zoe buy the beans from?  
You must show how you get your answer.

$$6 \times 0.48$$

$$\begin{array}{r} 48 \\ \times 6 \\ \hline 288 \end{array}$$

$$£2.88$$

$$10\% = 28.8p$$

$$5\% = 24.4p$$

$$2.88 - 0.24 = £2.64$$

Shop B

pay for 4 get 2 free

$$0.65 \times 4 = £2.60$$

Shop B

(Total for question 16 is 3 marks)

- 17 Gary buys a dress in a sale.  
The normal price of the dress is reduced by 20%  
The normal price is £36.80

Work out the sale price of the dress.

$$\frac{36.80}{10} = £3.68 \quad (10\%)$$

$$3.68 \times 2 = £7.36 \quad (20\%)$$

$$\begin{array}{r} 2 \times 36.80 \\ 7.36 \\ \hline 29.44 \end{array}$$

£ 29.44

(Total for question 17 is 3 marks)

- 18 Holly invests £500 for 4 years in a bank account.  
The account pays simple interest at a rate of 1.5% per year.

Work out the total amount of interest Holly has got at the end of 4 years.

$$\begin{aligned} & \cancel{4 \times 1.5 = 6} \\ & \frac{500}{100} = 5 \quad (1\%) \\ & \frac{5}{2} = 2.5 \quad (0.5\%) \\ & 5 + 2.5 = 7.5 \quad (1.5\%) \\ & 7.5 \times 4 = \underline{30} \end{aligned}$$

£.....30.....

(Total for question 18 is 3 marks)

- 19 Phil invests £800 for 3 years in a bank account.  
The account pays simple interest at a rate of 2% per year.

Work out the total amount of interest Phil has got at the end of 3 years.

$$\begin{aligned} & \frac{800}{100} = 8 \quad (1\%) \\ & 8 \times 2 = 16 \quad (2\%) \end{aligned}$$

$$16 \times 3 = \pounds 48$$

£.....48.....

(Total for question 19 is 2 marks)

- 1 Write down the ratio of 350 cm to 25 cm.  
Give your answer in its simplest form.

$$\begin{array}{r} 350 : 25 \\ \div 25 \quad \div 25 \\ 14 : 1 \end{array}$$

$$14 : 1$$

(Total for question 1 is 2 marks)

- 2 Write down the ratio of 220 kg to 5 kg.  
Give your answer in its simplest form.

$$\begin{array}{r} 220 : 5 \\ \div 5 \quad \div 5 \\ 44 : 1 \end{array}$$

$$44 : 1$$

(Total for question 2 is 2 marks)

- 3 Alex has the following coins:



Write down the ratio of the value of Alex's 20p coins to the value of Alex's 50p coins.

$$\begin{array}{r} 40 : 150 \\ 4 : 15 \end{array}$$

$$4 : 15$$

(Total for question 3 is 2 marks)

- 4 (a) Write the ratio 32 : 24 in its simplest form

$$\div 8 \quad \div 8$$

$$4 : 3$$

$$\frac{4 : 3}{(1)}$$

- (b)  $\frac{1}{9}$  of people in a class are left handed.

Write the ratio of left handed people to right handed people

$$\frac{1}{9} : \frac{8}{9}$$

$$1 : 8$$

$$\frac{1 : 8}{(1)}$$

(Total for question 7 is 2 marks)

- 5 (a) Write the ratio 15 : 35 in its simplest form.

$$\div 5 \quad \div 5$$

$$3 : 7$$

$$\frac{3 : 7}{(1)}$$

- (b) There are red shapes and blue shapes in a box,  $\frac{2}{3}$  of the shapes are red.

Write the ratio of red shapes to blue shapes.

$$\frac{2}{3} : \frac{1}{3}$$

$$2 : 1$$

$$\frac{2 : 1}{(1)}$$

(Total for question 9 is 2 marks)

- 6 (a) Write the ratio 81 : 27 in its simplest form

$$\div 9 \quad \div 9$$

$$9 : 3$$

$$\div 3 \quad \div 3$$

$$3 : 1$$

$$3 : 1$$

(1)

- (b)  $\frac{3}{8}$  of chocolates in a box are white chocolate, the rest are milk chocolate.

Write the ratio of white chocolates to milk chocolates.

$$\frac{3}{8} : \frac{5}{8}$$

$$3 : 5$$

$$3 : 5$$

(1)

(Total for question 6 is 2 marks)

- 7 (a) Write the ratio 24 : 72 in its simplest form.

$$\div 8 \quad \div 8$$

$$3 : 9$$

$$1 : 3$$

$$1 : 3$$

(1)

- (b) In February, it rained on  $\frac{3}{7}$  of days

Write the ratio of the days it rained to the number of days it did not rain.

$$\frac{3}{7} : \frac{4}{7}$$

$$3 : 4$$

$$3 : 4$$

(1)

(Total for question 9 is 2 marks)

- 8 Write the ratio  $7.5 : 2.5$  in the form  $n : 1$

$$\div 2.5 \quad \div 2.5$$

$$3 : 1$$

$$3 : 1$$

(Total for question 8 is 1 mark)

- 9 Write the ratio  $12 : 30$  in the form  $1 : n$

$$6 : 15$$

$$2 : 5$$

$$1 : 2.5$$

$$1 : 2.5$$

(Total for question 9 is 1 mark)

- 10 There are some cubes in a bag.

$\frac{1}{6}$  of the cubes are red.

The rest of the cubes are blue.

Write the ratio of the number of red cubes to the number of blue cubes.

Give your answer in the form  $1 : n$

$$\frac{1}{6} : \frac{5}{6}$$

$$1 : 5$$

$$1 : 5$$

(Total for question 10 is 2 marks)

- 11 There are only blue counters, red counters and yellow counters in a bag.

There are twice as many blue counters as yellow counters.

$$B : Y$$

$$2 : 1$$

There are three times as many red counters as yellow counters.

$$R : Y$$

$$3 : 1$$

Write down the ratio of blue counters to red counters to yellow counters.

$$B : R : Y$$

$$2 : 3 : 1$$

---

(Total for question 11 is 2 marks)

- 12 There are only green pens, black pens and red pens in a box.

There are four times as many green pens as black pens.

$$4 : 1$$

There are twice as many red pens as green pens.

$$4 : 8$$

Write down the ratio of green pens to black pens to red pens.

$$G : B : R$$

$$4 : 1 : 8$$

$$4 : 1 : 8$$

---

(Total for question 12 is 2 marks)



- 13 Charlotte, Jo and Mike played a game.

Charlotte's scored four times as many points as Jo.  
Mike's scored half as many points as Charlotte.

Write down the ratio of Charlotte's points to Jo's points to Mike's points

$$C : J : m$$
$$4 : 1 : 2$$

$$4 : 1 : 2$$

(Total for question 13 is 2 marks)

- 14 There are 120 people in a school canteen.  
Half of the people in the canteen are in year 11 students. 60

The number of year 11 students in the canteen is three times the number of year 10 students.  
The rest of the people in the canteen are year 9 students.

$$\frac{60}{3} = 20$$

the number of year 9 students : the number of year 10 students =  $n : 1$

Work out the value of  $n$ .

You must show how you get your answer.

$$120 - 60 - 20 = 40 \quad \text{YEAR 9}$$

$$40 : 20$$
$$2 : 1$$

$$n = 2$$

(Total for question 14 is 2 marks)

- 15 In a bag there are blue sweets, red sweets and yellow sweets.

The number of red sweets is three times the number of blue sweets.

The number of yellow sweets is half the number of red sweets.

Write down the ratio of blue sweets to red sweets to yellow sweets.

Give your answer in the form  $a : b : c$  where  $a$ ,  $b$  and  $c$  are whole numbers

$$B : R : Y$$

$$1 : 3 : 1.5$$

$$2 : 6 : 3$$

$$2 : 6 : 3$$

(Total for question 15 is 2 marks)

- 16 In a bag there are blue sweets, red sweets and yellow sweets.

The number of blue sweets is four times the number of yellow sweets.

The number of red sweets is half the number of yellow sweets.

Find the percentage of sweets in the bag that are yellow.

$$B : R : Y$$

$$4 : 0.5 : 1$$

$$8 : 1 : 2$$

$$\text{Yellow } \frac{2}{11}$$

$$\frac{2}{11} \times 100$$

$$\frac{200}{11}$$

%

(Total for question 16 is 2 marks)

$$18.18\%$$

- 1 Will and Olly share £80 in the ratio 3 : 2

Work out how much each of them get.

$$\boxed{16} \quad \boxed{16} \quad \boxed{16} : \boxed{16} \quad \boxed{16}$$

$$80 \div 5 = 16$$

$$3 \times 16 = 48$$

$$2 \times 16 = 32$$

Will £ 48

Olly £ 32

(Total for question 1 is 3 marks)

- 2 Molly, Paige and Demi share 42 sweets in the ratio 3 : 2 : 1

Work out the number of sweets that each of them receives.

$$\boxed{7} \quad \boxed{7} \quad \boxed{7} : \boxed{7} \quad \boxed{7} : \boxed{7}$$

$$42 \div 6 = 7$$

$$3 \times 7 = 21$$

$$2 \times 7 = 14$$

$$1 \times 7 = 7$$

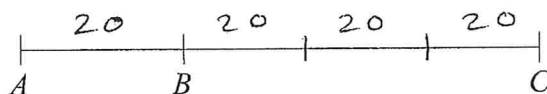
Molly 21 sweets

Paige 14 sweets

Demi 7 sweets

(Total for question 2 is 3 marks)

- 3  $ABC$  is a straight line.



The length of  $BC$  is three times the length of  $AB$ .

$AC = 80$  metres.

Work out the length  $BC$ .

$$3 : 1$$

$$BC : AB$$

$$\frac{80}{4} = 20$$

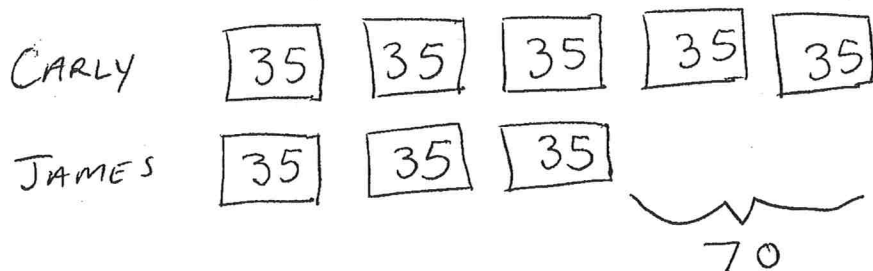
$$3 \times 20 = 60$$

60 metres

(Total for question 3 is 3 marks)

- 4 Carly and James share some money in the ratio 5 : 3  
Carly gets £70 more than James.

Work out how much money James gets.



$$\frac{70}{2} = 35$$

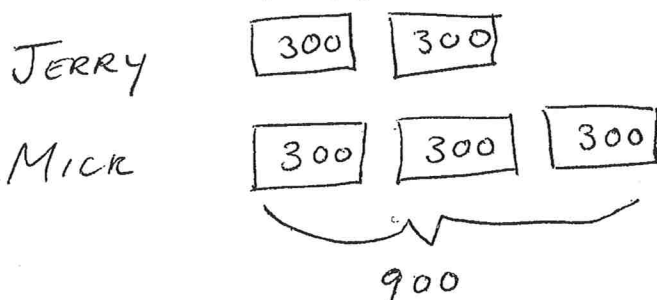
$$3 \times 35$$

£ 105

(Total for question 4 is 3 marks)

- 5 Jerry and Mick share some money in the ratio 2 : 3  
Mick gets £900

Work out how much money Jerry gets.



$$\frac{900}{3} = 300$$

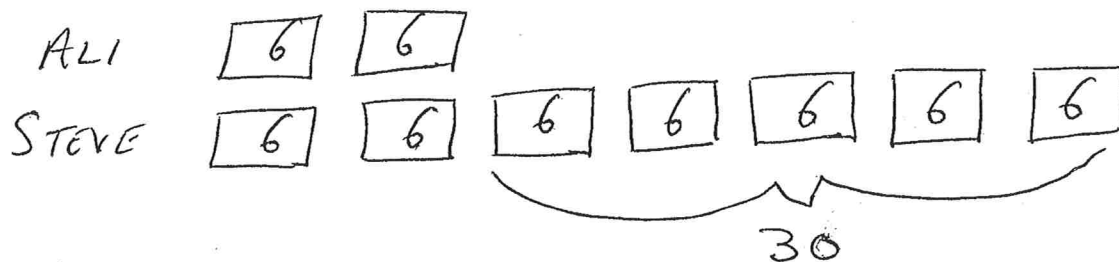
$$2 \times 300$$

£ 600

(Total for question 5 is 3 marks)

- 6 Ali and Steve share some sweets in the ratio 2 : 7  
Ali gets 30 more sweets than Steve.

Work out how many sweets Steve gets.



$$\frac{30}{5} = 6$$

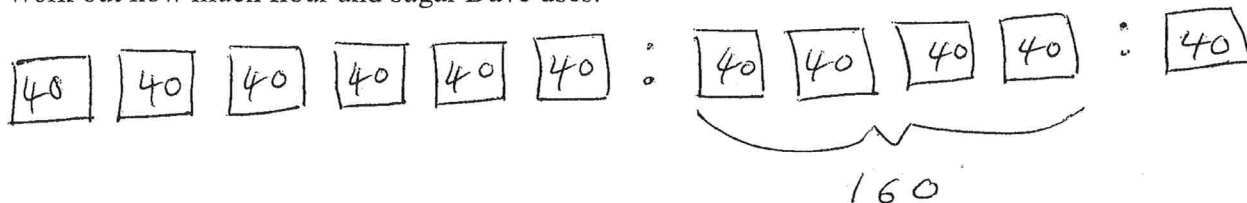
$$6 \times 7 = 42$$

42

(Total for question 6 is 3 marks)

- 7 Dave is making cookies.  
He mixes flour, butter and sugar in the ratio 6 : 4 : 1

Dave uses 160 grams of butter.  
Work out how much flour and sugar Dave uses.



$$\frac{160}{4} = 40$$

$$6 \times 40 \text{ flour } 240 \text{ grams}$$

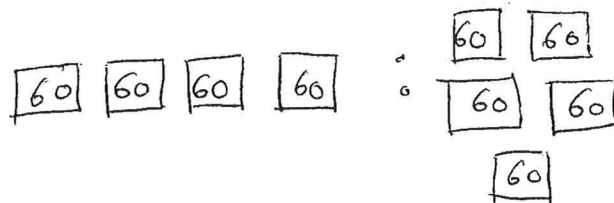
$$1 \times 40 \text{ sugar } 40 \text{ grams}$$

(Total for question 7 is 3 marks)

- 8 Alvin and Simon shared £540 in the ratio 4 : 5

Alvin gave half of his share to Theo.  
Simon gave a tenth of his share to Theo.

What fraction of the £540 did Theo receive?



$$\frac{540}{9} = 60$$

$$\text{ALVIN } 4 \times 60 = 240$$

$$\text{SIMON } 5 \times 60 = 300$$

$$\text{THEO gets } \frac{1}{2} \text{ of } 240 = 120$$

$$\frac{1}{10} \text{ of } 300 = 30$$

$$120 + 30 = 150$$

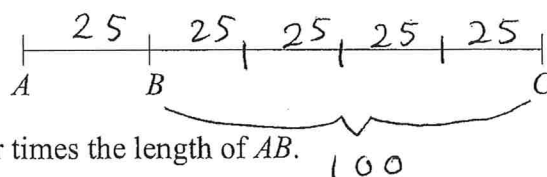
$$\frac{150}{540} = \frac{15}{54}$$

$$= \frac{5}{18}$$

$$\frac{5}{18}$$

(Total for question 8 is 3 marks)

- 9 ABC is a straight line.



The length of BC is four times the length of AB.

BC = 100 metres.

Work out the length AC.

$$\frac{100}{4} = 25$$

$$5 \times 25$$

$$125 \text{ metres}$$

(Total for question 9 is 3 marks)

- 10 Bob is going to make some orange paint.  
He needs to mix red paint, yellow paint and white paint in the ratio 5 : 4 : 1

Bob wants to make 750 ml of orange paint.

Bob has

400 ml of red paint  $400 > 375$   
300 ml of yellow paint  $300 = 300$   
200 ml of white paint  $200 > 75$

Does Bob have enough red paint, yellow paint and white paint to make the orange paint?  
You must show all your working.

RED  $\boxed{75} \boxed{75} \boxed{75} \boxed{75} \boxed{75}$   
YELLOW  $\boxed{75} \boxed{75} \boxed{75} \boxed{75}$   
WHITE  $\boxed{75}$

$$5 \times 75 = 375 \checkmark$$

$$4 \times 75 = 300 \checkmark$$

$$1 \times 75 = 75 \checkmark$$

$$\frac{750}{10} = 75$$

Yes Bob has enough paint

(Total for question 10 is 4 marks)

- 11 Megan is going to make a drink using the instructions below.

Mix 2 parts of fruit juice  
with 5 parts of sparkling water

Megan has 180 ml of fruit juice and 400 ml of sparkling water.

What is the greatest amount of the drink Megan can make?

with 180 ml of fruit juice

$\boxed{90} \boxed{90} : \boxed{90} \boxed{90} \boxed{90} \boxed{90} \boxed{90}$   
180

$$5 \times 90 = 450 \text{ ml}$$

(NOT ENOUGH)

$$\frac{180}{2} = 90$$

with 400 ml of sparkling water  $\frac{400}{5} = 80$

$\boxed{80} \boxed{80} : \boxed{80} \boxed{80} \boxed{80} \boxed{80} \boxed{80}$   
160 400

560 ml

(Total for question 11 is 3 marks)

- 12 In a bag there are only red counters, blue counters and white counters.  
A counter is taken at random from the bag.

The table shows the probability of getting a red counter.

Colour	Red	Blue	White
Probability	0.35	0.26	0.39

the number of blue counters : the number of white counters = 2 : 3

Complete the table.

$$1 - 0.35 = 0.65$$

$$\boxed{0.13} \boxed{0.13} : \boxed{0.13} \boxed{0.13} \boxed{0.13}$$

$$\frac{0.65}{5} = 0.13$$

$$2 \times 0.13 = 0.26$$

$$3 \times 0.13 = 0.39$$

(Total for question 12 is 4 marks)

- 13 Al, Tom and Joe share €3000.

The ratio of the amount Al gets to the amount Tom gets is in the ratio 5 : 4  
Joe gets 1.5 times the amount Tom gets.

Work out the amount of money that Tom gets.

$$1.5 \times 4 = 6$$

Joe gets 6 parts

$$5 : 4 : 6$$

$$\boxed{200} \boxed{200} \boxed{200} \boxed{200} \boxed{200} : \boxed{200} \boxed{200} \boxed{200} \boxed{200} : \boxed{200} \boxed{200} \boxed{200} \boxed{200} \boxed{200} \boxed{200}$$

$$\frac{3000}{15} = \frac{6000}{30} = 200$$

$$4 \times 200$$

$$€ 800$$

(Total for question 13 is 4 marks)