

1 Here is a list of numbers.

8 11 19 26 39 49 65 114

From this list, write down

(a) an even number,

(a) 8 / 26 / 114 ✓ Any [1]

(b) a square number,

(b) 49 ✓ [1]

(c) a factor of 57.

(c) 19 ✓ [1]

2 Kai has four differently numbered cards.

- The range of the numbers is 14.
- The median of the numbers is 9.
- All the numbers are prime numbers.
- The lowest number is 5.

$5 + 14 = 19$  ✓

Work out the numbers on the cards.  
Write the numbers in order of size.

5, 7, 11, 13, 17, 19

median of 9

5 7 11 19 ✓✓ [3]  
lowest

3 Here are the first four terms of a sequence.

5    12    19    26

(+7)

(a) Write down the next term in the sequence.

33



(a) ..... [1]

(b) Explain how you worked out your answer.

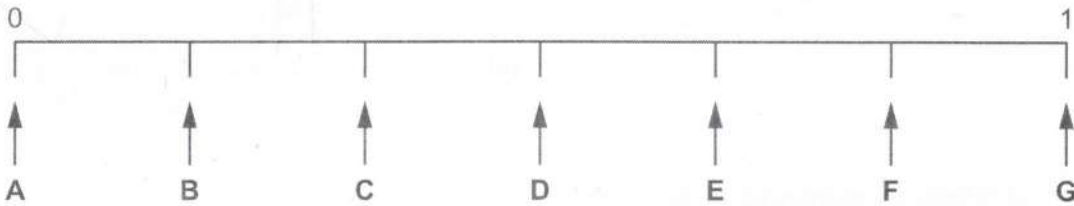
add 7 each time



..... [1]

4 A fair six-sided dice, numbered 1 to 6, is rolled.

The diagram shows a probability scale.



Which arrow shows the probability that the dice

(a) lands on 5,

B



(a) ..... [1]

(b) lands on 7,

A



(b) ..... [1]

(c) lands on a number greater than 2?

E



(c) ..... [1]

- 5 (a) Write 0.17 as a fraction.

$$\frac{17}{100}$$



(a) ..... [1]

- (b) Write 0.04 as a percentage.

$$\textcircled{\times 100}$$

$$4$$



(b) .....% [1]

- (c) Write  $\frac{7}{8}$  as a decimal.

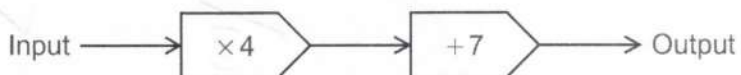
$$\begin{array}{r} 0.875 \\ 8 \overline{) 7.700} \end{array}$$

$$0.875$$



(c) ..... [1]

- 6 Here is a function.



- (a) Find the input when the output is 87.

$$87 - 7 = 80$$



$$80 \div 4 = 20$$

$$= 20$$



(a) ..... [2]

- (b) The input is  $x$  and the output is  $y$ .

Write an equation for  $y$  in terms of  $x$ .

$$y = 4x + 7$$

(b) ..... [2]

7 (a) Work out.

(i)  $3^5$

(a)(i)  $243$  ✓ [1]

(ii)  $\sqrt[3]{2744}$

(ii)  $14$  ✓ [1]

(b) Find the value of  $y$ .

$$384 = 6 \times 4^y$$

$$384 \div 6 = 64$$

$$64 = 4^y$$
 ✓

(b)  $y = 3$  ✓ [2]

(c) Write  $3^{-1}$  as a fraction.

(c)  $\frac{1}{3}$  ✓ [1]

8 450g of flour costs £1.44.

Work out the cost of 1 kg of this flour.

$$50g = \pounds 1.44 \div 9 = \pounds 0.16$$
 ✓ OE

$$0.16 \times 20 = \pounds 3.20$$
 ✓ [2]

- 9 A farmer keeps sheep in a rectangular field measuring 120 m by 180 m. —  
The farmer can keep up to 20 sheep per hectare in the field.  
1 hectare is 10 000 square metres.

Work out the maximum number of sheep the farmer can keep in the field.

$$120 \times 180 = 21600 \text{ m}^2 \quad \checkmark$$

$$21600 \div 10000 \times 20 \quad \checkmark$$

$$= 43.2 \quad \checkmark$$

43  $\checkmark$

..... [4]

- 10 (a) Finley is asked to solve the equation  $5x + 4 = 19$ .

Finley's working is shown below.

$$\begin{aligned} 5x + 4 &= 19 \\ 5x &= 19 + 4 \\ 5x &= 23 \\ x &= 4.6 \end{aligned}$$

Write down the error that Finley has made.

Should have subtracted 4 ✓

[1]

- (b) Charlie is asked to use the formula

$$v = u + at$$

to find the initial velocity, when

- the acceleration is  $5 \text{ m/s}^2$
- the final velocity is  $29 \text{ m/s}$
- the time is 3 seconds.

Charlie's working is shown below.

$$\begin{aligned} v &= 29 + (5 \times 3) \\ v &= 29 + 15 \\ v &= 44 \end{aligned}$$

Write down the error that Charlie has made.

$v = 29$ , not  $v$  ✓

[1]

- 11 Cookies are made using these ingredients.

Ingredients
Makes 24 cookies
240g butter
360g sugar
2 eggs
240g flour
170g cranberries
100g white chocolate

(x2)

- (a) How many eggs are needed to make 48 cookies?

$$2 \times 2 = 4 \quad \checkmark$$

(a) ..... [1]

- (b) How much sugar is needed to make 6 cookies?

$$360 \div 4 = 90 \quad \checkmark$$

(b) ..... g [1]

- (c) Ashley has 520g of cranberries and plenty of the other ingredients. Ashley thinks this is enough to make at least 80 cookies.

Is Ashley correct?  
Show working to support your answer.

$$80 \div 24 = 3 \frac{1}{3} \quad \checkmark$$

$$170 \times 3 \frac{1}{3} = 566 \frac{2}{3} \text{ g} \quad \checkmark$$

No because another  $46 \frac{2}{3}$  g needed

[3]

- (d) Darcie makes 100 cookies.  
They are put into packets, each holding 6 cookies.  
Each packet of 6 cookies is sold for £1.35.  
Darcie sells all of these packets.

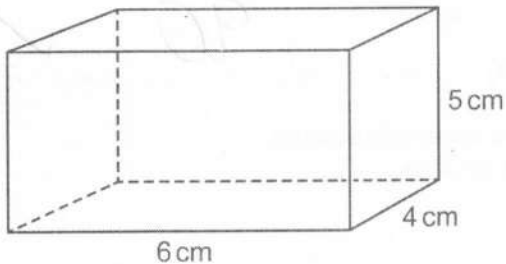
Work out how much money Darcie receives.

$$100 \div 6 = 16 \text{ full packs } \checkmark$$

$$1.35 \times 16 \checkmark$$

$$(d) \text{ £ } 21.60 \checkmark \quad [3]$$

- 12 Work out the surface area of the cuboid.



$$6 \times 5 = 30 \checkmark$$

$$6 \times 4 = 24$$

$$5 \times 4 = 20$$

$$\underline{\quad 74 \quad} \checkmark$$

$$74 \times 2$$

$$= 148 \checkmark$$

$$\text{..... cm}^2 [3]$$

13 Kareem runs 2460 metres in 8 minutes.

(a) Calculate his average speed in metres per minute.



$$S = 2460 \div 8$$

307.5

(a) ..... m/min [2]

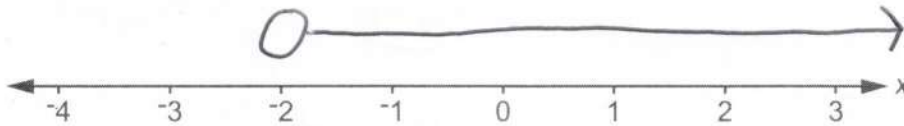
(b) Kareem says

This means I can run 6150 metres in 20 minutes.

Write down **one** assumption Kareem has made.

..... That he can maintain the same  
..... average speed ..... [1]

14 Show the inequality  $x > -2$  on this number line.



[2]

- 15 Finley has 72 sweets.  
Finley gives

- 25% of the sweets to Alex
- $\frac{1}{6}$  of the sweets to Umi.

Show that Finley has  $\frac{7}{12}$  of the sweets left.

[4]

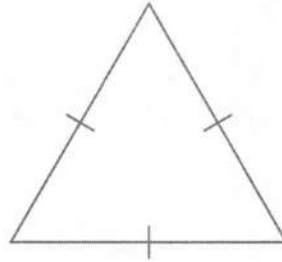
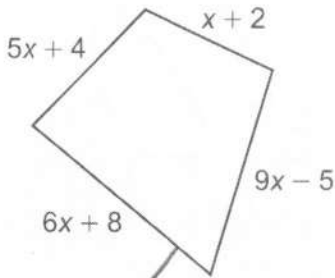
$$25\% \text{ of } 72 = 72 \div 4 = 18 \quad \checkmark$$

$$\frac{1}{6} \text{ of } 72 = 12 \quad \checkmark$$

$$72 - 30 = 42 \text{ left} \quad \checkmark$$

$$\frac{42}{72} = \frac{21}{36} = \frac{7}{12} \quad \checkmark$$

- 16 The diagram shows a quadrilateral and an equilateral triangle. The perimeter of the quadrilateral is equal to the perimeter of the equilateral triangle.



Not to scale

Find an expression for the length of one side of the equilateral triangle. Give your answer in terms of  $x$  in its simplest form.

$$\begin{array}{r}
 5x + 4 \\
 x + 2 \\
 6x + 8 \\
 9x - 5 \\
 \hline
 21x + 9 \\
 \hline
 \end{array}$$

$$21x + 9$$

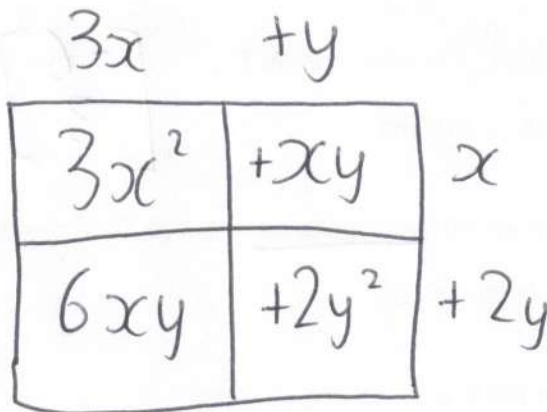
$$\div 3$$

$$7x + 3$$

[4]

- 17 Multiply out and simplify.

$$(3x + y)(x + 2y)$$

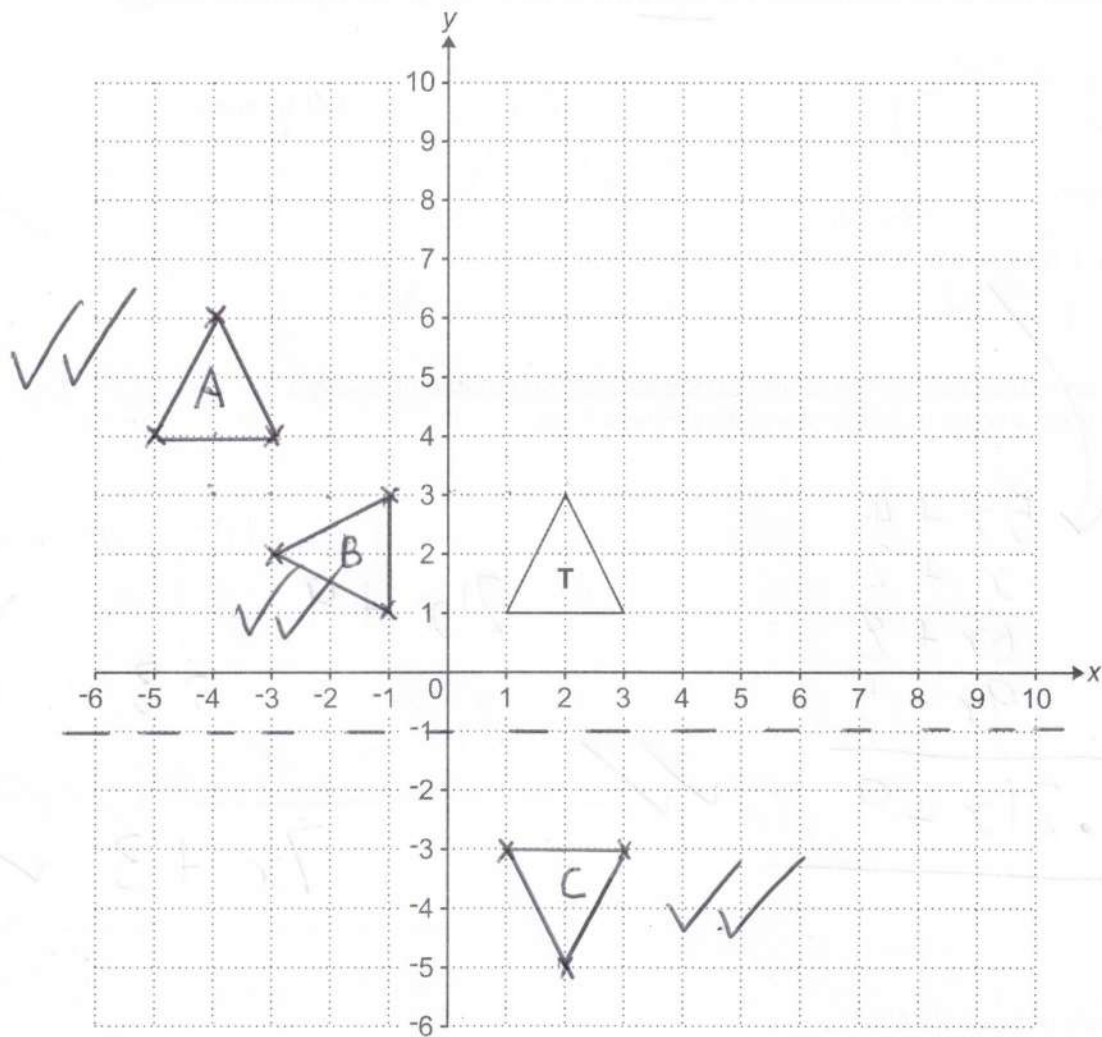


✓✓ Any 3

$$3x^2 + 7xy + 2y^2$$

[3]

18 Triangle T is drawn on a coordinate grid.



- (a) Triangle A is translated by  $\begin{pmatrix} 6 \\ -3 \end{pmatrix}$  to give triangle T.

Draw and label triangle A on the grid.

$$\begin{bmatrix} -6 \\ 3 \end{bmatrix}$$

[2]

- (b) Triangle T is rotated through  $90^\circ$  anticlockwise about (0, 0) to give triangle B.

Draw and label triangle B on the grid.

[2]

- (c) Triangle T is reflected in the line  $y = -1$  to give triangle C.

Draw and label triangle C on the grid.

[2]

19 Calculate.

$$\sqrt{5.2^2 - 4.8 \times 6.3}$$

Give your answer correct to 3 significant figures.

$$\sqrt{57.28} = 7.568\dots \quad \checkmark$$

$$\underline{7.57} \quad \checkmark$$

[2]

20 The price of petrol decreases from £1.32 per litre to £1.02 per litre.

Calculate the percentage decrease in the price.

$$\frac{0.30}{1.32} \times 100 \quad \checkmark$$

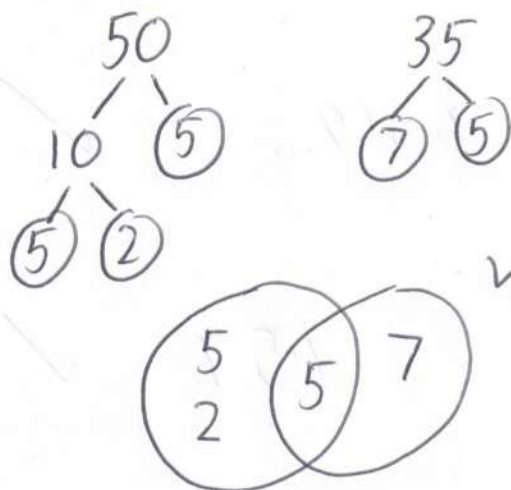
$$= 22.7\dot{2}$$

$$\underline{22.7} \quad \checkmark$$

% [3]

- 21 Trams to the airport leave every 50 minutes.  
Trams to the beach leave every 35 minutes.  
A tram to the airport and a tram to the beach leave together at 9:30 am.

When is the next time that two of these trams leave together?

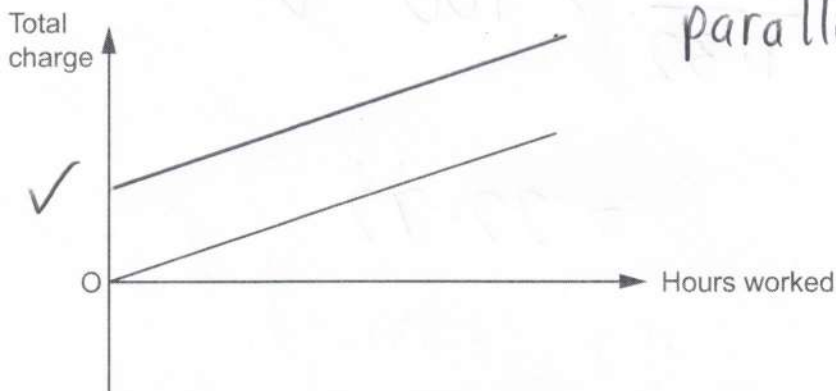


$$\begin{aligned} \text{LCM} &= 5 \times 2 \times 5 \times 7 \checkmark \\ &= 350 \text{ mins } \checkmark \\ &= 5 \text{ hr } 50 \end{aligned}$$

3:20 pm ✓  
..... [4]

- 22 Hiro and Taylor are both electricians.  
Hiro **does not** charge to visit a house but charges a fixed rate per hour for the work needed.

This graph shows the relationship between the hours worked and the total charge made by Hiro.



- (a) Explain how this graph shows that Hiro's total charge is directly proportional to the hours worked.

Straight line ✓  
.....  
through the origin ✓  
..... [2]

- (b) Taylor **does** charge to visit a house and charges the same fixed rate per hour as Hiro for the work needed.

On the axes above, draw a graph to show the relationship between the hours worked and the total charge made by Taylor. [2]

- 23 (a) Eve, Jack and Ling share some money in the ratio 2 : 3 : 4 = 9  
 Jack gets £720. = 3

Work out how much Ling gets.

$$720 \times 3 = 2160$$

$$\frac{4}{9} \times 2160$$

✓ OE

$$= 960 \quad \checkmark$$

(a) £ ..... [2]

- (b) Amir, Beth and Casey share some money in the ratio 3 : 5 : c.  
 Casey's share is  $\frac{2}{3}$  of the total.

Find the value of c.

$$\frac{c}{c+8} = \frac{2}{3} \quad \checkmark$$

$$3c = 2(c+8) \quad \checkmark$$

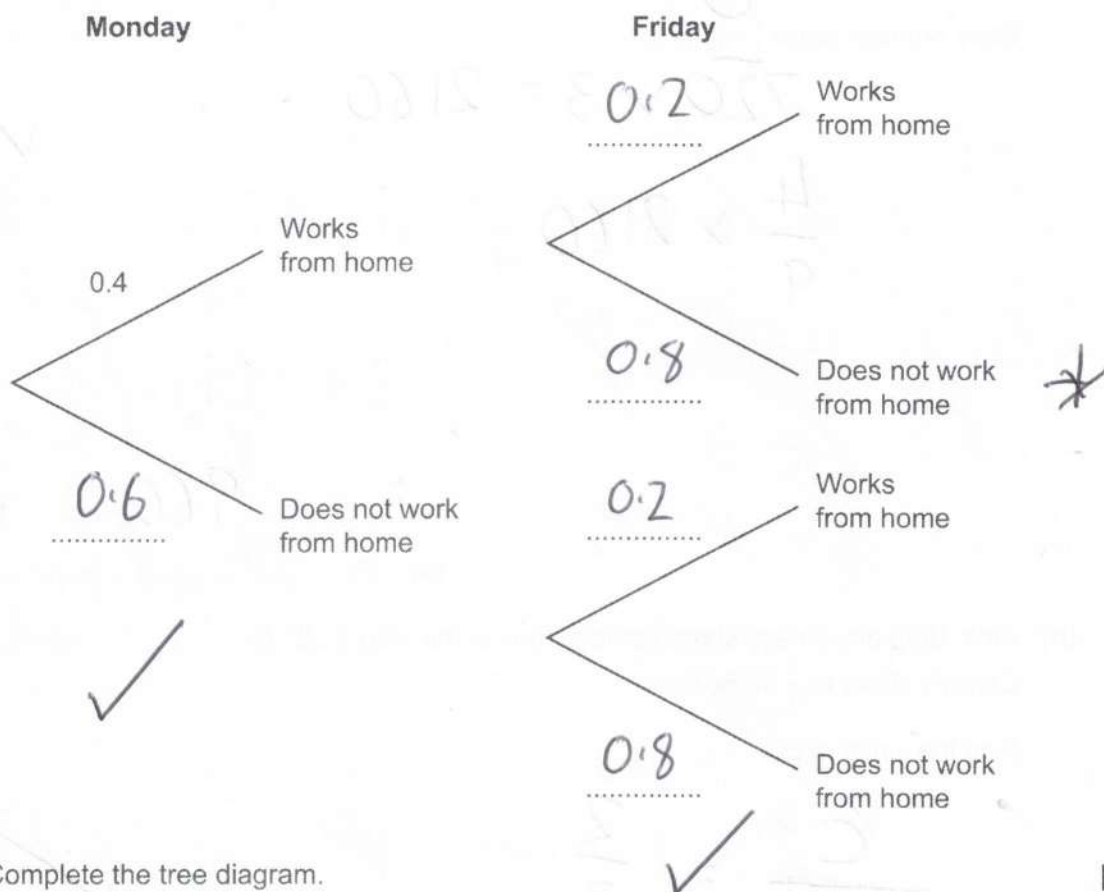
$$3c = 2c + 16$$

$$c = 16$$

16 ✓

(b) c = ..... [3]

- 24 The probability that Sam works from home on Monday is 0.4.  
The probability that Sam works from home on Friday is 0.2.



- (a) Complete the tree diagram.

[2]

- (b) Work out the probability that Sam works from home on Monday but does not work from home on Friday.

$$0.4 \times 0.8$$

✓

(b)

0.32

[2]

- 25 A six-sided numbered spinner is thrown 50 times. The score for each throw is recorded. Some of the results are shown in the table.

An 8 was thrown  $f$  times.

An unknown number on the spinner is represented by  $n$ .

Score	Frequency
1	X 12
3	X 2
5	X 9
6	X 16
8	X $f$
$n$	X 4
Total	50

$$= 12$$

$$= 6$$

$$= 45$$

$$= 96$$

$$= 8f$$

$$= 4n$$

$$f = 50 - 43$$

$$= 7$$

$$= 8 \times 7 = 56$$

The mean score of the 50 throws is 5.5.

Find the value of  $f$  and the value of  $n$ .

$$\text{Total} = 50 \times 5.5$$

$$= 275 \quad \checkmark$$

$$4n + 215 = 275 \quad \checkmark$$

$$4n = 60$$

$$f = \frac{7}{15} \quad \checkmark$$

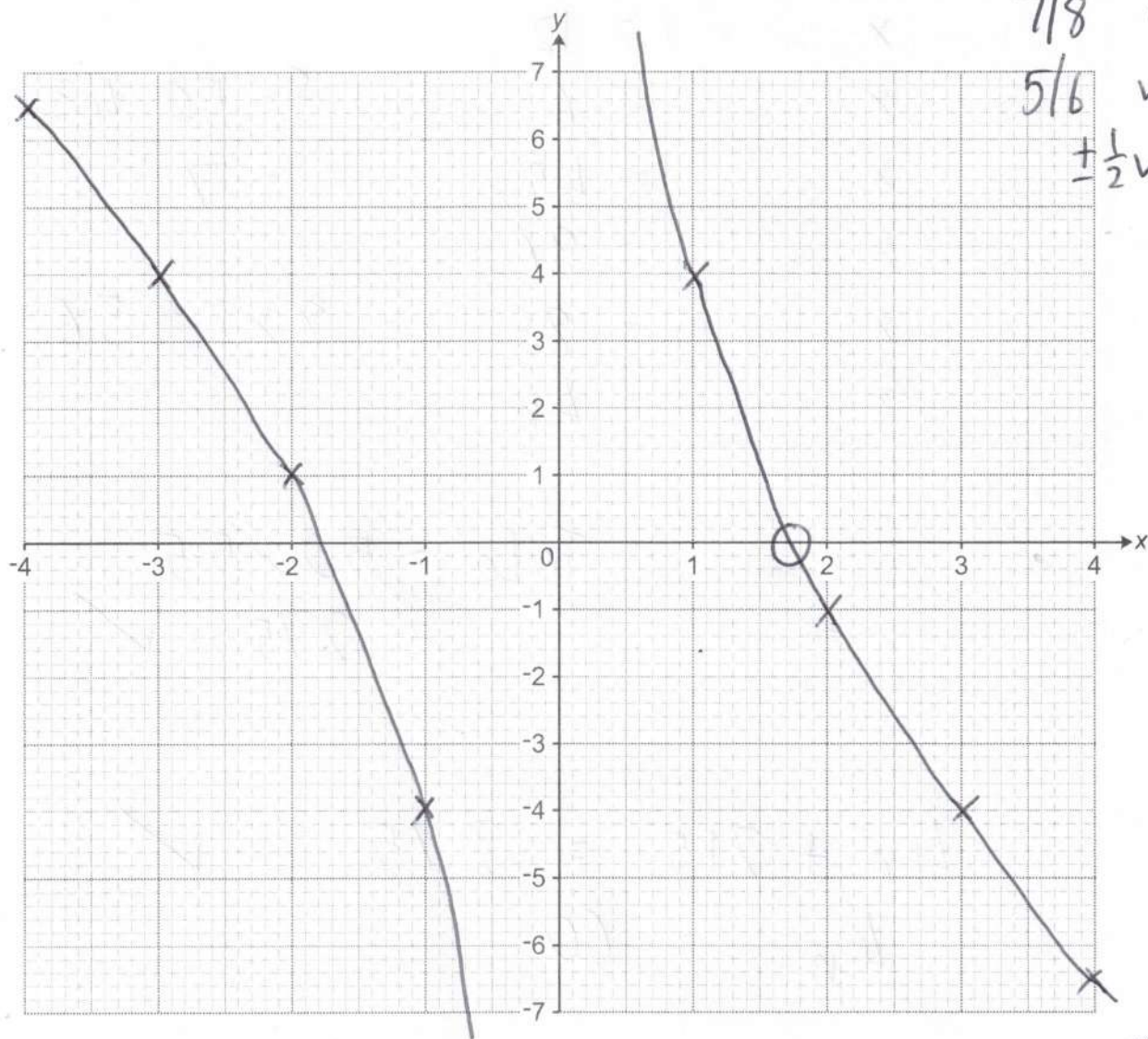
$$n = \frac{15}{15} \quad \checkmark$$

[4]

26 Here is a table of values for  $y = \frac{6}{x} - 2x$ .

$x$	-4	-3	-2	-1	1	2	3	4
$y$	6.5	4	1	-4	4	-1	-4	-6.5

(a) Draw the graph of  $y = \frac{6}{x} - 2x$  for  $-4 \leq x \leq 4$ ,  $x \neq 0$ .



[3]

(b) Use your graph to find the positive solution of  $\frac{6}{x} - 2x = 0$ .

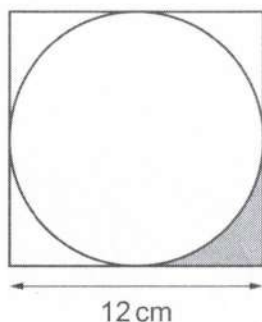
Give your answer to 1 decimal place.

(b)  $x = \dots\dots\dots$  [1]

1.7 ✓

TURN OVER FOR QUESTION 27

- 27 The diagram shows a circle inside a square of side 12 cm.



$$r = 6$$

Work out the percentage of the square that is shaded.  
You must show your working.

$$\begin{aligned} 4 \text{ corners} &= \square - \bigcirc \\ &= 12^2 - \pi \times 6^2 \\ &= 30.9\dots \end{aligned}$$

$$\text{shaded} = 30.9\dots \div 4 = 7.7\dots$$

$$\% = \frac{7.7}{144} \times 100 = 5.365\dots$$

5.4

..... % [6]

END OF QUESTION PAPER

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