

Write your name here

Surname

Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9–1)

Centre Number

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Candidate Number

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Mathematics Shadow Paper Set A

Paper 1 (Non-Calculator)

Foundation Tier

Thursday 24 May 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference

1MA1/1F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**



Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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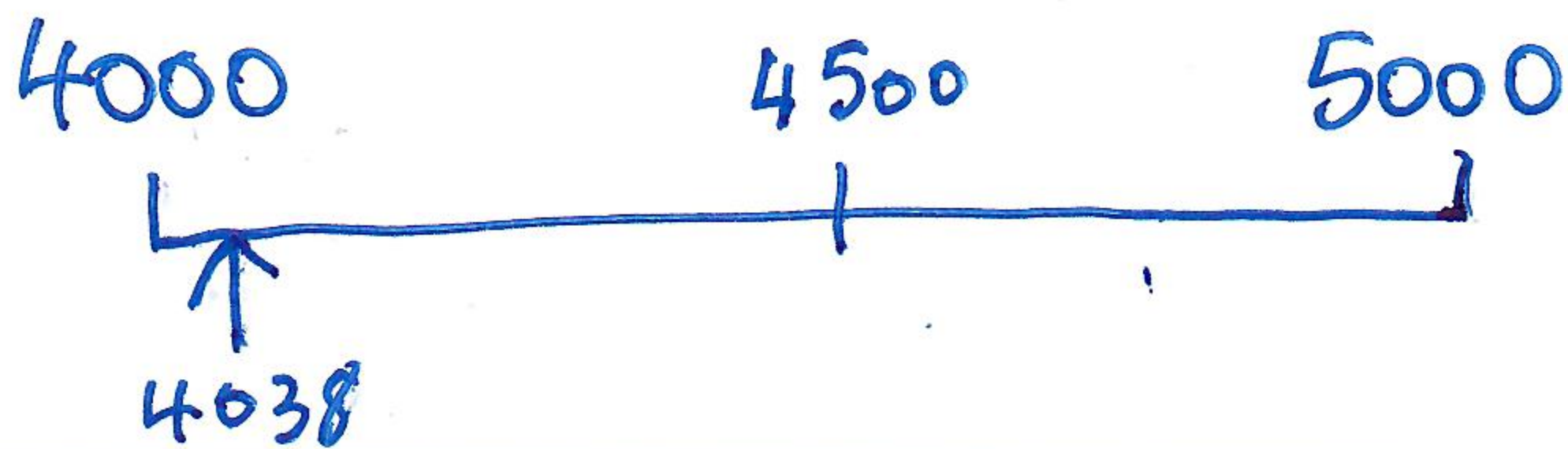

Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write 4038 correct to the nearest thousand.



4000

(Total for Question 1 is 1 mark)

2 (a) Write the following numbers in order of size.
Start with the smallest number.

-1 6 -2 0 12

-2 -1 0 6 12

(1)

(b) Write the following numbers in order of size.
Start with the smallest number.

0.315 0.000513 0.00315 0.513

0.000513 0.00315 0.315 0.513

(1)

(Total for Question 2 is 2 marks)

3 Write 60% as a fraction.

$$\frac{3}{5} = \frac{60}{100} = \frac{6}{10}$$

(Total for Question 3 is 1 mark)

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4 Here is a list of four fractions.

$\frac{4}{16}$

$\frac{2}{12}$

$\frac{15}{60}$

$\frac{3}{4}$

Two of these fractions are **not** equivalent to $\frac{1}{4}$

Write down these fractions.

$$\frac{4}{16} = \frac{1}{4}$$

(Handwritten: $\div 4$ above the fraction bar, $\div 4$ below the fraction bar)

$$\frac{2}{12} = \frac{1}{6}$$

(Handwritten: $\div 2$ above the fraction bar, $\div 2$ below the fraction bar)

$$\frac{15}{60} = \frac{1}{4}$$

(Handwritten: $\div 15$ above the fraction bar, $\div 15$ below the fraction bar)

$\frac{3}{4}$

$\frac{2}{12}$ and $\frac{3}{4}$

(Total for Question 4 is 1 mark)

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5 Write down the first even multiple of 11

$2 \times 11 = 22$

22

(Total for Question 5 is 1 mark)

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6 (a) Simplify $7 \times 3t$

21t

(1)

(b) Simplify $6a - 4a + 7a$

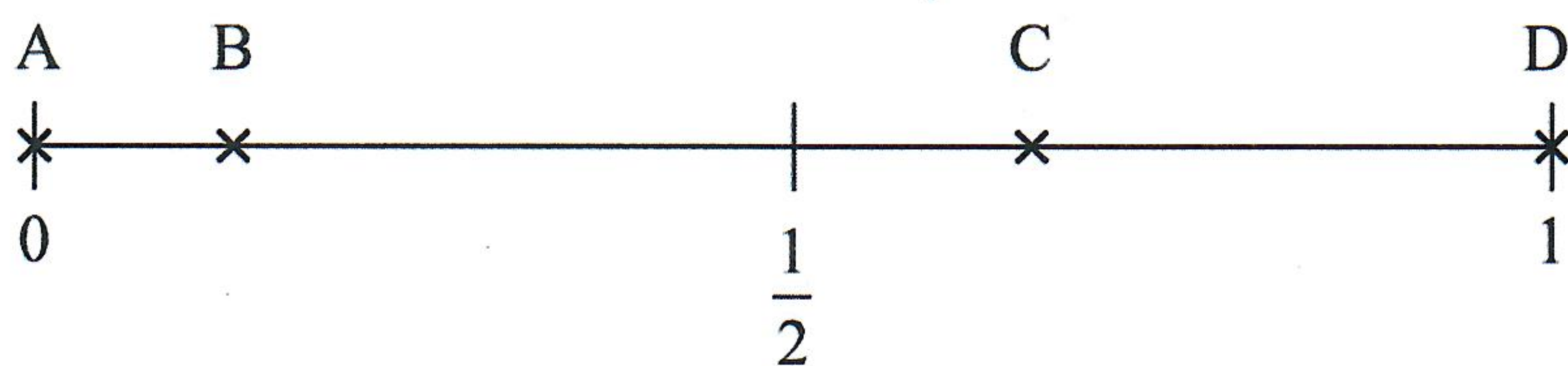
9a

(1)

(Total for Question 6 is 2 marks)



- 7 Here is a probability scale.
It shows the probability of each of the events A, B, C and D.



- (a) Write down the letter of the event that is impossible.

A

(1)

- (b) Write down the letter of the event that is likely.

C

(1)

There are 15 counters in a bag.

- 3 of the counters are red.
- 1 of the counters is blue.
- 2 of the counters are yellow.
- The rest of the counters are green.

Caitlin takes at random a counter from the bag.

- (c) Show that the probability that this counter is red or green is $\frac{4}{5}$

$$15 - (3 + 1 + 2) = 9$$

9 of the counters are green.

$$\frac{9 + 3}{15} = \frac{12}{15} = \frac{4}{5}$$

$\xrightarrow{\div 3}$
 $\xrightarrow{\div 3}$

(3)

(Total for Question 7 is 5 marks)



- 8 9 kg of meat costs £54
Nina buys 5 kg of the meat.

Work out how much Nina pays.

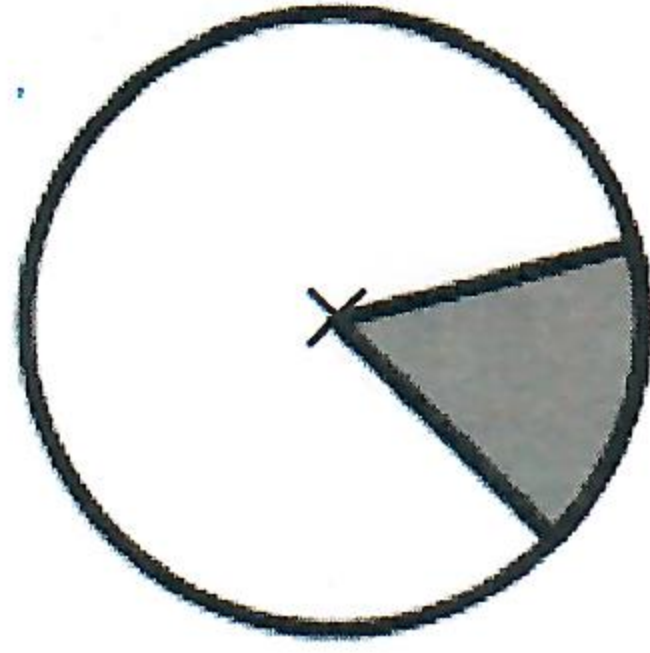
$$\frac{54}{9} = \text{£}6 \text{ per kg.}$$

$$5 \times 6 = 30$$

£ 30 - 00

(Total for Question 8 is 2 marks)

- 9 The centre of this circle is marked with a cross (×).

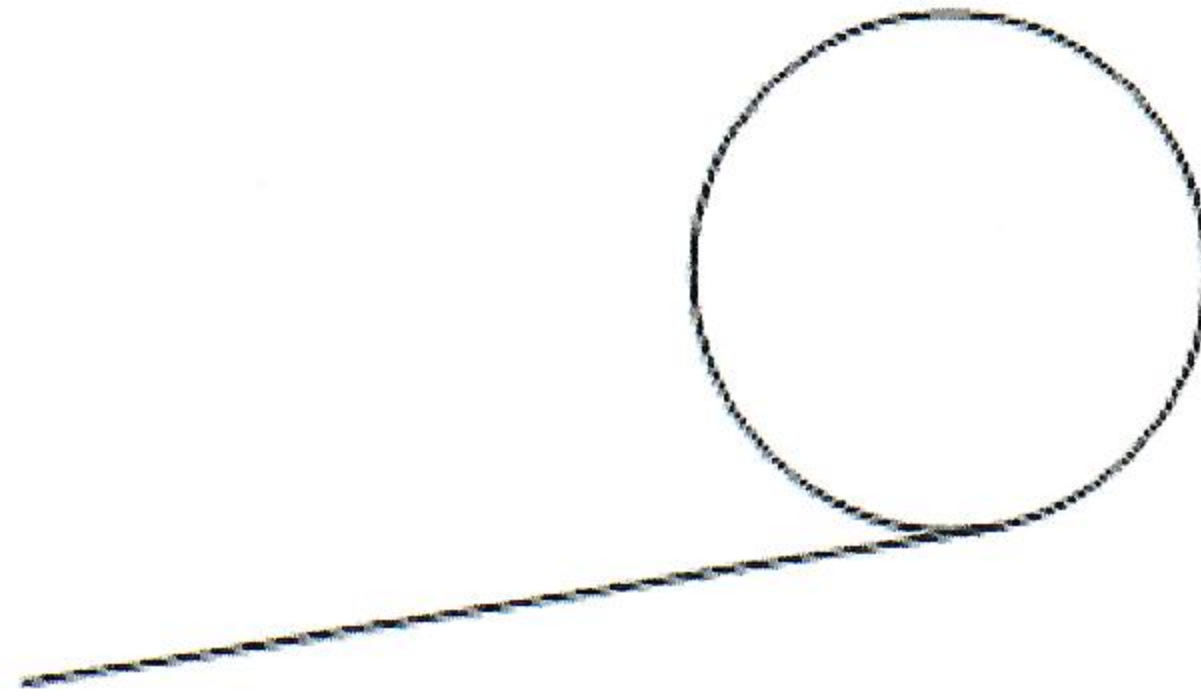


- (a) Write down the mathematical name of the shaded part shown in the circle.

Sector

(1)

- (b) Write down the mathematical name of the straight line that is touching the circle.



tangent

(1)

(Total for Question 9 is 2 marks)



10 Tim and three friends go on holiday together for a week.

The 4 friends will share the costs of the holiday equally.

Here are the costs of the holiday.

£1780 for 4 return plane tickets
£748 for the villa
£268 for hire of a car for the week

Work out how much Tim has to pay for his share of the costs.

$$\begin{array}{r} 1780 \\ 748 + \\ 268 \\ \hline 2796 \end{array}$$

$$\begin{array}{r} 0699 \\ 4 \overline{) 2796} \end{array}$$

£ 699—00

(Total for Question 10 is 3 marks)



11 Write down an example to show that each of the following two statements is **not** correct.

(a) The factors of an even number are always even.

12 has a factor of 1 and 3
.....
(1)

(b) All the digits in an even number are even.

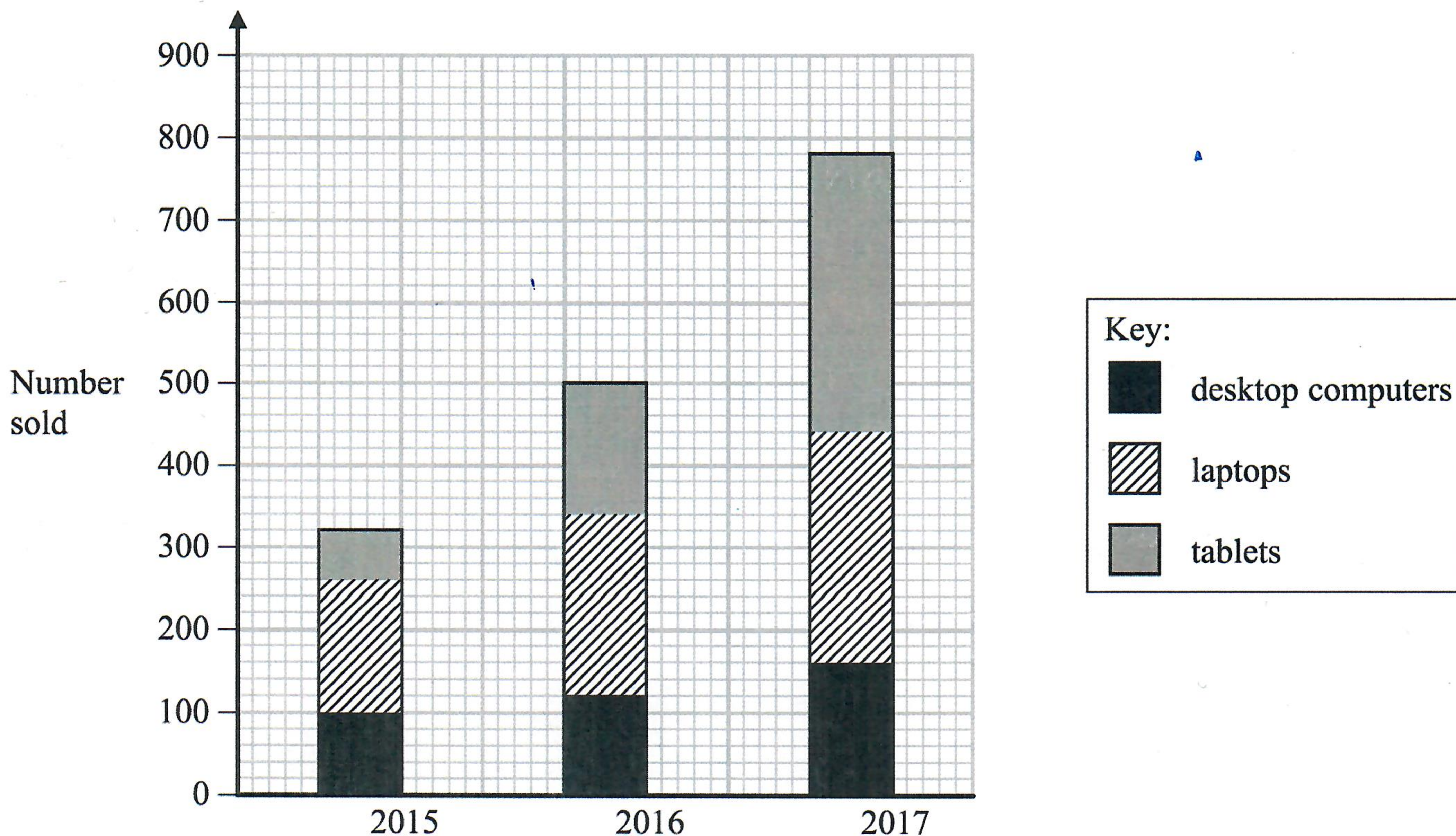
12 is an even number but 1 is
an odd ~~is~~ digit
(1)

(Total for Question 11 is 2 marks)



12 A shop sells desktop computers, laptops and tablets.

The composite bar chart shows information about sales over the last three years.



(a) Write down the number of desktop computers sold in 2017

160

(1)

(b) Work out the total number of tablets sold in the 3 years.

$$60 + 160 + 340 = 560$$

560

(3)

(c) State the item that had the greatest increase in sales over the 3 years.
Give a reason for your answer.

Tablets have the greatest increase moving from 60 in 2015 to 340 in 2017. This is an increase of 466.66% whereas desktop sales increased by 60% and laptops increased from 160 to 280 (approx 75% increase).



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Alex says,

“In 2017, more tablets were sold than desktop computers. This means the shop makes more profit from the sale of tablets than from the sale of desktop computers.”

(d) Is Alex correct?

You must justify your answer.

You don't really know because there is no information about the price of each individual item.

(1)

(Total for Question 12 is 7 marks)

13 A piece of wire is 303 cm long.

Peter cuts three 45 cm lengths off the wire.

He then cuts the rest of the wire into as many 24 cm lengths as possible.

Work out how many 24 cm lengths of wire Peter cuts.

$$303 - (45 \times 3) = 303 - 135 \\ = 168$$

$$168 \div 24 = 7$$

1	24
2	48
3	72
4	96
5	120
6	144
→ 7	168
8	192

7 pieces of wire.

(Total for Question 13 is 3 marks)



14 Gavin, Harry and Isabel each earn the same monthly salary.

Each month, Gavin saves 41% of his salary and spends the rest.

Harry spends $\frac{3}{4}$ of his salary and saves the rest.

The proportion that Isabel saves her salary to spends it is 3:5.

Work out who saves the most of their salary each month.
You must show how you get your answer.

Gavin saves 41%

Harry

$$1 - \frac{3}{4} = \frac{1}{4} = 25\%$$

Isabel

$$\frac{3}{8} : \frac{5}{8} ; \frac{3}{8} = 0.375 = 37\frac{1}{2}\%$$

So Gavin saves the most

(Total for Question 14 is 4 marks)

15 Work out 45% of 160 grams.

$$\frac{45}{100} \times 160 = \frac{45}{10} \times 16 = \frac{9}{2} \times \frac{16}{1} = 9 \times 8 = 72$$

.....72..... grams

(Total for Question 15 is 2 marks)



16 $P = 4x + 3y$

$$x = 8$$

$$y = -3$$

(a) Work out the value of P .

$$4(8) + 3(-3) = 32 + (-9) = 32 - 9 = 23$$

23

(2)

(b) Expand $6f(f+2)$

$$\begin{array}{r|l} f & +2 \\ \hline 6f & 6f^2 + 12f \end{array}$$

$$6f^2 + 12f$$

(2)

(c) Solve $5(m-4) = 10$

$$\begin{array}{l} +20 (5m - 20 = 10) +20 \\ \div 5 (5m = 30) \div 5 \\ m = 6 \end{array}$$

$$m = 6$$

(2)

(Total for Question 16 is 6 marks)



17 There are some chocolates in a box.

$\frac{3}{5}$ of the chocolates contain nuts.

The rest of the chocolates do not contain nuts.

Write down the ratio of the number of chocolates that contain nuts to the number of chocolates that do not contain nuts.

Give your answer in the form $1 : n$

5-3

$3 : 2$
 $\div 3 \rightarrow 1 : \frac{2}{3}$
To decimal $\rightarrow 1 : 0.6\bar{6}$

$1 : 0.6\bar{6}$

(Total for Question 17 is 2 marks)



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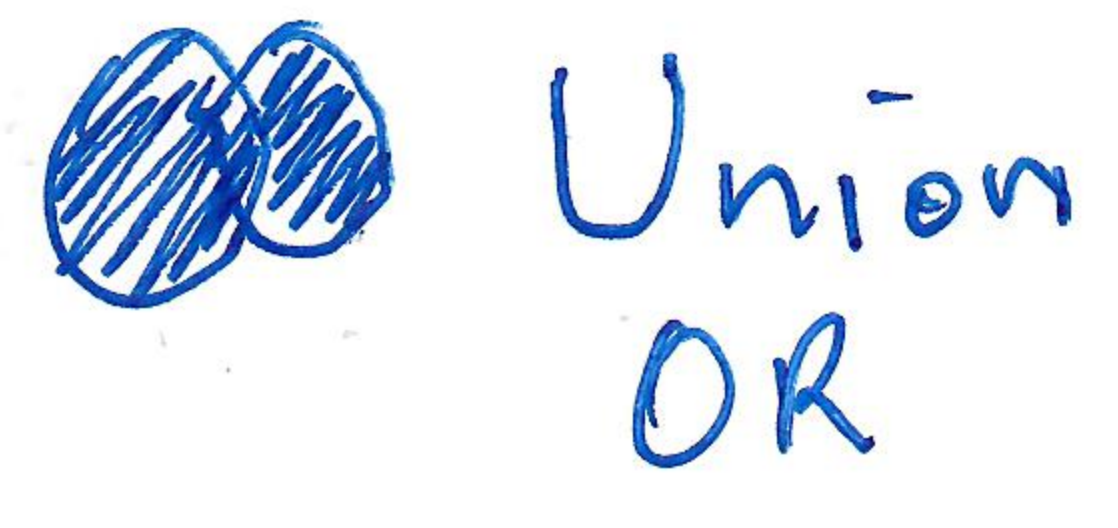
18 $A = \{\text{multiples of 3 between 14 and 26}\}$

15 18 21 24

$B = \{\text{odd numbers between 14 and 26}\}$

15 17 19 21 23 25

(a) List the members of $A \cup B$



15, 17, 18, 19, 21, 23, 24, 25

(2)

(b) Describe the members of $A \cap B$



15, 21

(1)

(Total for Question 18 is 3 marks)



19 (a) Work out $2\frac{1}{8} + 1\frac{1}{5}$

$$2\frac{1}{8} + 1\frac{1}{5} = \frac{(2 \times 8) + 1}{8} + \frac{(1 \times 5) + 1}{5} = \frac{17}{8} + \frac{6}{5} = \frac{(17 \times 5) + (8 \times 6)}{(8 \times 5)}$$
$$= \frac{85 + 48}{40} = \frac{133}{40} = 3\frac{13}{40}$$

$$3\frac{13}{40}$$

(2)

(b) Work out $1\frac{3}{5} \times 4\frac{7}{8} =$

Give your answer in the simplest form possible

$$1\frac{3}{5} \times 4\frac{7}{8} = \frac{(1 \times 5) + 3}{5} \times \frac{(4 \times 8) + 7}{8} = \frac{8}{5} \times \frac{39}{8} = \frac{39}{5} = 7\frac{4}{5}$$

$$7\frac{4}{5}$$

(2)

(Total for Question 19 is 4 marks)



20 In a village

the number of houses and the number of flats are in the ratio 5 : 3

the number of flats and the number of bungalows are in the ratio 18 : 20

There are 160 bungalows in the village.

How many houses are there in the village?

H F B

5 : 3

30 : 18 : 20

$$\frac{160}{20} = 8$$

So value of 1 part is 8.

$$30 \times 8 = 240$$

240 houses

(Total for Question 20 is 3 marks)



21 Renee buys 7 kg of sweets to sell.
She pays £21 for the sweets.

Renee puts all the sweets into bags.
She puts 250 g of sweets into each bag.
She sells each bag of sweets for 95p.

Renee sells all the bags of sweets.

Work out her percentage profit.

$$\frac{21}{7} = \text{£}3 \text{ per kg.}$$

$$7 \times 4 = 28 \text{ bags of sweets.}$$

$$\begin{aligned} \text{Sells } 28 \times 95 &= 2660 \text{ p} \\ &= \text{£}26.60 \end{aligned}$$

$$\frac{26.60}{21} \times 100 = \frac{2660}{21}$$

$$\begin{array}{r} 126.\dot{6} \\ 21 \overline{) 2660.0} \\ \underline{-21} \quad \downarrow \\ 56 \quad \downarrow \\ \underline{42} \quad \downarrow \\ 140 \quad \downarrow \\ \underline{126} \quad \downarrow \\ 140 \\ \underline{126} \\ 14 \end{array}$$

$$126.\dot{6}66 = 126.\dot{6} \frac{2}{3} \% \text{ } 10$$

This is the sale price so deduct the original cost to find a profit of $26\frac{2}{3}\%$

$$\text{Profit } \underline{\underline{26\frac{2}{3}}}\%$$

(Total for Question 21 is 4 marks)



22 A cycle race in America 8148.95 miles in length.

Juan knows his average speed for his previous races is 18.37 miles per hour. For the next race in America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

$$\begin{array}{r} 18.37 \\ 8 \times \\ \hline 146.96 \end{array} \text{ miles per day. } \approx 150 \text{ miles each day.}$$

$$\begin{array}{r} 54.3\bar{3} \\ 150 \overline{) 87150.00} \\ \underline{750} \downarrow \\ 650 \downarrow \\ \underline{600} \downarrow \\ 500 \downarrow \\ \underline{450} \downarrow \\ 500 \downarrow \end{array}$$

$$\underline{54\frac{1}{3} \text{ days}} \\ (3)$$

Juan trains for the race.

The average speed he can cycle at increases.

It is now 19.237 miles per hour.

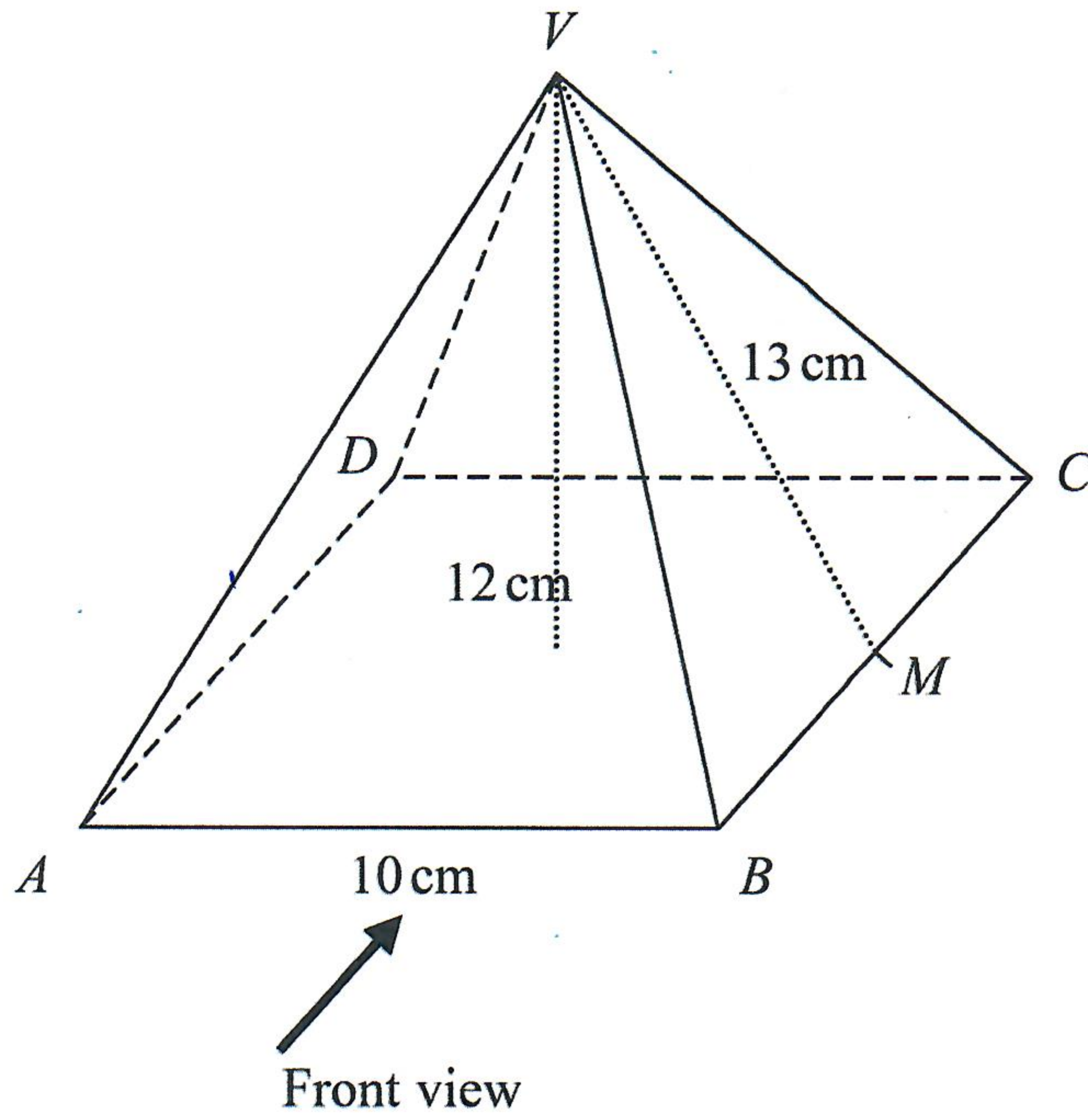
(b) How does this affect your answer to part (a)?

It would be less time to finish the race as he is faster and the distance is the same.

(1)

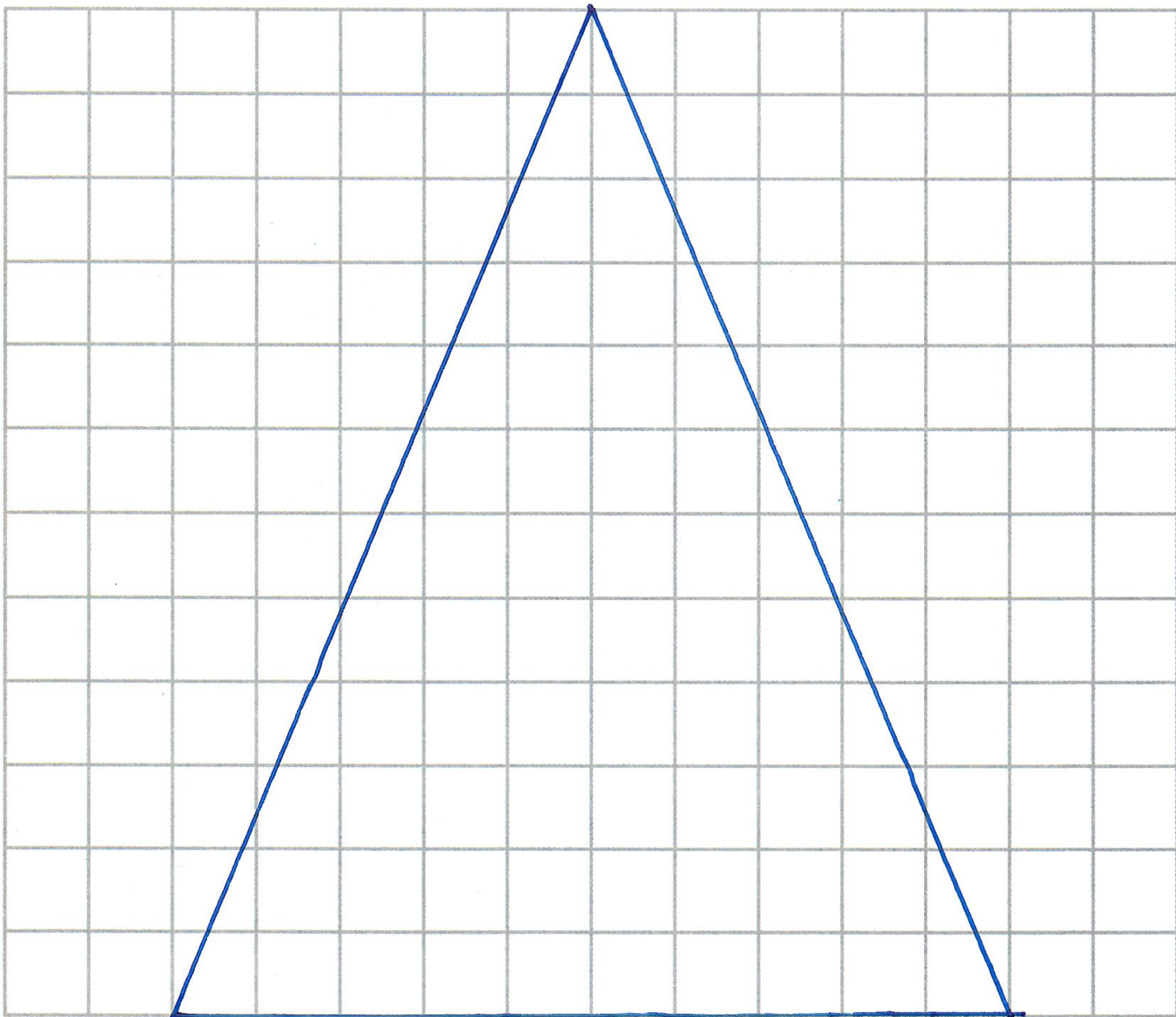
(Total for Question 22 is 4 marks)

23 Here is a solid square-based pyramid, $VABCD$.



The base of the pyramid is a square of side 10 cm.
The height of the pyramid is 12 cm.
 M is the midpoint of BC and $VM = 13$ cm.

(a) Draw an accurate front elevation of the pyramid from the direction of the arrow.



(2)



(b) Work out the total surface area of the pyramid.

$$\text{Area}_{\Delta} = \frac{1}{2} b h = \frac{1}{2} \times 10 \times 13 = 65 \text{ cm}^2$$

$$4 \times \text{Triangles} = 4 \times 65 = 260 \text{ cm}^2$$

$$\text{Base} = 10 \times 10 = 100 \text{ cm}^2$$

$$\begin{aligned} \text{Surface Area of the pyramid} &= 260 + 100 \\ &= 360 \text{ cm}^2 \end{aligned}$$

$$\underline{\underline{360 \text{ cm}^2}}$$

(4)

(Total for Question 23 is 6 marks)

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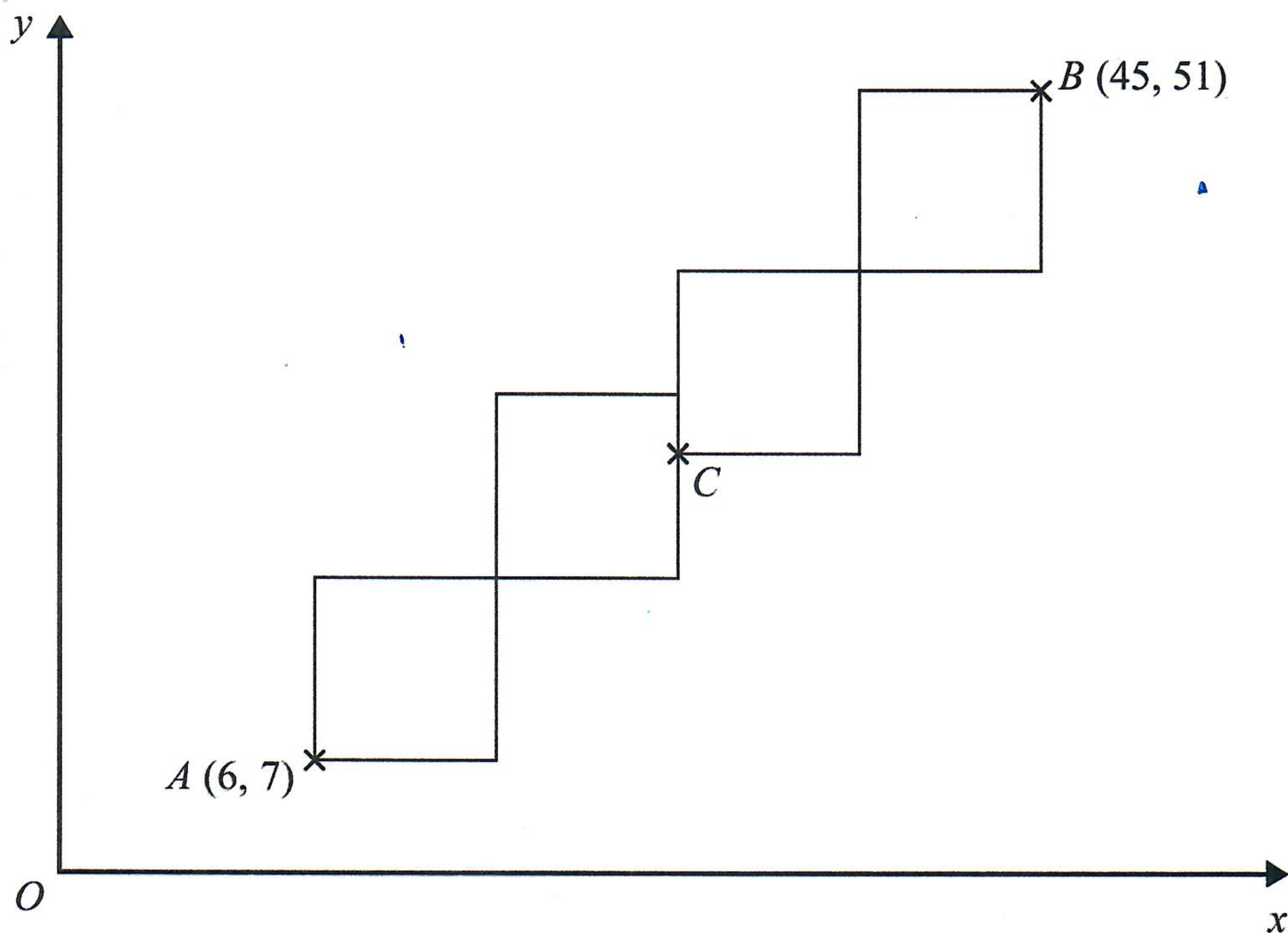
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24 A pattern is made from four identical squares.

The sides of the squares are parallel to the axes.



Point A has coordinates $(6, 7)$

Point B has coordinates $(45, 51)$

Point C is marked on the diagram.

Work out the coordinates of C .

$$\text{Length of 1 side} = \frac{45 - 6}{4} = \frac{39}{4} = 9\frac{3}{4}$$

$$x\text{-co-ordinate of } C : 6 + 9\frac{3}{4} + 9\frac{3}{4} = 25\frac{1}{2}$$

$$y\text{-co-ordinate of } C : 51 - (9\frac{3}{4} + 9\frac{3}{4}) = 51 - 19\frac{1}{2} = 31\frac{1}{2}$$

($25\frac{1}{2}$, $31\frac{1}{2}$)

(Total for Question 24 is 5 marks)



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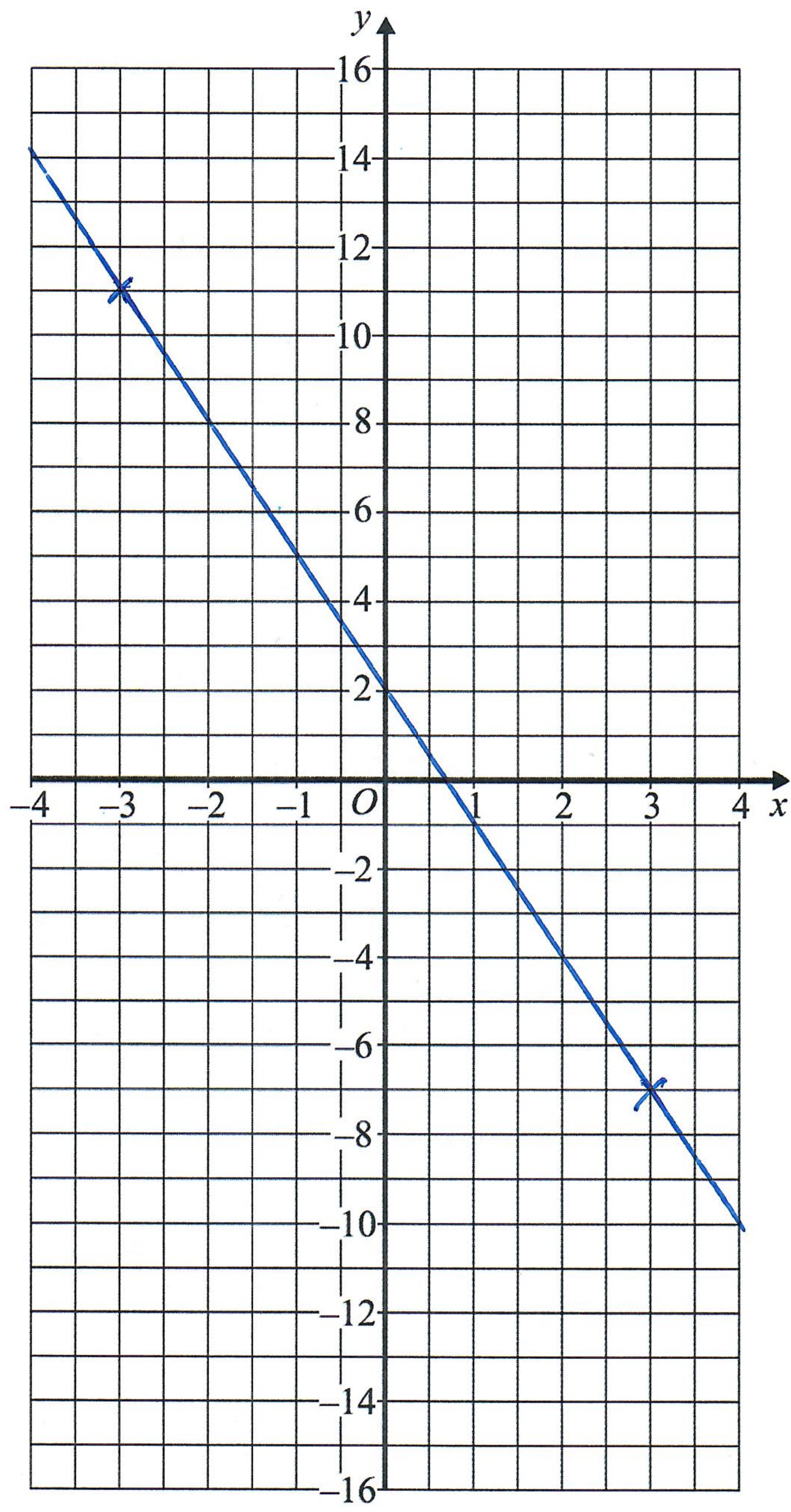
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25 On the grid below, draw the graph of $y = 2 - 3x$ for values of x from -3 to 3

$$\begin{aligned}x & -3 \\ y & 2 - 3(-3) \\ & = 2 + 9 \\ & = 11\end{aligned}$$

$$\begin{aligned}& 3 \\ & 2 - 3(3) \\ & = 2 - 9 \\ & = -7\end{aligned}$$



(Total for Question 25 is 3 marks)



$$26 \quad \mathbf{a} = \begin{pmatrix} 5 \\ 2 \end{pmatrix} \quad \mathbf{b} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$$

Work out $2\mathbf{a} + 7\mathbf{b}$ as a column vector.

$$2 \begin{pmatrix} 5 \\ 2 \end{pmatrix} + 7 \begin{pmatrix} -1 \\ 7 \end{pmatrix} = \begin{pmatrix} 10 \\ 4 \end{pmatrix} + \begin{pmatrix} -7 \\ 49 \end{pmatrix} = \begin{pmatrix} 3 \\ 53 \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ 53 \end{pmatrix}$$

(Total for Question 26 is 2 marks)

TOTAL FOR PAPER IS 80 MARKS

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Write your name here

Surname	Other names
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Level 1/Level 2 GCSE (9-1)

Centre Number

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Candidate Number

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Mathematics Shadow Paper Set A

Paper 2 (Calculator)

Foundation Tier

Thursday 7 June 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference
1MA1/2F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

--

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write $\frac{7}{50}$ as a percentage.

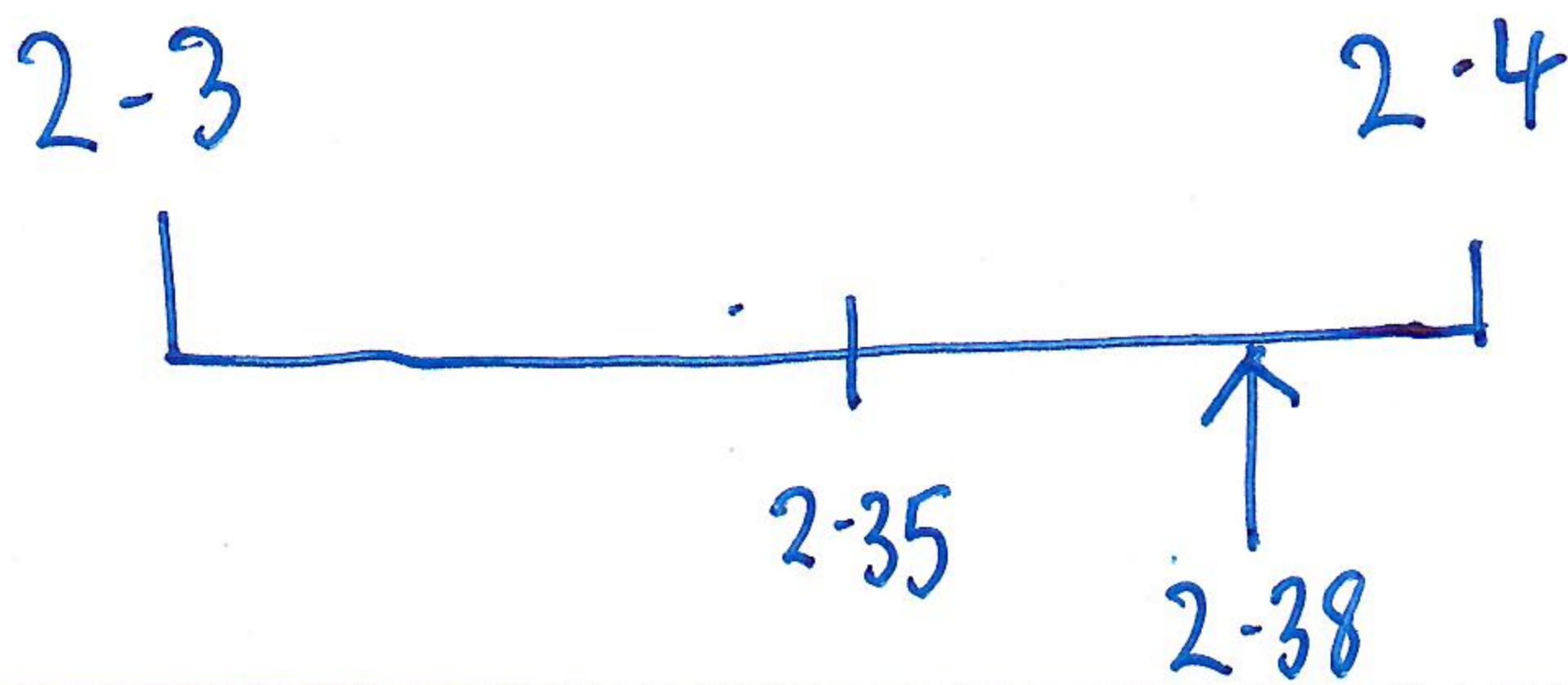
$$\frac{7}{50} \stackrel{\times 2}{=} \frac{14}{100} = 14\%$$

$\times 2$ to get 100

14 %

(Total for Question 1 is 1 mark)

2 Write 2.38 correct to 1 decimal place.



2.4

(Total for Question 2 is 1 mark)

3 Work out the value of 5^5

$$5 \times 5 \times 5 \times 5 \times 5 = 3125$$

3125

(Total for Question 3 is 1 mark)

4 Write down a 6 digit number that has 3 as its thousands digit. You can only use the digit 3 once.

HTh	TTh	Th	H	T	U
8	9	3	2	1	7
.	.	*	.	.	.

• Can be any number apart from 3.

893,217

* Must be 3.

(Total for Question 4 is 1 mark)

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- 5 (a) Change 72 cm to mm.

$$10\text{mm} = 1\text{cm} \quad \text{so} \quad 72 \times 10 = 720$$

..... 720 mm
(1)

- (b) Change 6400 millilitres to litres.

$$1000\text{ ml} = 1\text{ l} \quad 6400 \div 1000 = 6.4$$

..... 6.4 litres
(1)

- (c) Change 0.57 kilograms to grams.

$$1\text{ kg} = 1000\text{ g} \quad \text{so} \quad 0.57 \times 1000 = 570$$

..... 570 grams
(1)

(Total for Question 5 is 3 marks)

- 6 Margaret is thinking of a number.
She says,

“My number is even. It is a factor of 36 and a multiple of 4”

There are three possible numbers Margaret can be thinking of.

Write down these three numbers.

1, 36
2, 18
3, 12
4, 9
6, 6

..... 4, 12, 36

(Total for Question 6 is 3 marks)



7 Mohsin, Yusuf, Daisy and Luke are going to play a game.
 At the end of the game, one of them will be in First place, one of them will be in Second place, one of them will be in Third place and one of them will be in Fourth place.

Use the table below to list all the possible outcomes of the game.

First	Second	Third	Fourth
M	Y	D	L
M	Y	L	D
M	D	Y	L
M	D	L	Y
M	L	Y	D
M	L	D	Y
Y	M	D	L
Y	M	L	D
Y	D	Y	L
Y	D	L	Y
Y	L	Y	D
Y	L	D	Y

(Total for Question 7 is 2 marks)

D	L	M	Y
D	L	Y	M
D	M	L	Y
D	M	Y	L
D	Y	L	M
D	Y	M	L
L	Y	M	D
L	Y	D	M
L	M	Y	D
L	M	D	Y
L	D	Y	M
L	D	M	Y

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8 Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list

pens	5 for 82p
pencils	10 for 45p
rulers	15 for £1.25
pencil cases	57p each

What is the total amount of money Neil spends?

$$\begin{aligned} \text{Pens: } & 30 \div 5 = 6 \\ & 6 \times 0.82 = \text{£}4.92 \end{aligned}$$

$$\begin{aligned} \text{Pencils: } & 30 \div 10 = 3 \\ & 3 \times 0.45 = \text{£}1.35 \end{aligned}$$

$$\begin{aligned} \text{Rulers: } & 30 \div 15 = 2 \\ & 2 \times 1.25 = \text{£}2.50 \end{aligned}$$

$$\text{Pencil Cases: } 30 \times 0.57 = \text{£}17.10$$

Total cost

$$\begin{array}{r} 4.92 \\ 1.35 \\ 2.50 \\ 17.10 \\ \hline 25.87 \end{array}$$

£ 25.87

(Total for Question 8 is 5 marks)



9 Emily drives 188 miles in 4 hours.

(a) What is her average speed?

$$188 \div 4 = 47 \text{ mph}$$

..... 47 mph
(2)

Sarah drives at an average speed of 64 mph for 6 hours.

(b) How many miles does Sarah drive?

$$64 \times 6 = 384 \text{ miles}$$

..... 384 miles
(2)

(Total for Question 9 is 4 marks)

10 (a) Write down all the prime numbers between 25 and 40

~~25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40~~

..... 29, 31, 37
(2)

Catherine says,

“2 is the only even prime number.”

(b) Is Catherine right?

You must give a reason for your answer.

She is correct because a prime number has exactly 2 distinct factors. All even numbers have 2 as a prime. When added to 1 and the number itself,⁽¹⁾ this makes > 2 factors.

(Total for Question 10 is 3 marks)



11 (a) Solve $x + x + x + x = 56$

$$\begin{aligned} & \div 4 \quad \left\{ \begin{array}{l} 4x = 56 \\ x = 14 \end{array} \right. \quad \div 4 \end{aligned}$$

$$x = \underline{\quad 14 \quad} \quad (1)$$

(b) Solve $\frac{y}{4} = 9$

$$\begin{aligned} & \times 4 \quad \left\{ \begin{array}{l} \frac{y}{4} = 9 \\ y = 36 \end{array} \right. \quad \times 4 \end{aligned}$$

$$y = \underline{\quad 36 \quad} \quad (1)$$

(c) Solve $5f + 7 = 24$

$$\begin{aligned} & -7 \quad \left\{ \begin{array}{l} 5f + 7 = 24 \\ 5f = 17 \end{array} \right. \quad -7 \\ & \div 5 \quad \left\{ \begin{array}{l} 5f = 17 \\ f = 3.4 \end{array} \right. \quad \div 5 \end{aligned}$$

$$f = \underline{\quad 3.4 \quad} \quad (1)$$

(Total for Question 11 is 3 marks)



12 A group of football fans were asked which United team was their favourite.

The table below gives information about their answers.

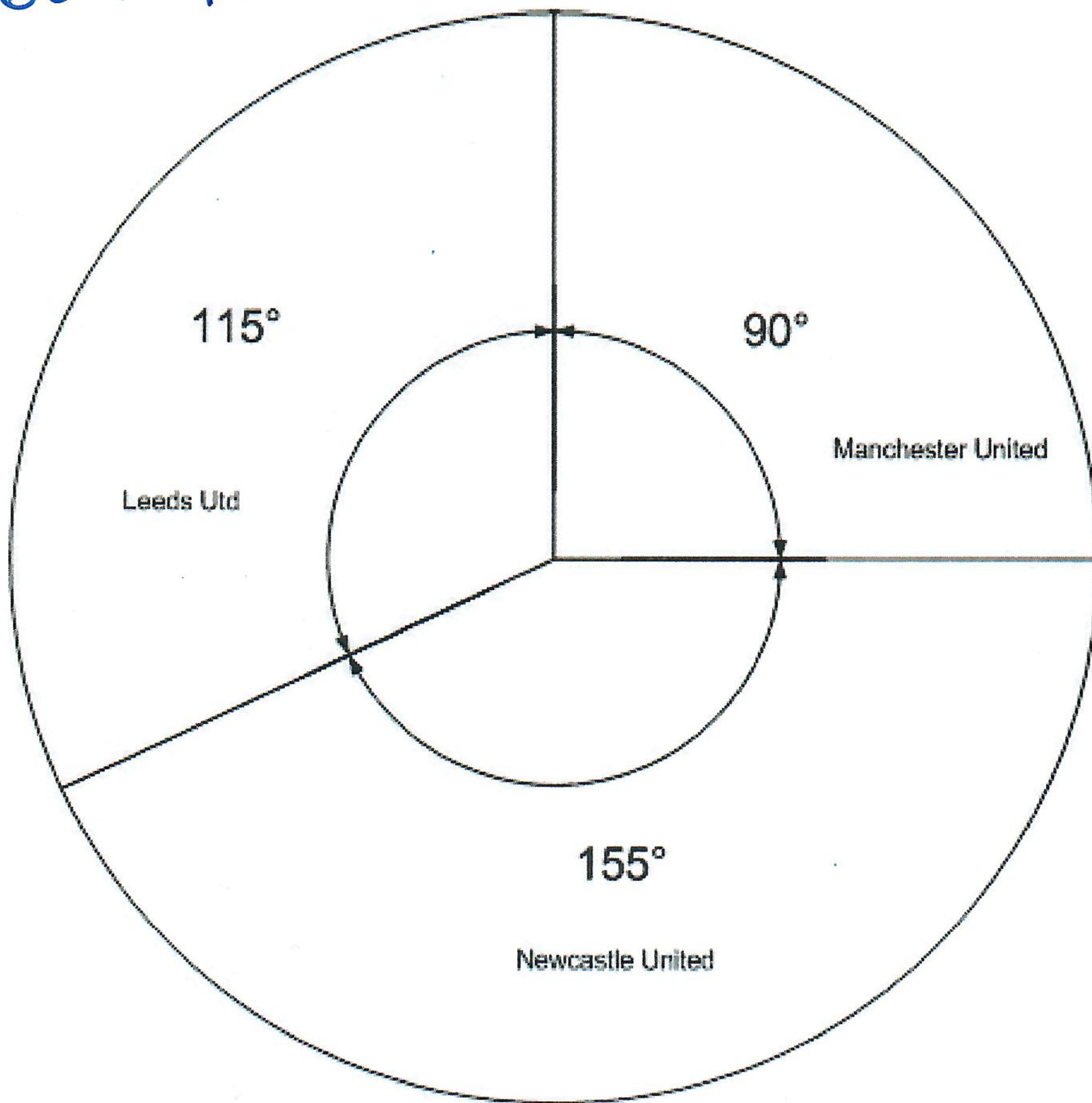
Team	Number of fans
Leeds	23
Newcastle	31
Manchester	18

$\times 5 = 115^\circ$
 $\times 5 = 155^\circ$
 $\times 5 = 90^\circ$

Draw an accurate pie chart for this information.

$23 + 31 + 18 = 72$

$360 \div 72 = 5$ value of one part.



(Total for Question 12 is 3 marks)



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13 A Girl Guide group has a raffle to raise money for charity.
There is 1 prize to be won in the raffle.

Laura buys 18 raffle tickets.

A total of 360 raffle tickets are sold.

Find the probability that Laura does **not** win the prize.

$$360 - 18 = 342$$

$$\frac{342}{360} = 0.95$$

0.95

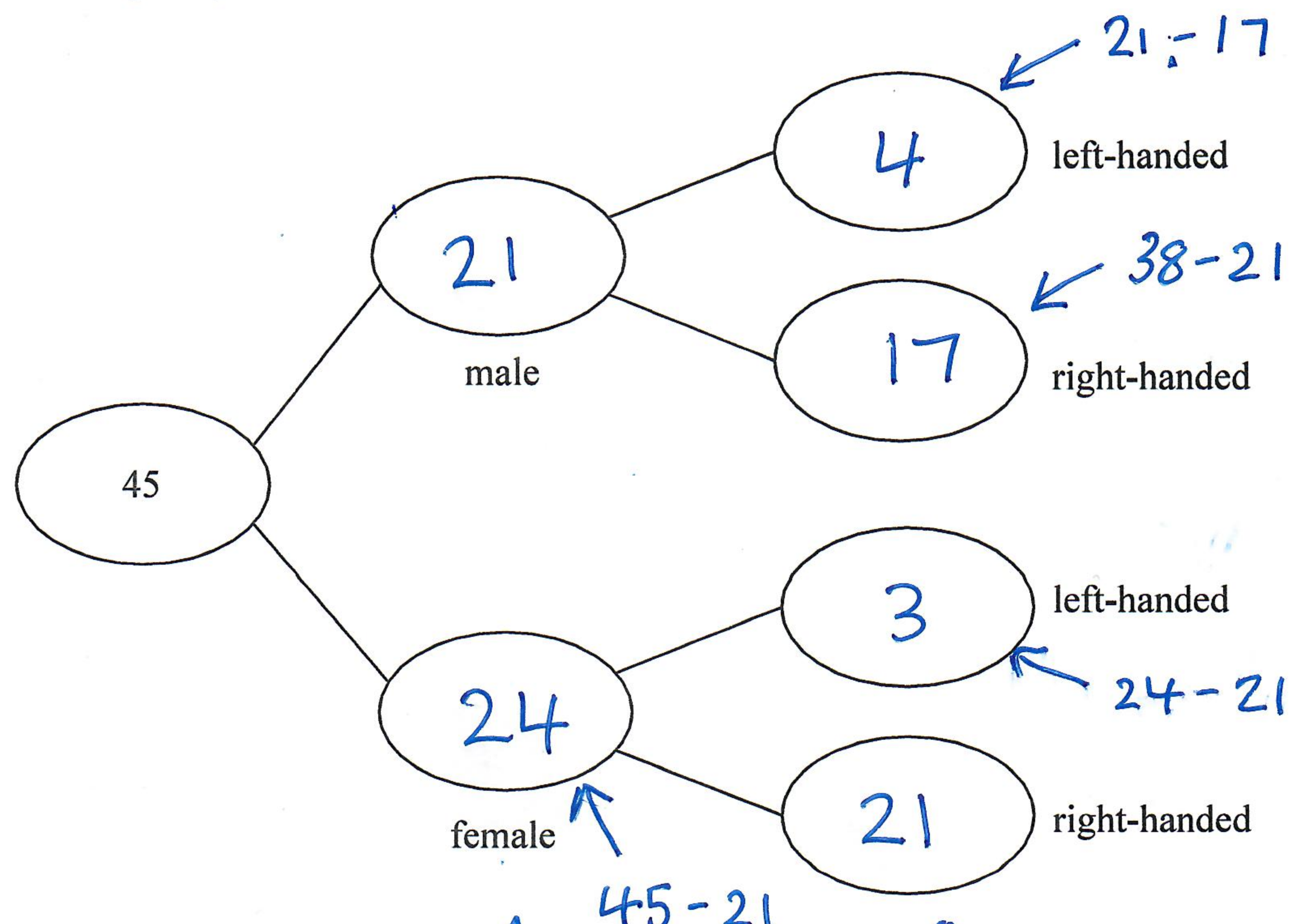
(Total for Question 13 is 2 marks)



14 Each worker in a factory is either left-handed or right-handed.

21 of the 45 workers are male.
21 of the 38 right-handed workers are female.

Complete the frequency tree for this information.



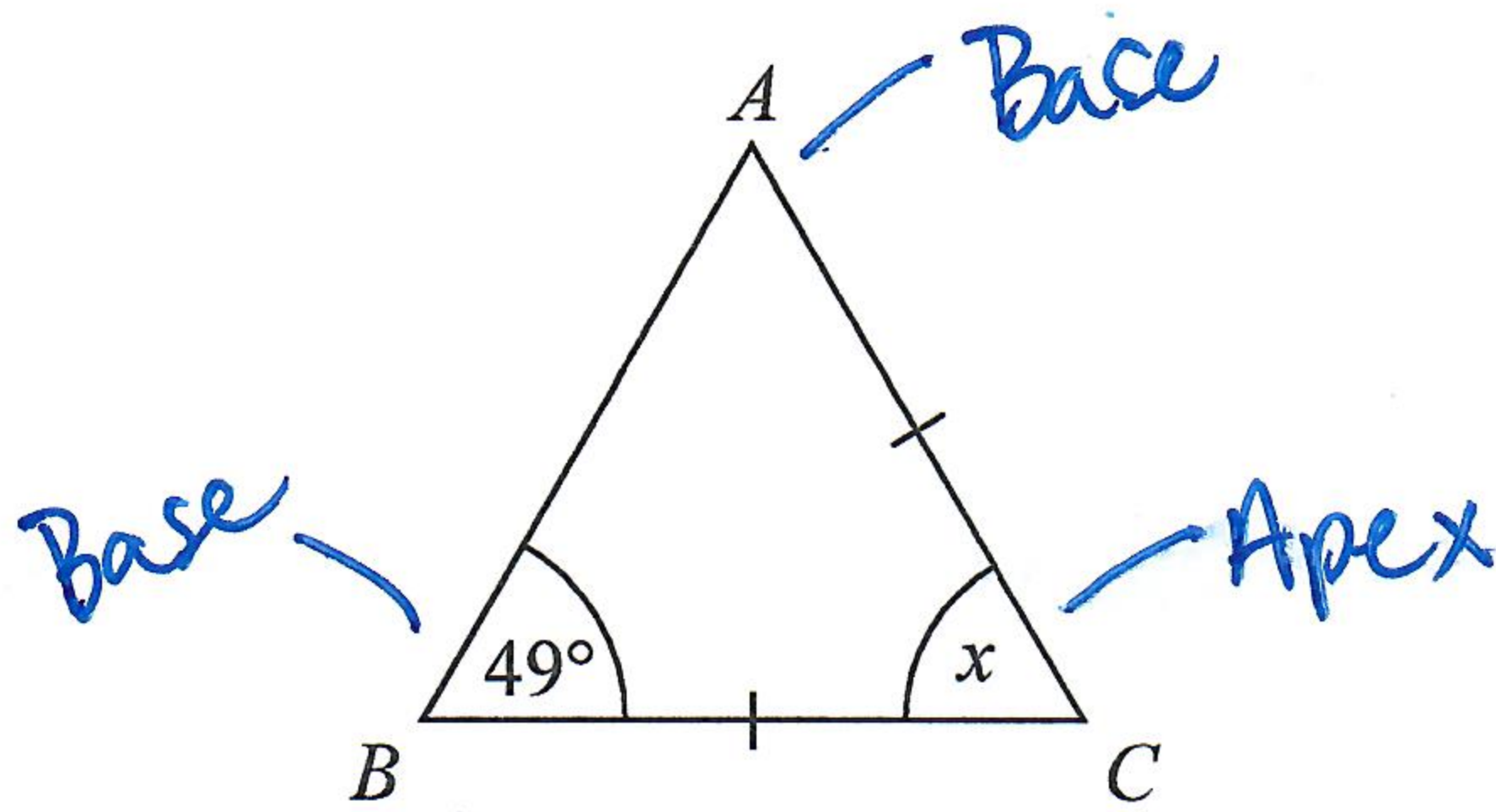
(Total for Question 14 is 3 marks)

This column must add up to 45.

This column must add up to 45.



15 Mary needs to work out the size of angle x in this diagram.



She writes

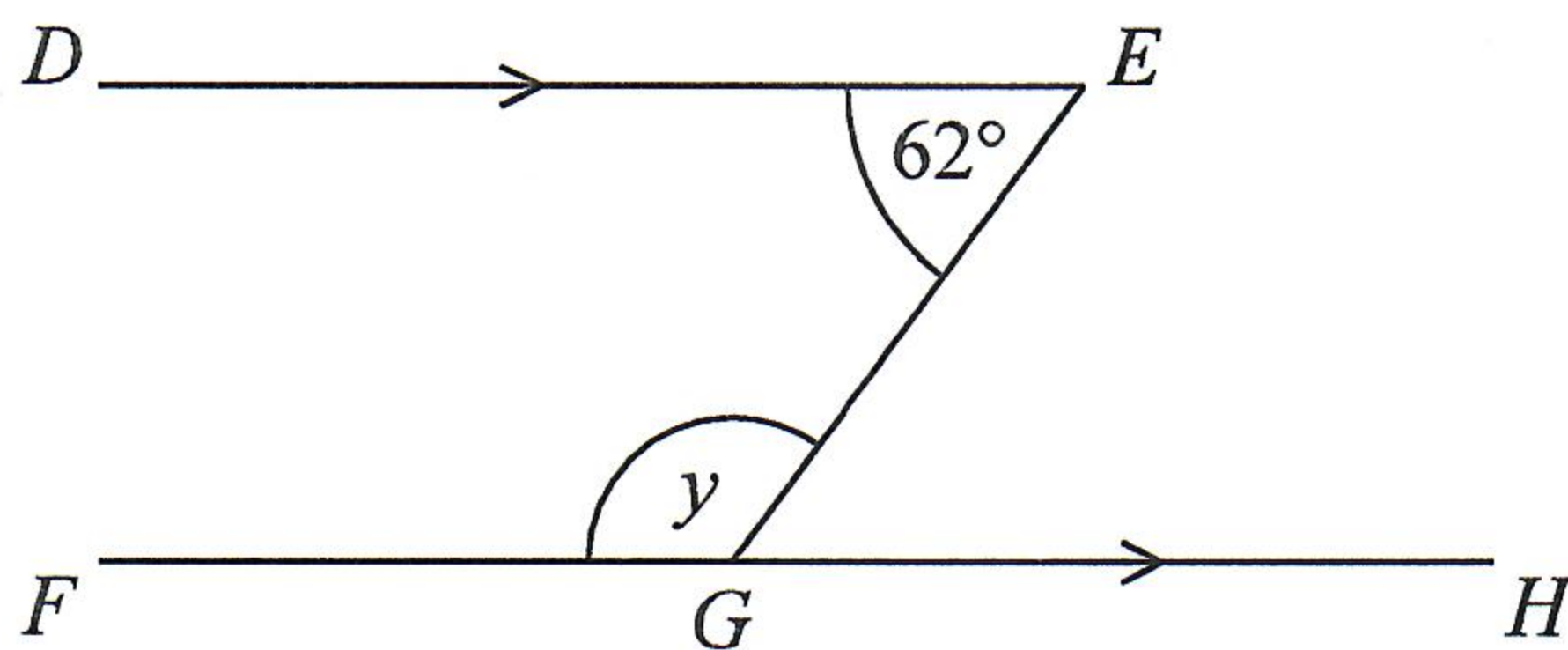
$$x = 49^\circ \text{ because base angles of an isosceles triangle are equal.}$$

Mary is wrong.

(a) Explain why.

The lines of the same length meet at the apex angle.
 The other two angles are the base angles (CBA and CAB).
 Mary is wrong because she misidentified the base angles.⁽¹⁾

William needs to work out the size of angle y in this diagram.



William writes

Working	Reason
angle $EGH = 62^\circ$	because corresponding angles are equal
$y = 180^\circ - 62^\circ$ $y = 117^\circ$	because co-interior angles add up to 180°

One of William's reasons is wrong.

(b) Write down the correct reason.

Co-interior angle add up to 180°

(1)

(Total for Question 15 is 2 marks)



16 Marla buys some bags of buttons.

There are 19 buttons or 20 buttons or 21 buttons or 22 buttons in each bag.

The table gives some information about the number of buttons in each bag.

Number of buttons	Frequency
19	6
20	8
21	3
22	5

The total number of buttons is 447

Complete the table.

$$19x + (20 \times 8) + (21 \times 3) + (22 \times 5) = 447$$

$$\therefore 19x + 160 + 63 + 110 = 447$$

$$\therefore 19x = 447 - (160 + 63 + 110)$$

$$= 447 - 333$$

$$= 114$$

$$\therefore x = \frac{114}{19} = 6$$

(Total for Question 16 is 3 marks)

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17 Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits
225 g butter
120 g caster sugar
260 g plain flour
80 g chocolate chips

Lucas has the following ingredients.

- 950 g butter
- 1000 g caster sugar
- 1200 g plain flour
- 270 g chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

Butter $225 \div 30 = 7.5$ g per biscuit
 $950 \div 7.5 = 126\frac{2}{3}$ biscuits.

Sugar $120 \div 30 = 4$ g per biscuit
 $1000 \div 4 = 250$ biscuits

Flour $260 \div 30 = 8\frac{2}{3}$ g per biscuit
~~8~~ $1200 \div 8\frac{2}{3} = 138.461\dots$ biscuits

Chocolate $80 \div 30 = 2\frac{2}{3}$ g per biscuit
 $270 \div 2\frac{2}{3} = 101.25$ biscuits.

So the greatest number of biscuits that Lucas can make is 101 biscuits.

..... 101

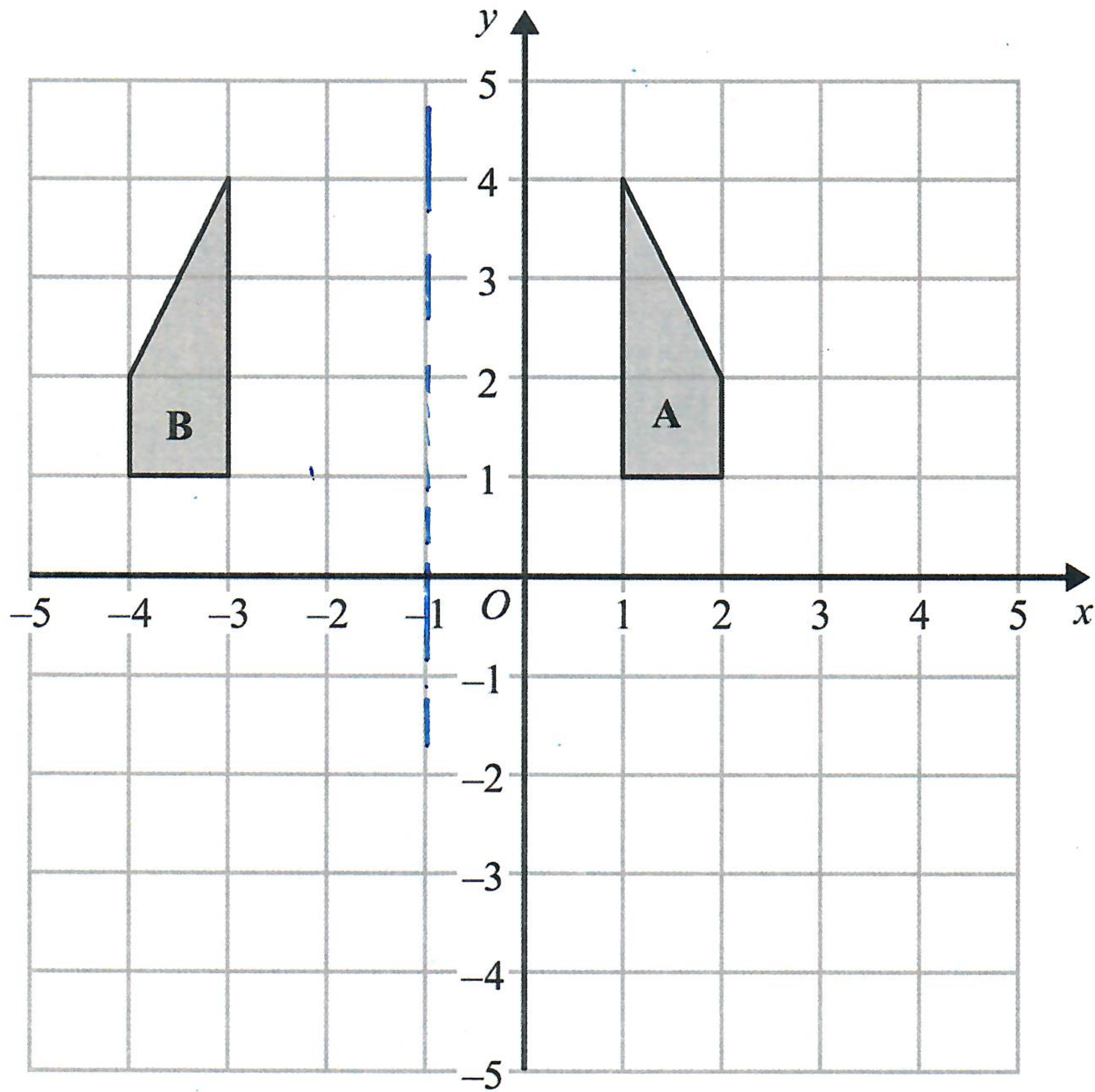
(Total for Question 17 is 3 marks)

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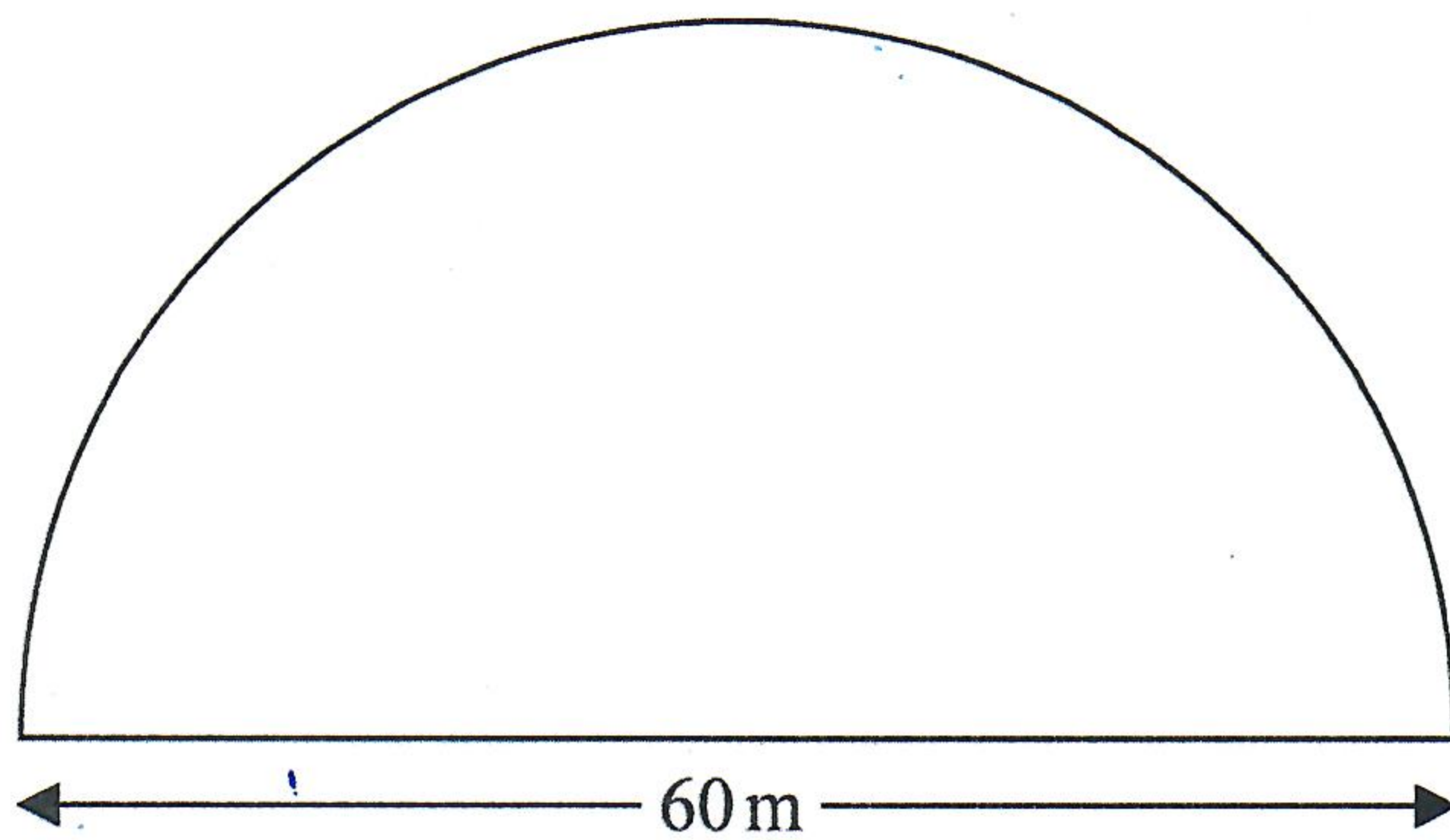
Describe fully the single transformation that maps shape A onto shape B.

Reflection through the line $x = -1$.

(Total for Question 18 is 2 marks)



19 A farmer has a field in the shape of a semicircle of diameter 60 m.



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £34.68 per metre of fence plus £210 for each day's work

Jim takes four days to build the fence.

Work out the total cost.

$$\text{Length of the fence} = \frac{\pi d}{2} + 60$$

$$= 30\pi + 60$$

$$= 154.2477796 \text{ m.}$$

$$\text{Cost of fence} = 154.2477796 \times 34.68$$

$$= 5349.312997$$

$$\approx \pounds 5,349.31$$

$$\text{Cost of labour} = 4 \times 210$$

$$= \pounds 840$$

$$\text{Total cost} = 5349.31 + 840$$

$$= \pounds 6189.312997$$

$$\approx \pounds 6189.31$$

$$\pounds 6189.31$$

(Total for Question 19 is 5 marks)



20 (a) Simplify $m^7 \times m^4$

$$(m \times m \times m \times m \times m \times m \times m) \times (m \times m \times m \times m)$$

$$= m^{7+4} = m^{11}$$

.....
(1)

(b) Simplify $(4np^3)^4$

$$(4np^3) \times (4np^3) \times (4np^3) \times (4np^3) = 256n^4p^{12}$$

$$\frac{256n^4p^{12}}{.....}$$

(2)

(c) Simplify $\frac{32q^4r^9}{4q^5r}$

$$\cancel{4} \times 8 \times \cancel{q} \times \cancel{q} \times \cancel{q} \times q \times r \times r \times r \times r \times r \times r \times r \times r \times r \times r$$

$$\cancel{4} \times q \times \cancel{q} \times \cancel{q} \times \cancel{q} \times \cancel{q} \times q \times r$$

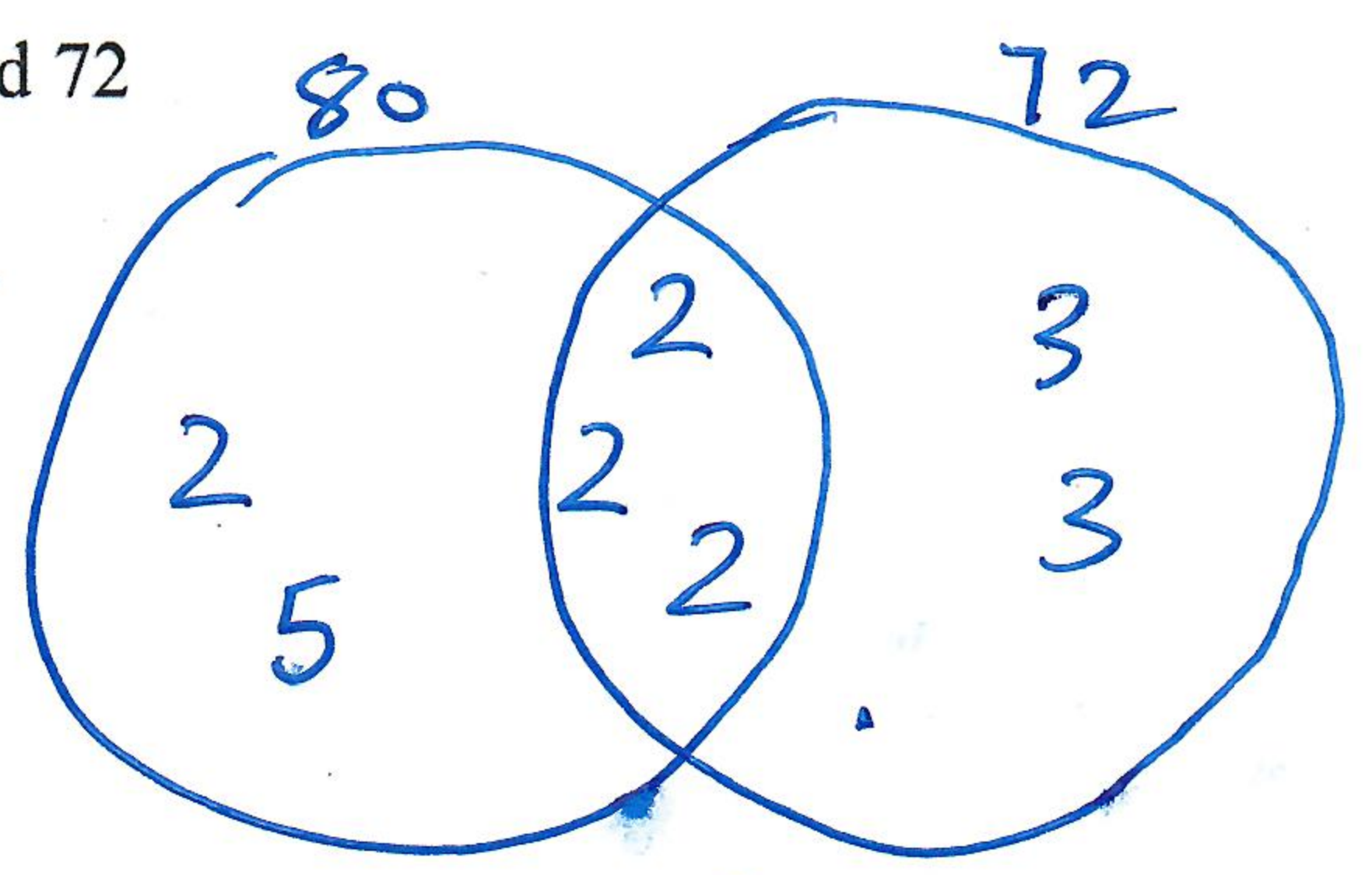
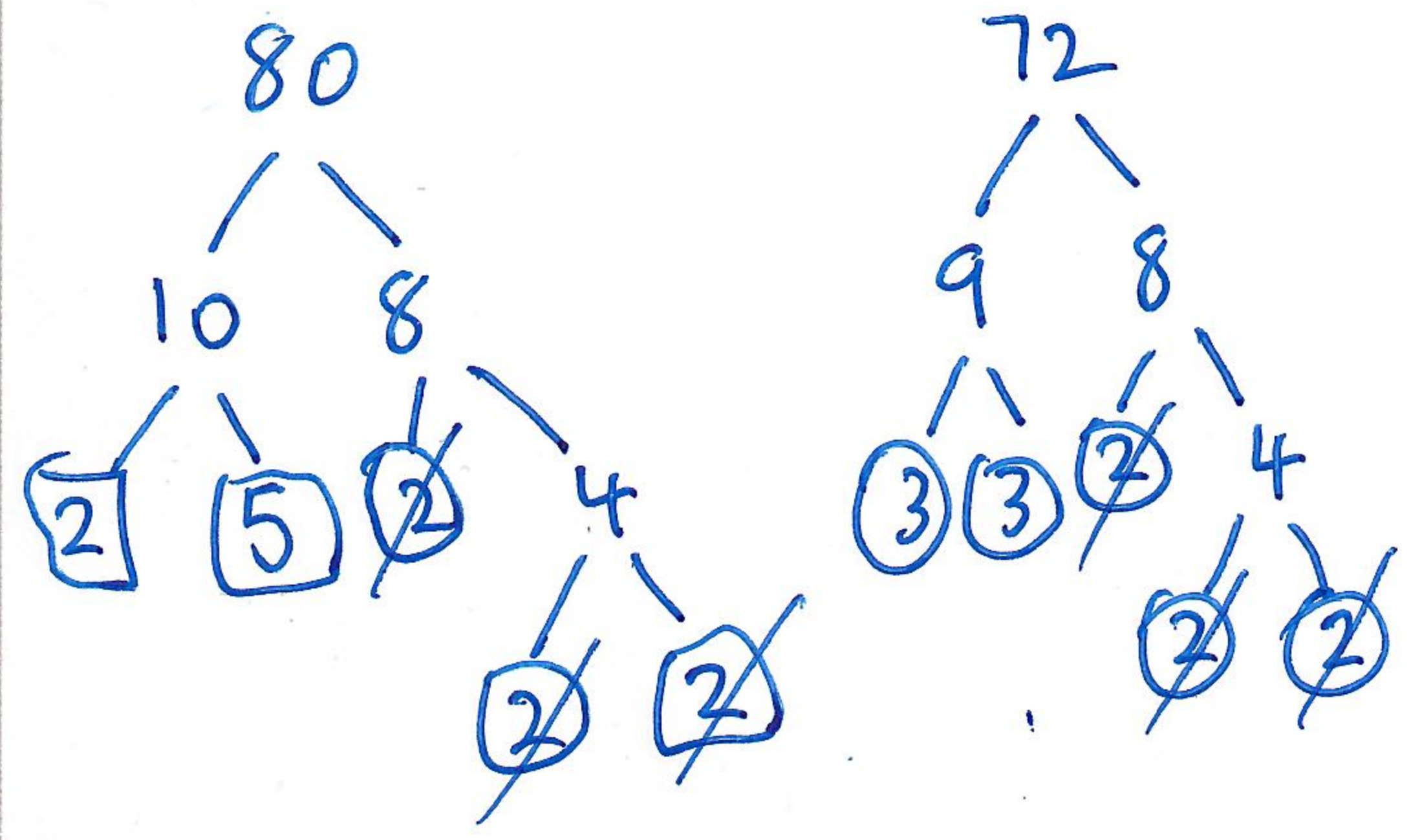
$$\frac{8r^8}{q}$$

.....
(2)

(Total for Question 20 is 5 marks)



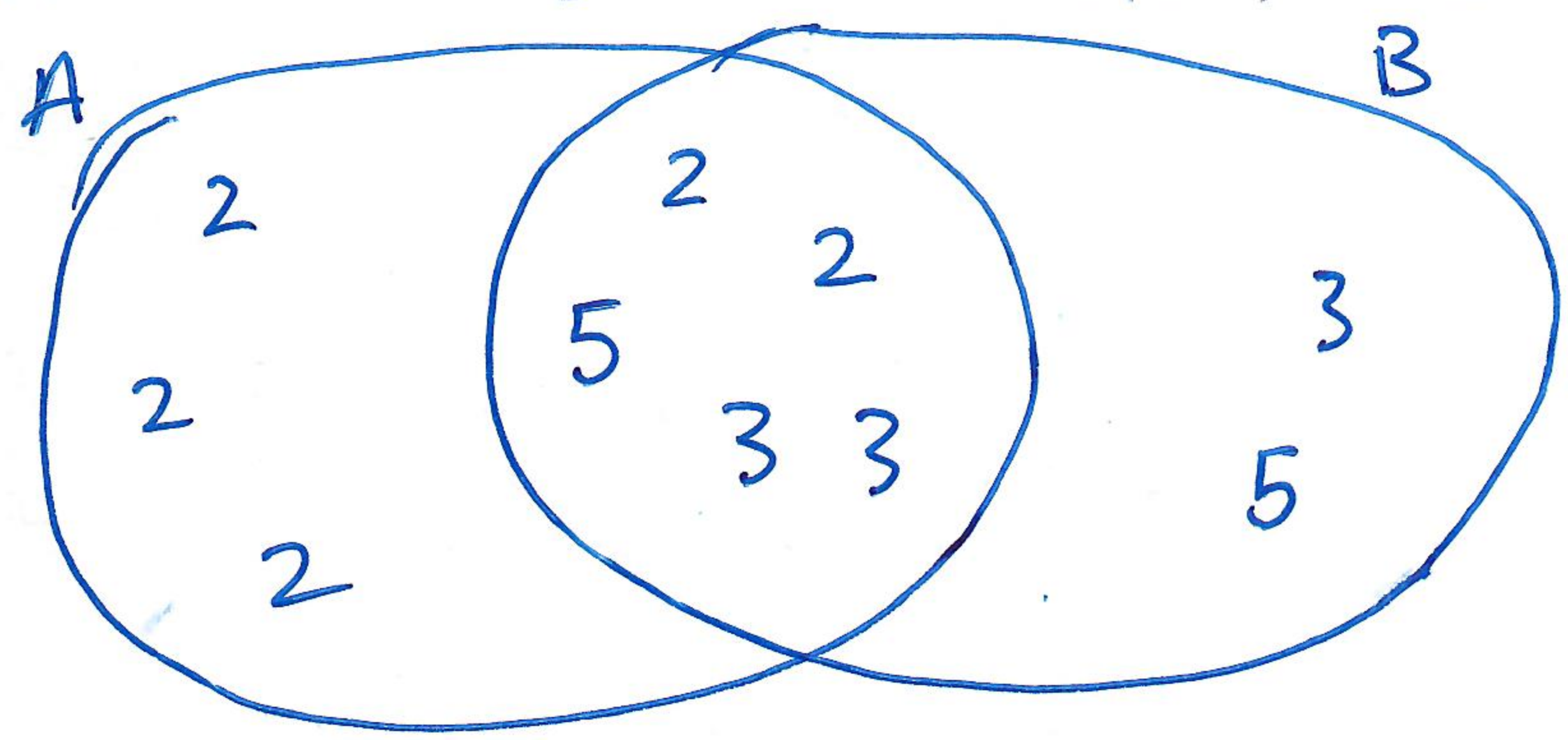
21 (a) Find the lowest common multiple (LCM) of 80 and 72



$2 \times 2 \times 2 \times 2 \times \cancel{2} \times 3 \times 5 = 720$
(2)

$A = 2^5 \times 3^2 \times 5$ $B = 2^2 \times 3^3 \times 5^2$

(b) Write down the highest common factor (HCF) of A and B.



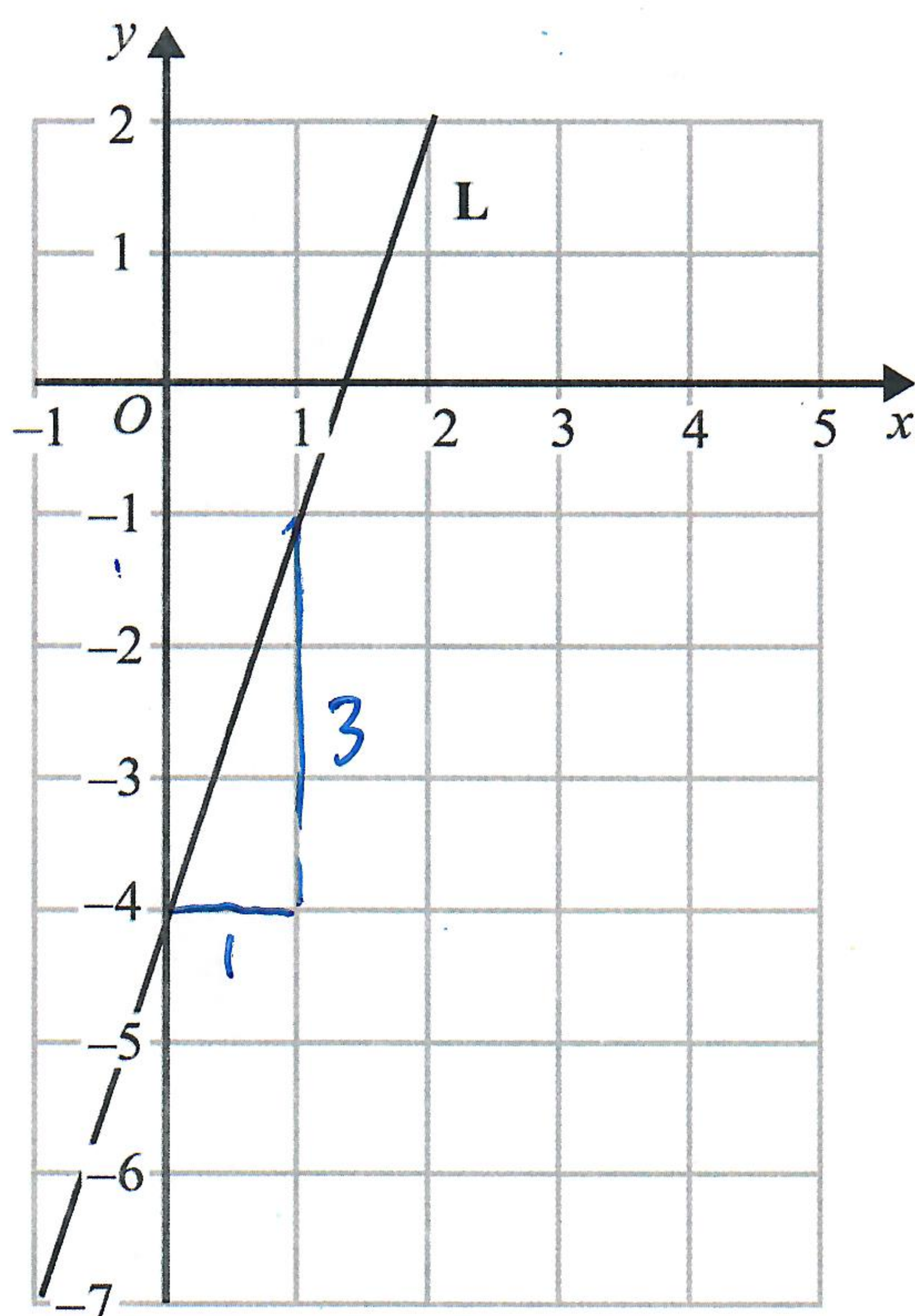
$2 \times 2 \times 3 \times 3 \times 5$

$HCF(A, B) = 180$
(1)

(Total for Question 21 is 3 marks)



22 The line L is shown on the grid.



Find an equation for L.

$$m = \frac{\Delta y}{\Delta x} = \frac{3}{1} = 3$$

$c =$ intercept at -4

So the equation = $y = 3x - 4$

$$y = 3x - 4$$

(Total for Question 22 is 3 marks)



23 Raya buys a van for £17015 plus VAT at 20%

Raya pays a deposit for the van.

She then pays the rest of the cost in 12 equal payments of £850.75 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.

Give your answer in its simplest form.

$$\text{Cost of the van} = \frac{100 + 20}{100} \times 17015 = 1.2 \times 17015 = \pounds 20418.$$

$$\text{Total amount paid in monthly payments} = 12 \times 850.75 = \pounds 10209$$

$$\text{Ratio} \cdot \text{Deposit paid} = 20418 - 10209 = \pounds 10209$$

Ratio of Deposit to Monthly payments

$$10209 : 10209$$

which is 1 : 1

1 : 1

(Total for Question 23 is 5 marks)

24 (a) Complete the table of values for $y = x^2 - x - 7$

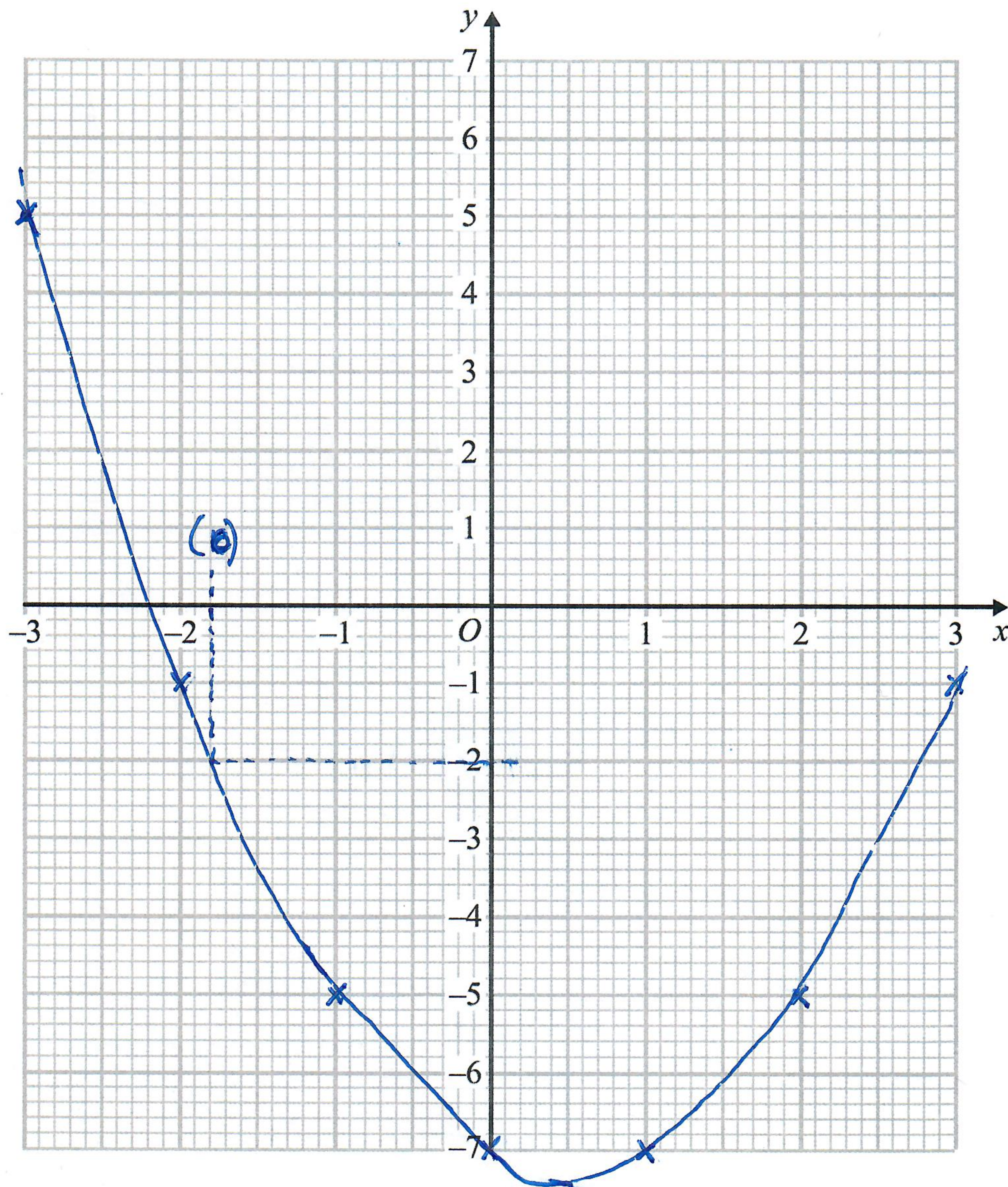
x	-3	-2	-1	0	1	2	3
y	5	-1	-5	-7	-7	-5	-1

In your calculator -2 sto → A then do $A^2 - A - 7 = -1$
then repeat for the rest of the x values.

(2)

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

(2)



(c) Use your graph to find estimates of the solutions to the equation $x^2 - x - 7 = -2$

Look at the
the graph.

----- line on

$$y = -2$$

$$x = -1.8$$

(2)

(Total for Question 24 is 6 marks)

25 A force of 80 newtons acts on an area of 30 cm^2

The force is increased by 20 newtons.

The area is increased by 6 cm^2

$\text{pressure} = \frac{\text{force}}{\text{area}}$
--

Helen says,

“The pressure decreases by less than 20%”

Is Helen correct?

You must show how you get your answer.

$$\begin{aligned} \text{Pressure} &= \frac{f}{a} \\ &= \frac{80}{30} \\ &= 2\frac{2}{3} \end{aligned}$$

$$\begin{aligned} \text{Pressure} &= \frac{f}{a} \\ &= \frac{100}{36} \\ &= 2\frac{7}{9} \end{aligned}$$

20% increase would give

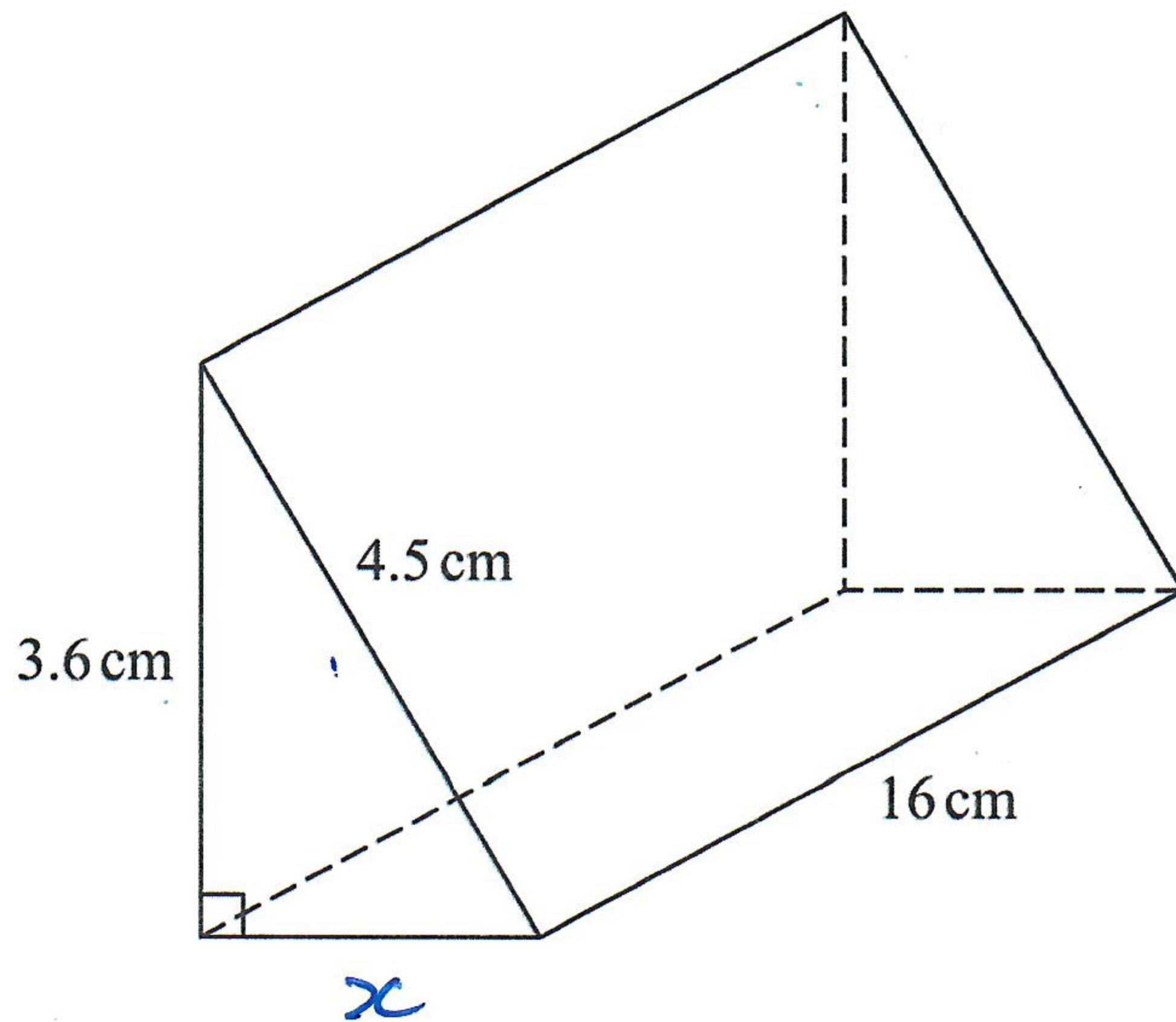
$$2\frac{2}{3} \times 1.2 = 3.2$$

$2\frac{7}{9} < 3.2$ \therefore Helen is correct

(Total for Question 25 is 3 marks)



26 Here is a triangular prism.



Work out the volume of the prism.

Give your answer correct to 3 significant figures.

To find x :

By Pythagoras, $c^2 = a^2 + b^2$

$$\therefore a^2 = c^2 - b^2$$

In this case $x^2 = 4.5^2 - 3.6^2$

$$= 7.29$$

$$\therefore x = \sqrt{7.29}$$

$$= 2.7$$

To calculate the volume of a prism = ^{cross} sectional area \times length

cross sectional area

$$\text{Area}_{\Delta} = \frac{1}{2} b h$$

$$= \frac{1}{2} \times 2.7 \times 3.6$$

$$= 4.86 \text{ cm}^2$$

Volume of Prism

$$\text{Volume} = \text{Area}_{\Delta} \times \text{length}$$

$$= 4.86 \times 16$$

$$= 77.76 \text{ cm}^3$$

$$\dots\dots\dots 77.76 \text{ cm}^3$$

(Total for Question 26 is 5 marks)

TOTAL FOR PAPER IS 80 MARKS

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Write your name here

Surname

Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9-1)

Centre Number

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Candidate Number

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Mathematics Shadow Set A

Paper 3 (Calculator)

Foundation Tier

Tuesday 12 June 2018 – Morning
Time: 1 hour 30 minutes

Paper Reference

1MA1/3F

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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6/7/7/7/8/8/7/1/




Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Write $\frac{3}{10}$ as a decimal.

0.3

(Total for Question 1 is 1 mark)

2 Write 0.2 as a percentage.

$$0.20 = 20\%$$

20%

(Total for Question 2 is 1 mark)

3 Write the number 4537 correct to the nearest hundred.

5 or more goes up

4500

(Total for Question 3 is 1 mark)

4 Here are the first 4 terms of a sequence.

9 17 25 33

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

9 $\xrightarrow{+8}$ 17 $\xrightarrow{+8}$ 25 $\xrightarrow{+8}$ 33 $\xrightarrow{+8}$ 41

41
(1)

(ii) Explain how you got your answer.

I added eight each time.

(1)

(b) Work out the 14th term of the sequence.

n th term = $8n + 1$

$$8(14) + 1 = 113$$

113

(1)

(Total for Question 4 is 3 marks)

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5 Here are four digits.

1 8 4 7

(a) Use three of these digits to write down the largest possible 3-digit number.

874

(1)

(b) Here are four different digits.

3 6 7 8

Put one of these digits in each box to give the smallest possible answer to the sum.
You must use each digit only once.

$$\boxed{3} \boxed{7} + \boxed{6} \boxed{8}$$

Lowest numbers in the tens column

(1)

(Total for Question 5 is 2 marks)

6 Write down all the factors of 24

1, 2, 3, 4, 6, 8, 12, 24

$$1 \times 24$$

$$2 \times 12$$

$$3 \times 8$$

$$4 \times 6$$

1, 2, 3, 4, 6, 8, 12, 24

(Total for Question 6 is 2 marks)



- 7 David has twice as many cousins as Becky.
Becky has twice as many cousins as Nishat.

Nishat has 9 cousins.

How many cousins does David have?

$$n = 9$$

$$b = 2n$$

$$d = 2b = 4n$$

$$4 \times 9 = 36$$

36

(Total for Question 7 is 2 marks)

- 8 (a) Find the value of $\sqrt{5.76 \times 8.41}$

6.96

(1)

- (b) Find the value of $(4.92 - 0.18)^2 - 8.192$

14.2756

(2)

(Total for Question 8 is 3 marks)

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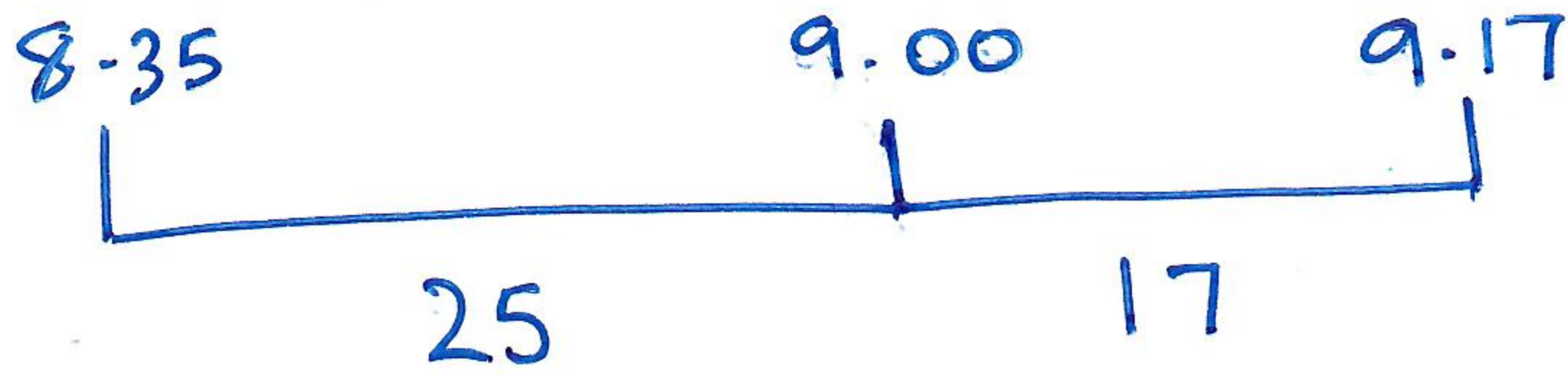
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9 This is part of a bus timetable between Bury and Manchester.

Bury	0835	0855	0915	0930	0945	1005
Whitefield	0847	0908	0924	0939	0954	1014
Heaton Park	0851	0919	0936	0951	1006	1027
Cheetham	0858	0929	0946	1001	1016	1037
Manchester	0917	0941	0955	1010	1025	1048

(a) How many minutes should the 0835 bus take to go from Bury to Manchester?



$$25 + 17 = 42$$

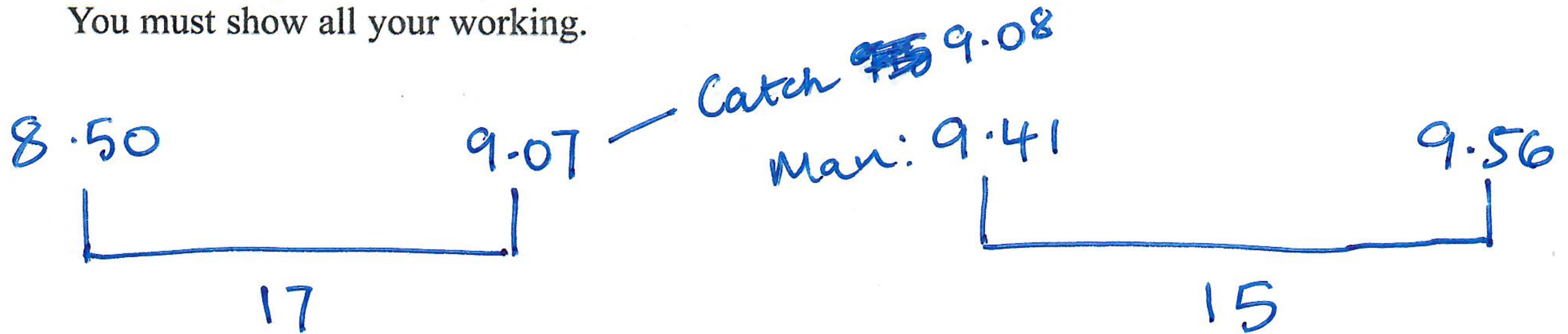
42 minutes
(1)

Daniel goes from Whitefield to Manchester by bus.

Daniel takes 17 minutes to get from his house to the bus stop in Whitefield.
He takes 15 minutes to get from the bus stop in Manchester to work.

Daniel has to get to work by 10 am.
He leaves his house at 8.50 am.

(b) Does Daniel get to work by 10 am?
You must show all your working.



Yes.
(3)

(Total for Question 9 is 4 marks)



10 Bronwin works in a restaurant.

The table gives her rates of pay.

Day	Rate of pay
Monday to Friday	£9.40 per hour
Weekend	£11.70 per hour

Bronwin worked for a total of 20 hours last week.
She worked 8 of these 20 hours at the weekend.

Show that Bronwin was paid less than £210 last week.

$$20 - 8 = 12$$

$$12 \times 9.40 = 112.80$$

$$8 \times 11.70 = 93.60$$

$$112.80 + 93.60 = £206.40 < £210.$$

(Total for Question 10 is 3 marks)

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- 11 Last year the cost of a season ticket for a football club was £760
This year the cost of a season ticket for the club has been increased to £820

Write down the increase in the cost of a season ticket as a fraction of last year's cost.

$$\frac{820}{760} = \frac{82}{76} = \frac{41}{38}$$

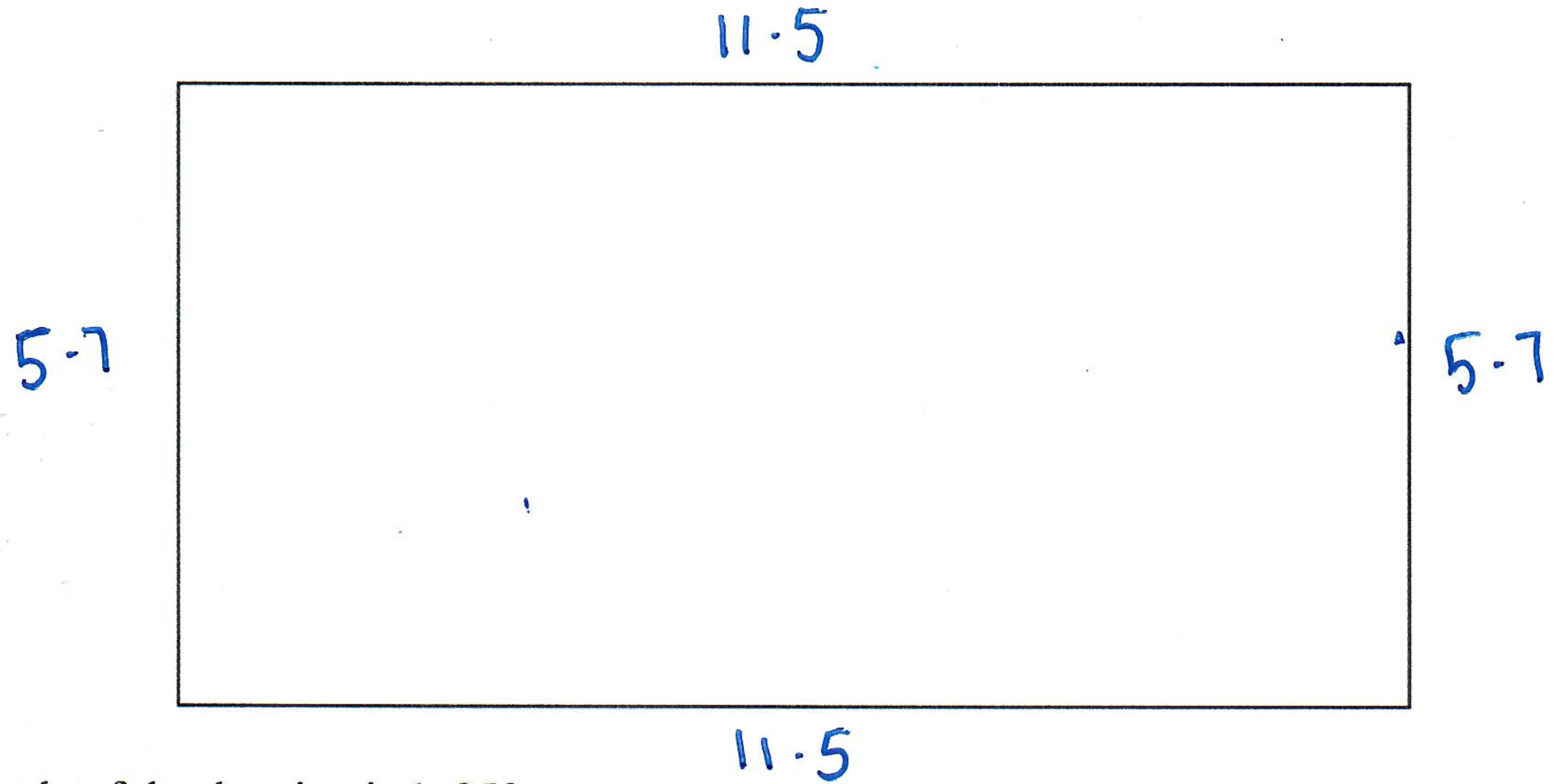
$$\text{Increase} = \frac{41 - 38}{38} = \frac{3}{38}$$

$$\frac{3}{38}$$

(Total for Question 11 is 2 marks)



12 The diagram shows a scale drawing of a games court.



The scale of the drawing is 1:250

Work out the perimeter of the real games court. Give your answer in metres.

$$11.5 + 5.7 + 11.5 + 5.7 = 34.4$$

$$34.4 \times 250 = 8600 \text{ cm}$$

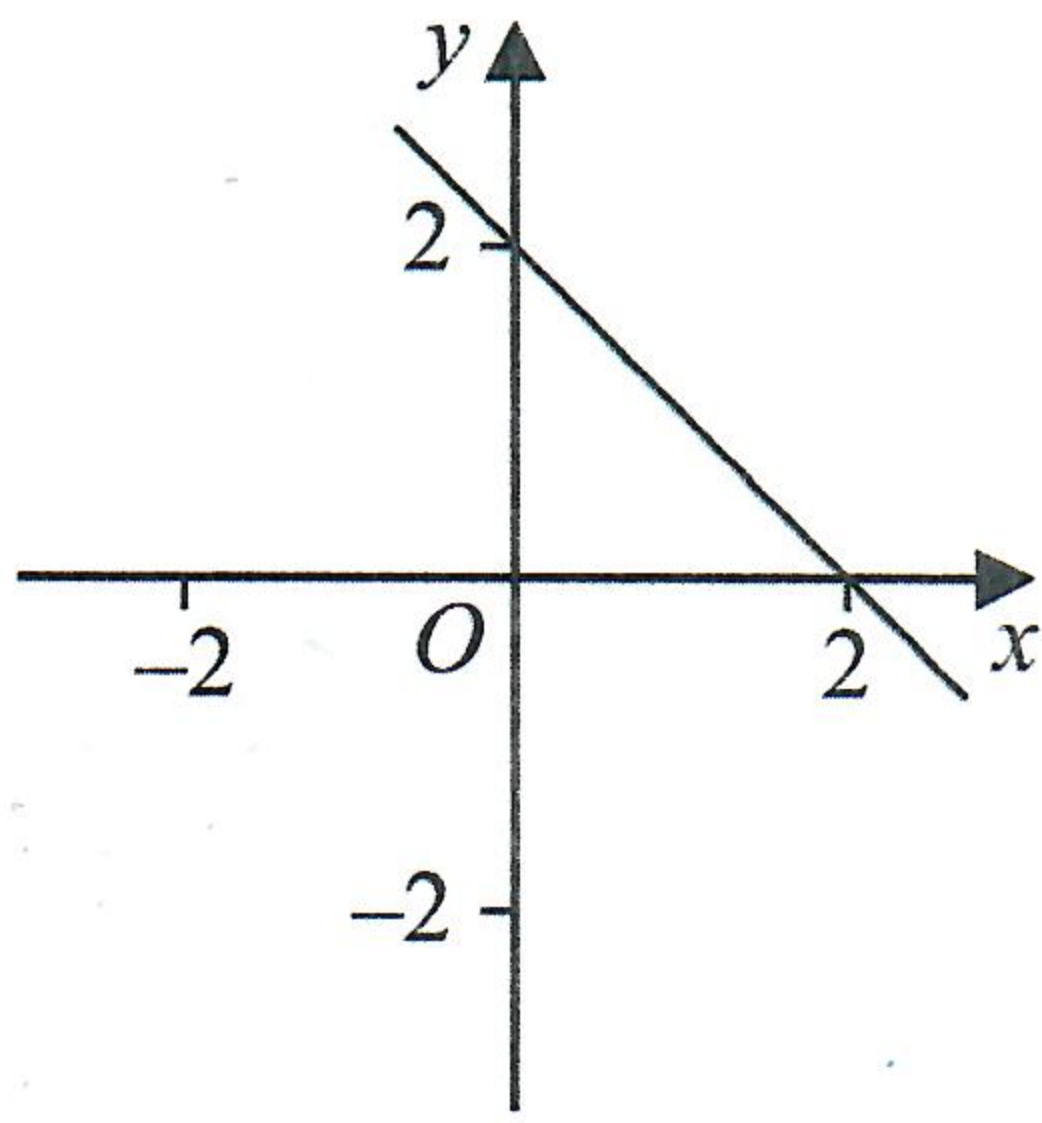
$$8600 \div 100 = 86 \text{ m}$$

86 metres

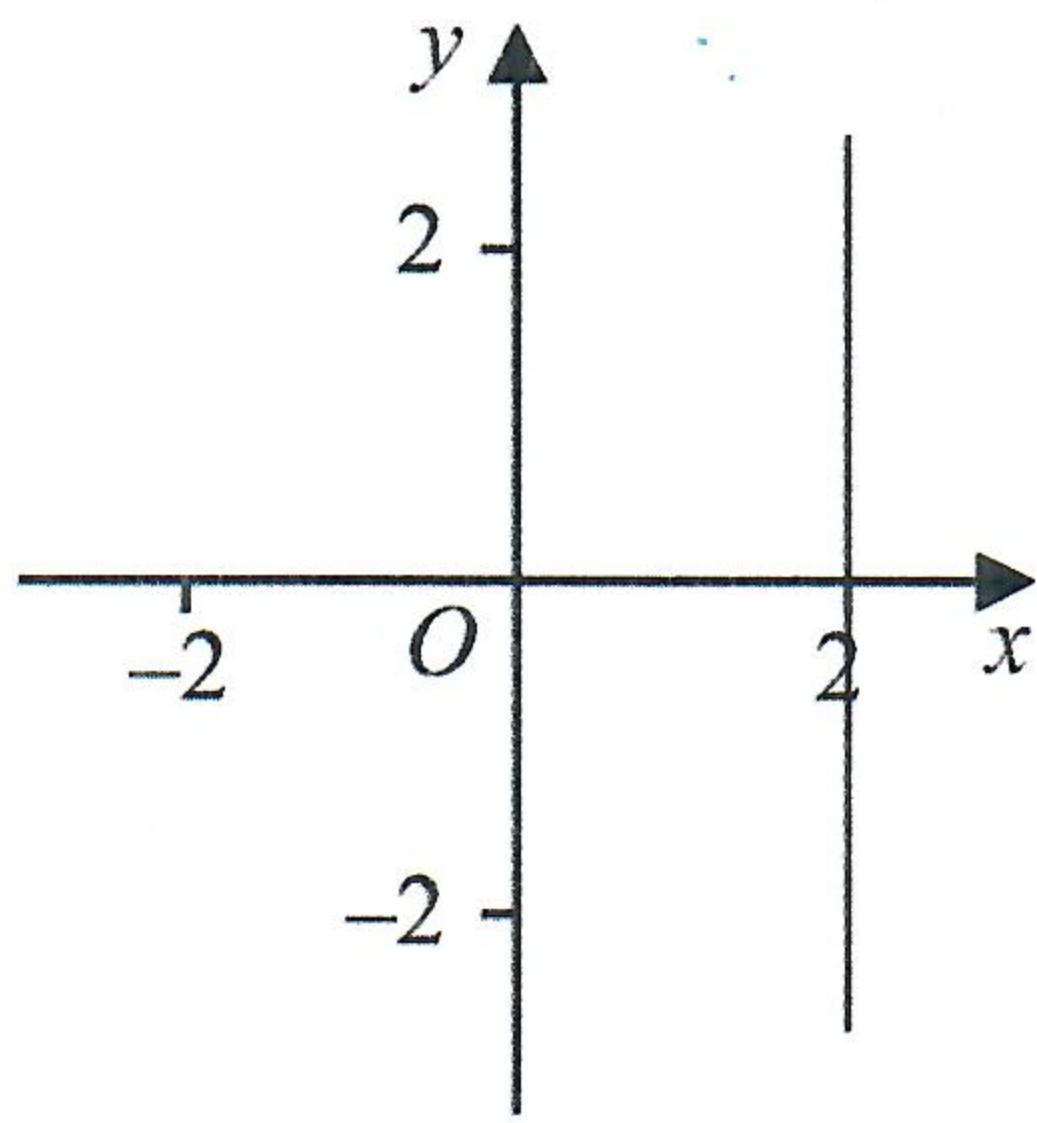
(Total for Question 12 is 5 marks)



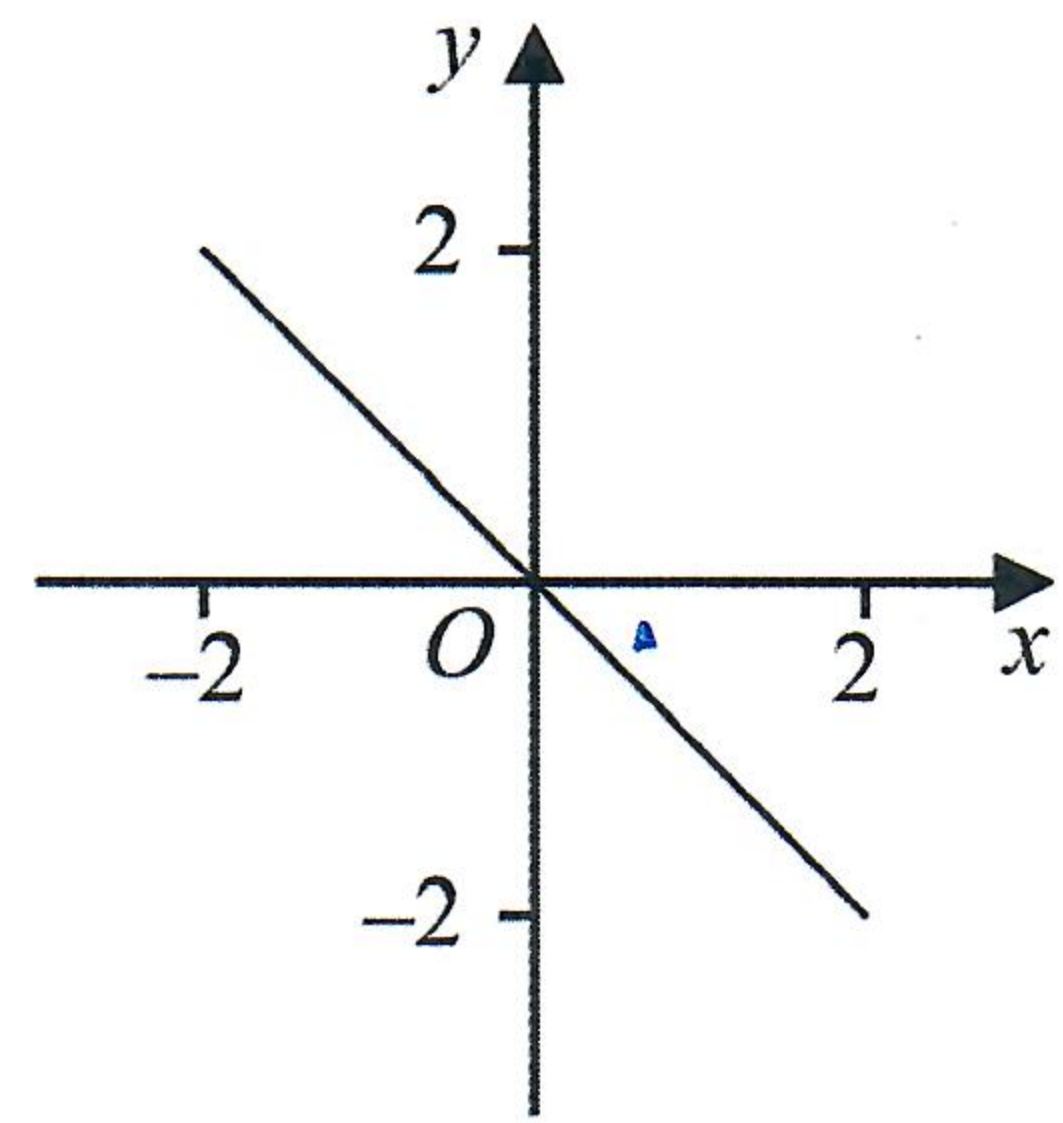
13 Here are six straight line graphs.



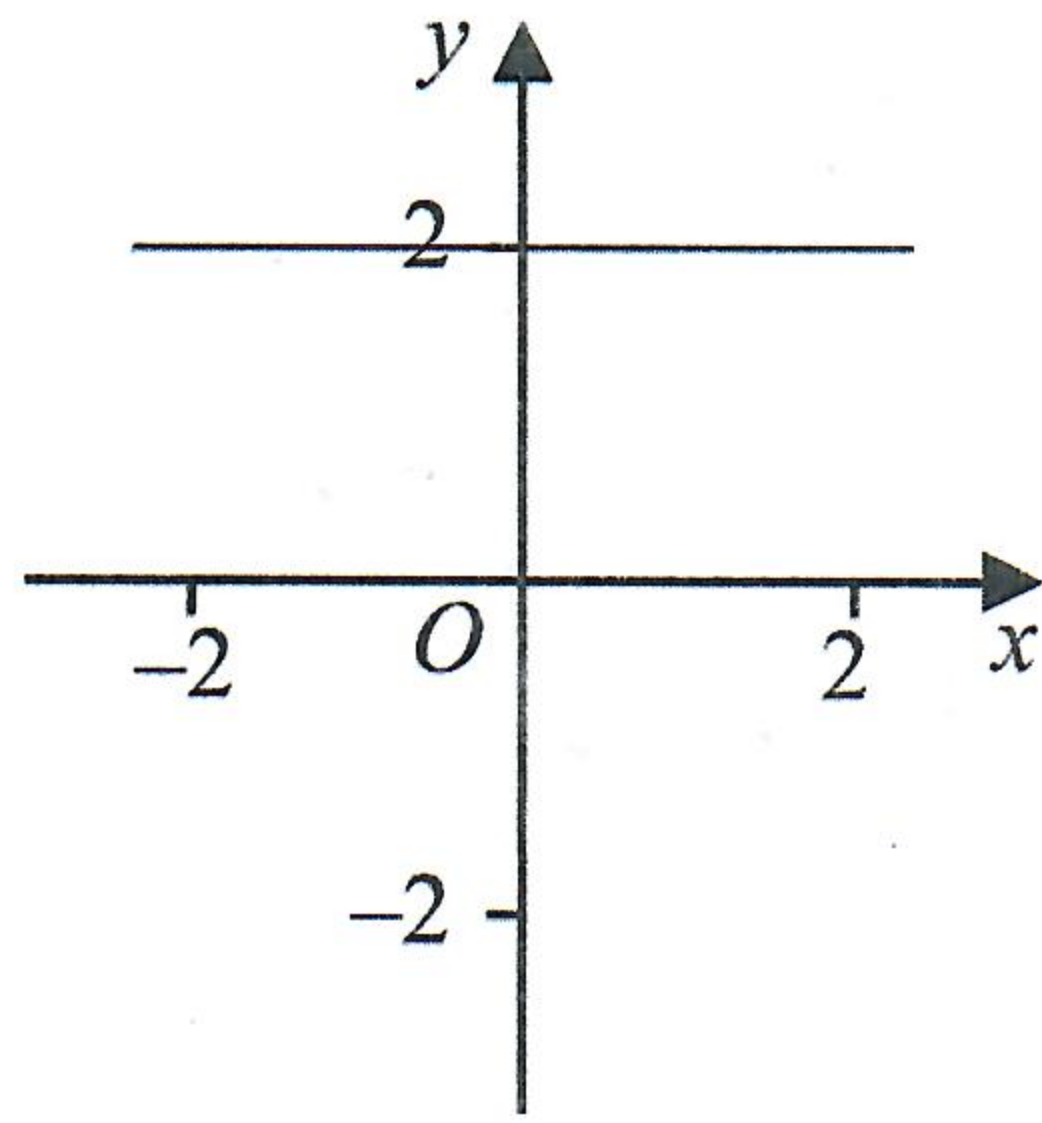
Graph A



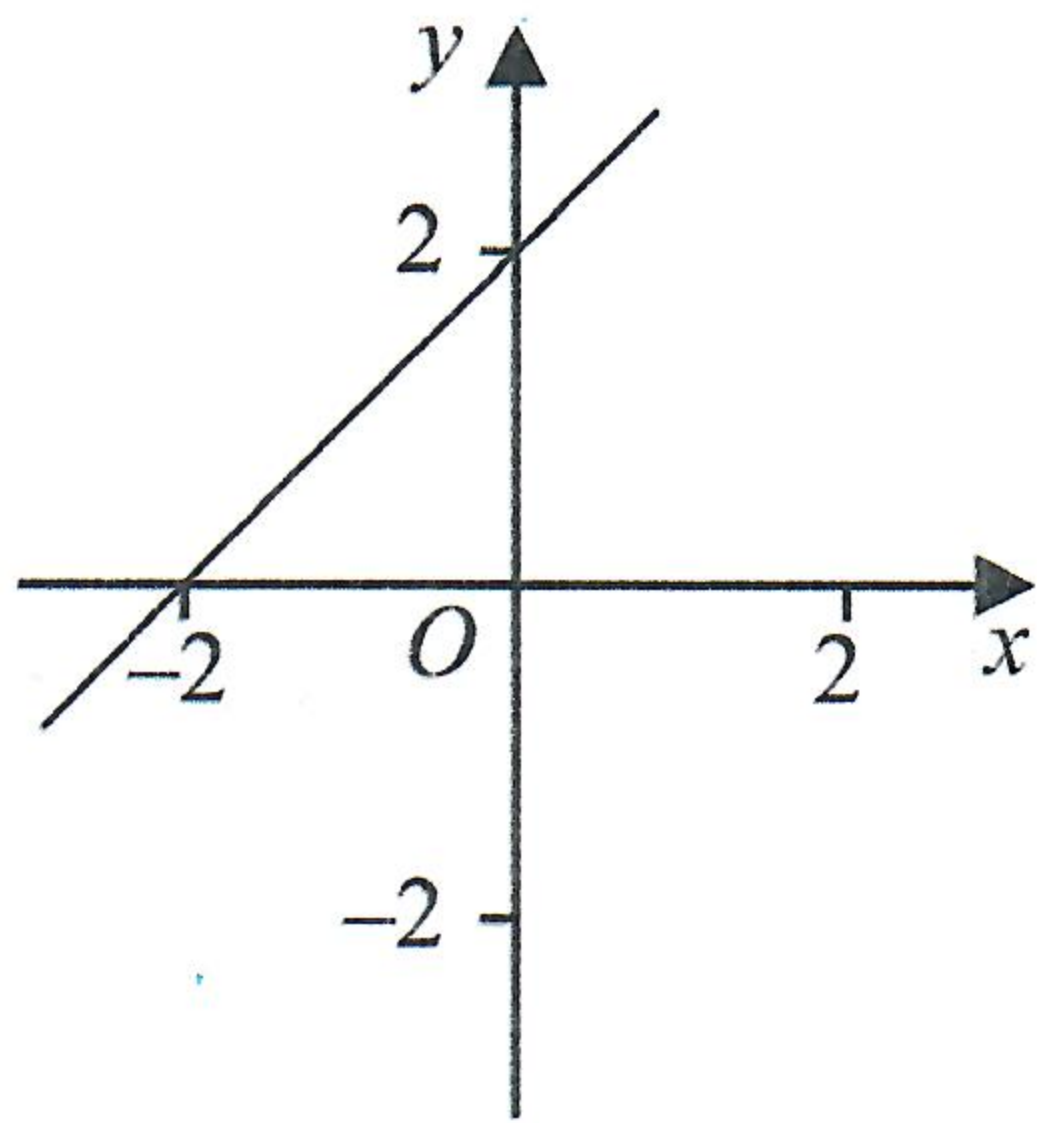
Graph B



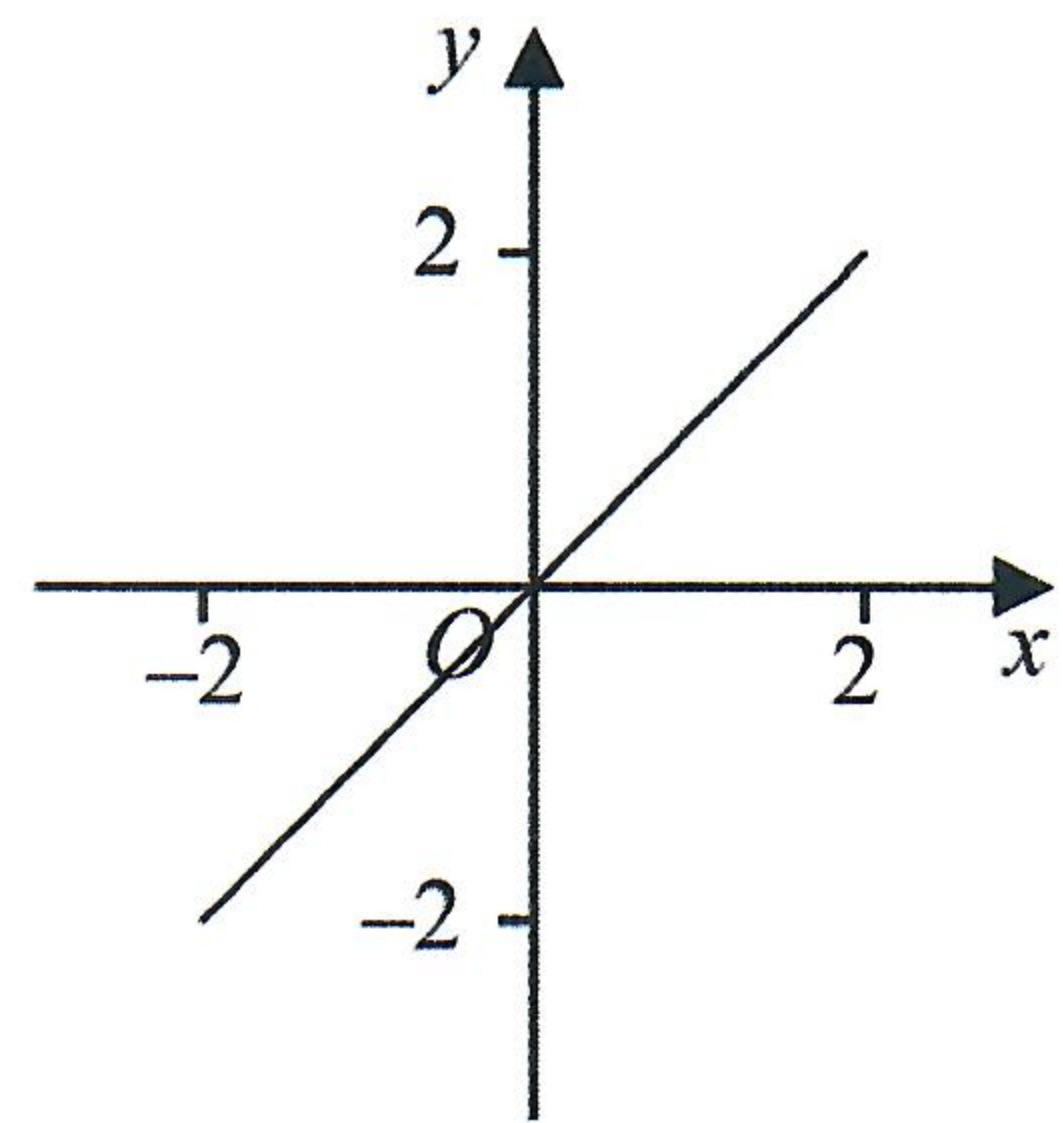
Graph C



Graph D



Graph E



Graph F

Match each equation in the table to the correct graph.
Write the letter of the graph in the table.

Equation	Graph
$y = 2 - x$	A
$y = x$	F
$y = x + 2$	E

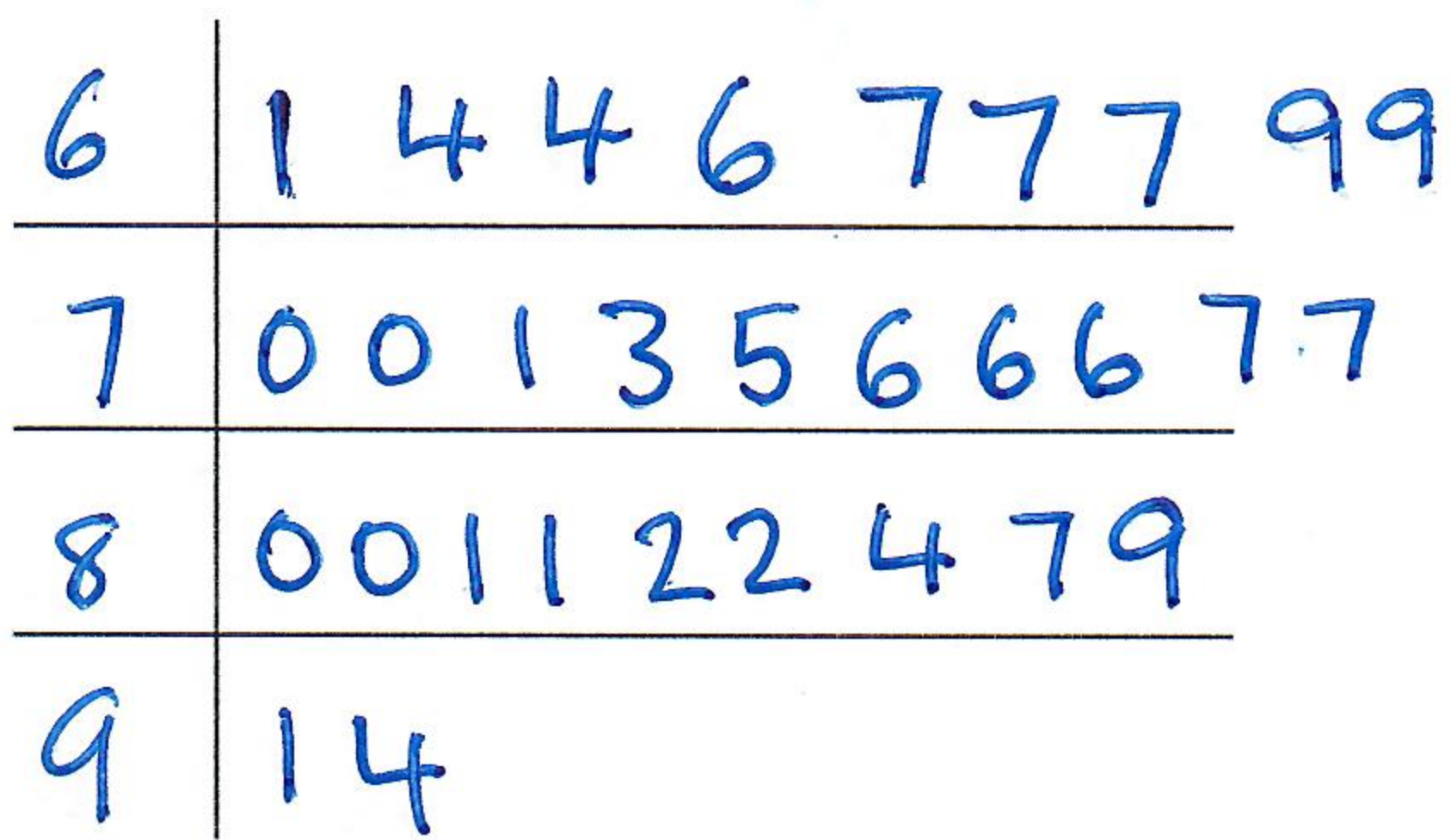
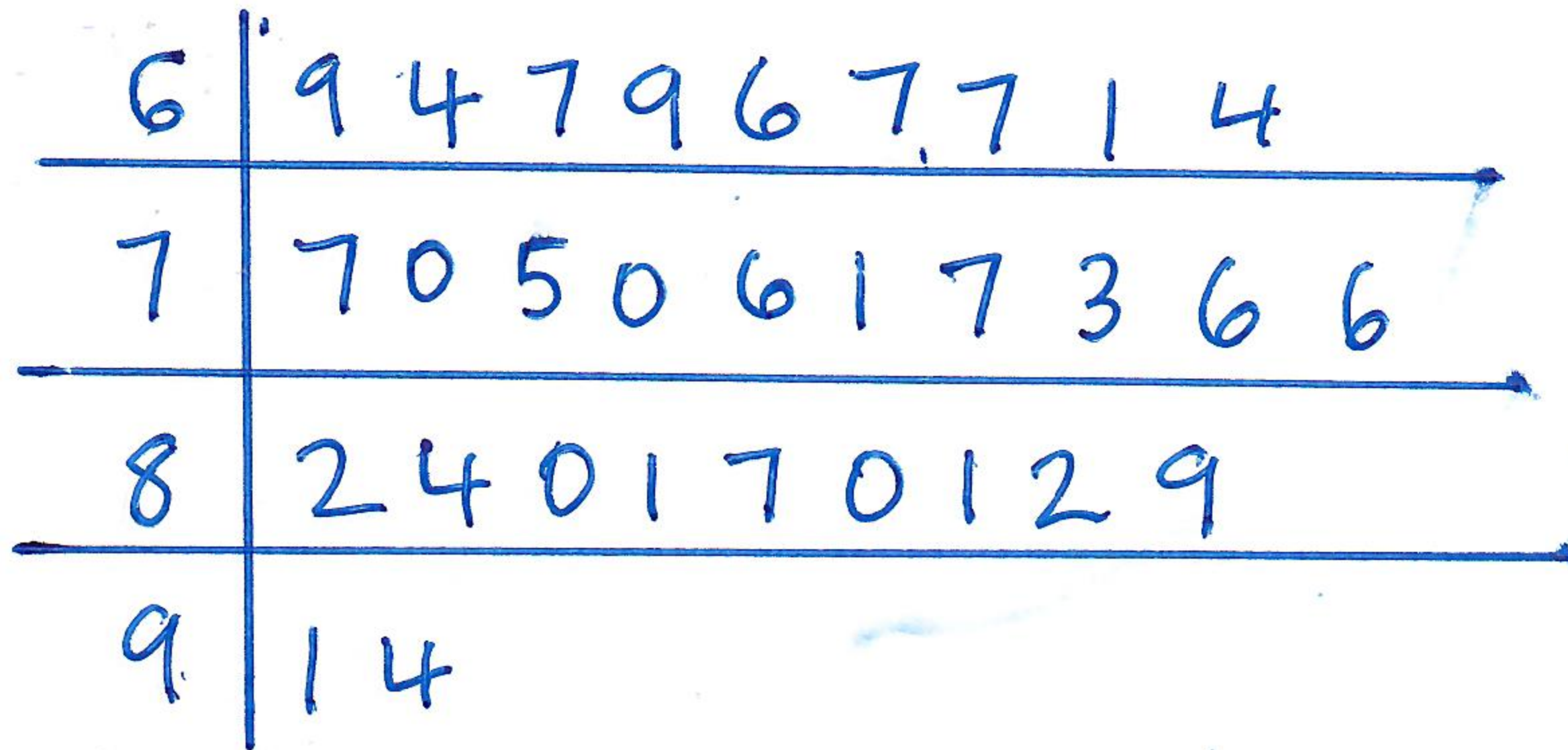
(Total for Question 13 is 2 marks)



14 Here are the marks 30 students got in a French test.

~~77~~ ~~82~~ ~~84~~ ~~69~~ ~~80~~ ~~64~~ ~~70~~ ~~81~~ ~~75~~ ~~91~~
~~87~~ ~~67~~ ~~80~~ ~~70~~ ~~94~~ ~~76~~ ~~81~~ ~~69~~ ~~71~~ ~~77~~
~~66~~ ~~67~~ ~~82~~ ~~67~~ ~~73~~ ~~76~~ ~~61~~ ~~64~~ ~~76~~ ~~89~~

(a) Show this information in a stem and leaf diagram.



Key 6|1 means 61

(3)

One of these students is going to be chosen at random.

The pass mark in the French test is 71

Omar writes,

The probability that this student failed the French test is $\frac{2}{3}$

Omar is wrong.

(b) Explain why.

$\frac{19}{30}$ students past the test.

$\frac{11}{30}$ failed

$\frac{11}{30} < \frac{2}{3}$

(2)

(Total for Question 14 is 5 marks)



15 Jenny is asked to find the value of $18 - 2 \times 5$

Here is her working.

$$18 - 2 \times 5 = 16 \times 5 = 80$$

Jenny's answer is wrong.

(a) Explain what Jenny has done wrong.

She should do 2×5 first so $18 - 2 \times 5 = 18 - 10 = 8$

(1)

Rehan is asked to find the range of the numbers 2 1 9 7 6

Here is his working.

$$\text{Range} = 6 - 2 = 4$$

This is wrong.

(b) Explain why.

He should put the numbers in order first.

1, 2, 6, 7, 9. $9 - 1 = 8$ which is the range.

(1)

(Total for Question 15 is 2 marks)

16 Alan, Bispah and Chan share a sum of money.

Alan gets $\frac{1}{5}$ of the money.

Bispah gets $\frac{1}{4}$ of the money.

Chan gets the rest of the money.

Alan gets £2.50

(a) Work out how much money Bispah gets.

$$\text{Total money} = 5 \times 2.50 = \text{£}12.50$$

$$\begin{aligned} \text{Bispah gets } & \frac{1}{4} \times 12.50 = \text{£}3.125 \\ & \approx \text{£}3.13 \end{aligned}$$

$$\text{£} \frac{3.13}{(2)}$$

(b) Find the ratio

amount of money Alan gets : amount of money Chan gets

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

$$\begin{aligned} \text{Chan gets } & 12.50 - (3.13 + 2.50) = 12.50 - 5.63 \\ & = 6.87 \end{aligned}$$

So the ratio is Alan : Chan
250 : 687

$$\frac{250 : 687}{(3)}$$

(Total for Question 16 is 5 marks)

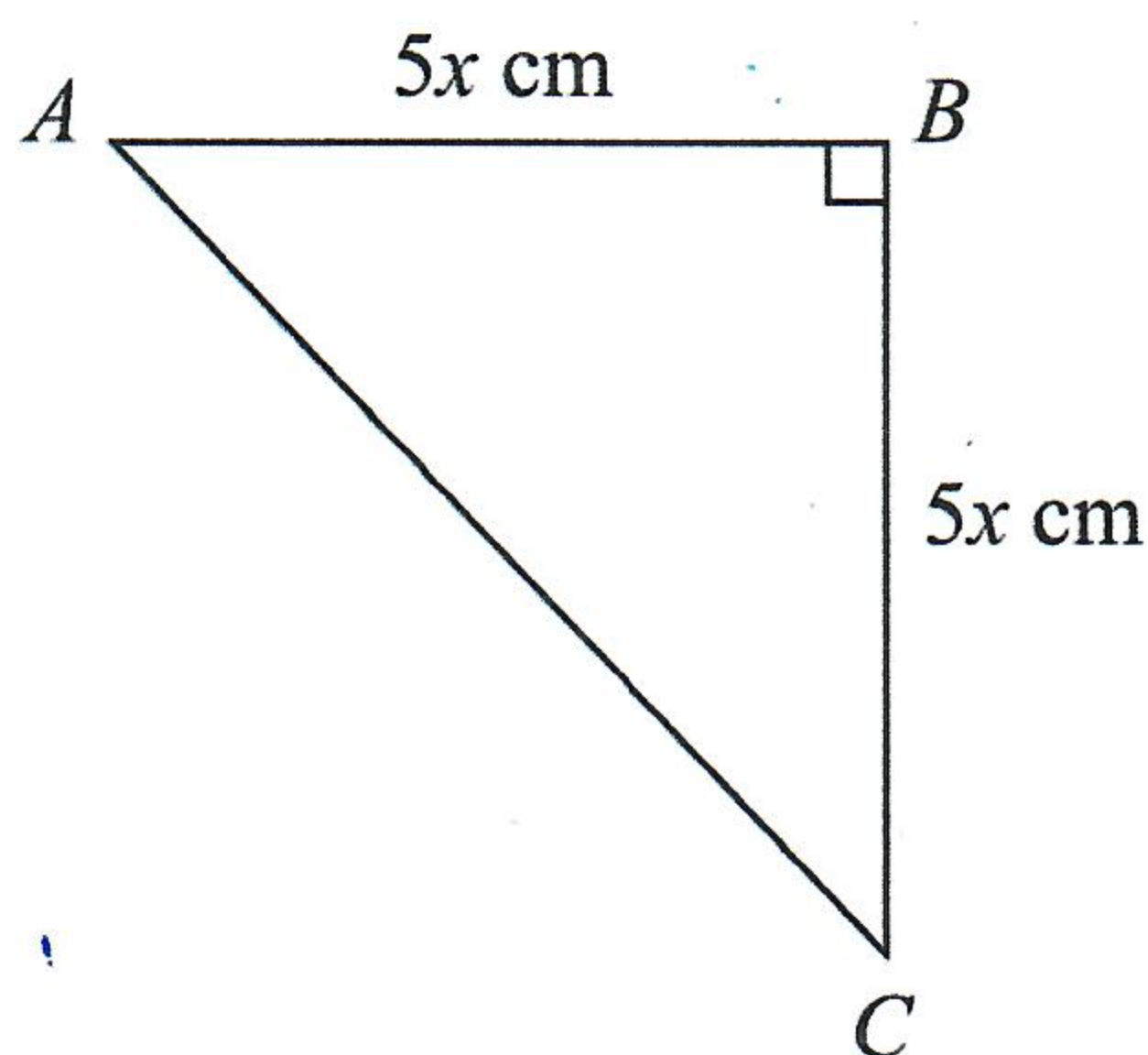
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17 ABC is an isosceles right-angled triangle.



The area of the triangle is 981 cm^2

Work out the value of x .

$$\begin{aligned} \text{Area} &= \frac{1}{2} b h \\ &= \frac{1}{2} (5x)(5x) \\ &= \frac{25x^2}{2} \end{aligned}$$

$$\begin{aligned} \therefore \frac{25x^2}{2} &= 981 \quad \downarrow \times 2 \\ 25x^2 &= 1962 \end{aligned}$$

$$\begin{aligned} \therefore x^2 &= \frac{1962}{25} \\ &= 78.48 \\ \therefore x &= \sqrt{78.48} \\ &= 8.858893836 \end{aligned}$$

$$x = 8.858893836$$

(Total for Question 17 is 3 marks)

18 Work out the value of $\frac{2.715 \times 10^7}{9.05 \times 10^4} = 0.3 \times 10^3$

Give your answer in standard form.

$$= 3 \times 10^2$$

$$\frac{2.715}{9.05} = 0.3$$

$$\frac{10^7}{10^4} = 10^{7-4} = 10^3$$

Remember $a \times 10^n$

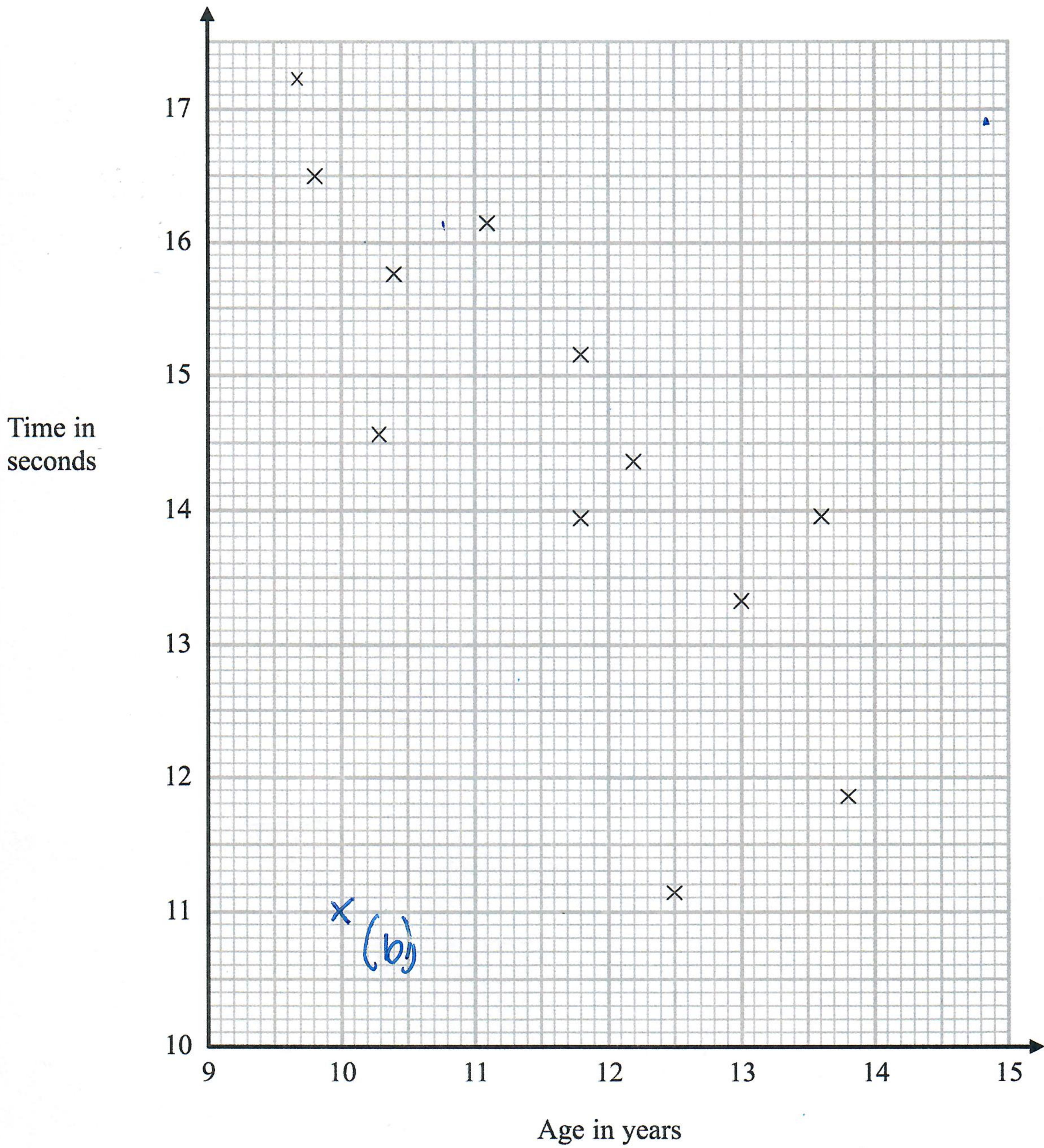
↖ number between 1 and less than 10. 3×10^2

(Total for Question 18 is 2 marks)



19 The scatter diagram shows information about 12 girls.

It shows the age of each girl and the best time she takes to swim 50 metres.



(a) Write down the type of correlation.

Negative

(1)

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Kristina is 10 years old.

Her best time to run 50 metres is 11 seconds.

The point representing this information would be an outlier on the scatter diagram.

(b) Explain why.

It is a long way out from the expected pattern which should put her time at c. 16.5 s. (1)

Debbie is 15 years old.

Debbie says,

“The scatter diagram shows I should take less than 12 seconds to swim 50 metres.”

(c) Comment on what Debbie says.

What Debbie says would appear to be correct but there is no data for swimmers over 14 and so the accuracy of the statement is dubious due to lack of relevant data. (1)

(Total for Question 19 is 3 marks)

20 Expand and simplify $5(p + 3) - 2(1 - 2p)$

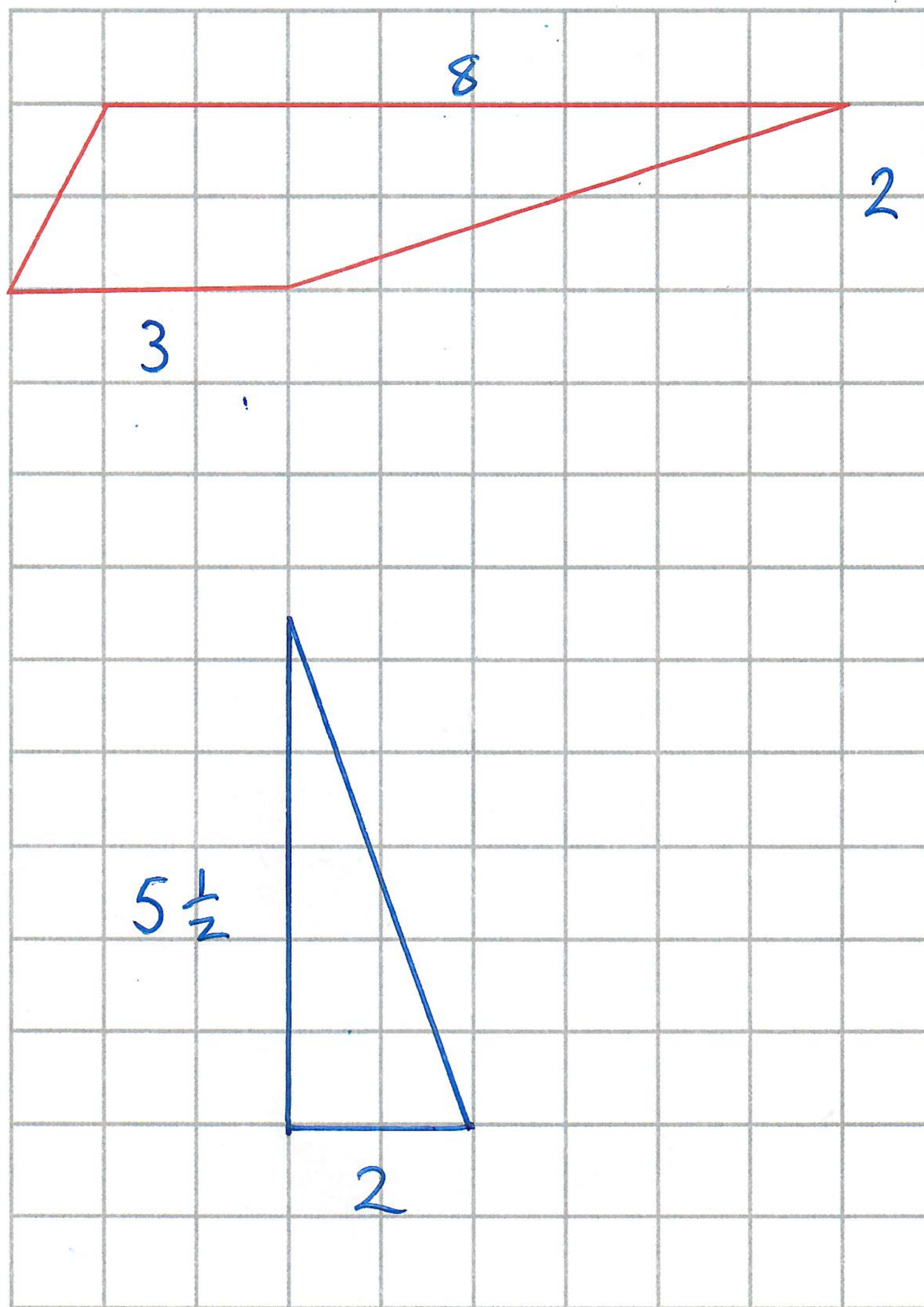
$$5p + 15 - 2 + 4p = 9p + 13$$

$$9p + 13$$

(Total for Question 20 is 2 marks)



21 Here is a trapezium drawn on a centimetre grid.



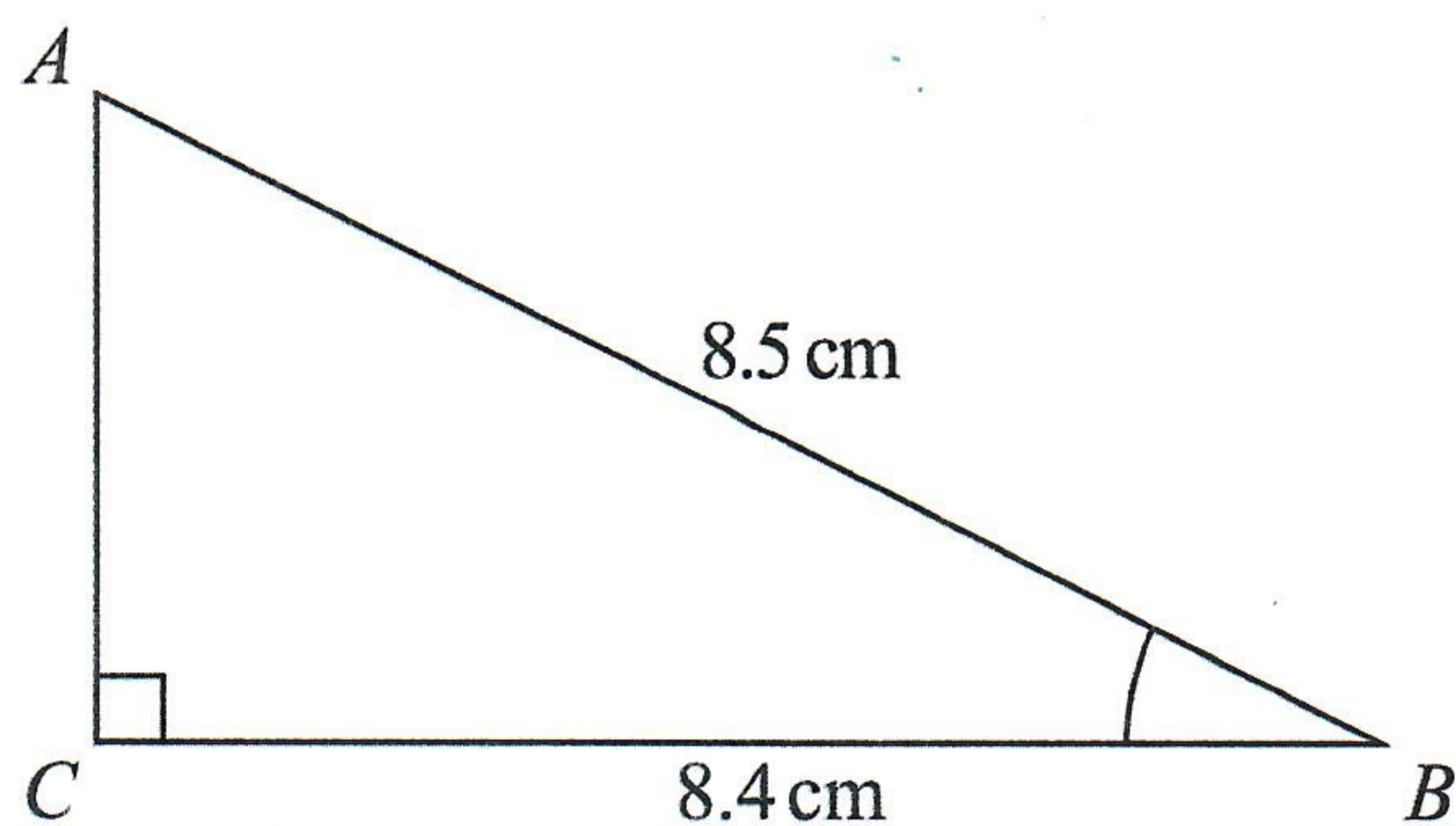
On the grid, draw a triangle equal in area to this trapezium.

$$\begin{aligned} \text{Area}_{\text{Trapezium}} &= \frac{1}{2}(a+b)h \\ &= \frac{1}{2}(3+8) \times 2 \\ &= 11 \text{ cm}^2 \end{aligned}$$

(Total for Question 21 is 2 marks)



23 ABC is a right-angled triangle.



- (a) Work out the size of angle ABC .
Give your answer correct to 1 decimal place.

$$\cos ABC = \frac{A}{H} = \frac{8.4}{8.5}$$

$$\therefore ABC = \cos^{-1}\left(\frac{8.4}{8.5}\right) = 8.79741071^\circ$$

$$\underline{8.79741071^\circ}$$

(2)

The length of the side AB is reduced by 1 cm.

The length of the side BC is still 8.4 cm.

Angle ACB is still 90°

- (b) Will the value of $\cos ABC$ increase or decrease?
You must give a reason for your answer.

Increase because the length of the sloped side gets shorter. This means the angle decreases.

As the angle decreases, the cosine of the angle increases. (1)

(Total for Question 23 is 3 marks)

$$\cos 0^\circ = 1 \quad \cos 90^\circ = 0$$

Cos gets smaller as angle gets bigger



- 24 There are some counters in a bag.
The counters are red or white or blue or yellow.

Bob is going to take at random a counter from the bag.

The table shows each of the probabilities that the counter will be blue or will be yellow.

Colour	red	white	blue	yellow
Probability	0.24	0.12	0.48	0.16

There are 18 blue counters in the bag.

The probability that the counter Bob takes will be red is twice the probability that the counter will be white.

- (a) Work out the number of red counters in the bag.

$$1 - (0.48 + 0.16) = 1 - 0.64$$

$$= 0.36$$

$$0.36 \div 3 = 0.12$$

$$\text{Red} = 0.12 \times 2 = 0.24$$

$$\text{White} = 0.12$$

$$\text{Value of 1 counter} = \frac{0.48}{18} = 0.02\bar{6}$$

$$0.48 \quad 18 \text{ Blue}$$

$$0.24 \quad 9 \text{ Red}$$

9

(4)

A marble is going to be taken at random from a box of marbles.
The probability that the marble will be silver is 0.5

There must be an even number of marbles in the box.

- (b) Explain why.

0.5 is exactly a half so there must be the same number of silver marbles as non silver marbles
so it must be even as it is the same as 2 x silver marbles. (1)

(Total for Question 24 is 5 marks)



25 Solve $\frac{5-x}{4} = 3x-7$

$$\begin{aligned} \frac{5-x}{4} &= 3x-7 \\ \times 4 & \rightarrow 5-x = 12x-28 \\ +x & \rightarrow 5 = 13x-28 \\ +28 & \rightarrow 33 = 13x \\ \div 13 & \rightarrow 2\frac{7}{13} = x \end{aligned}$$

$\therefore x = 2\frac{7}{13}$

(Total for Question 25 is 3 marks)

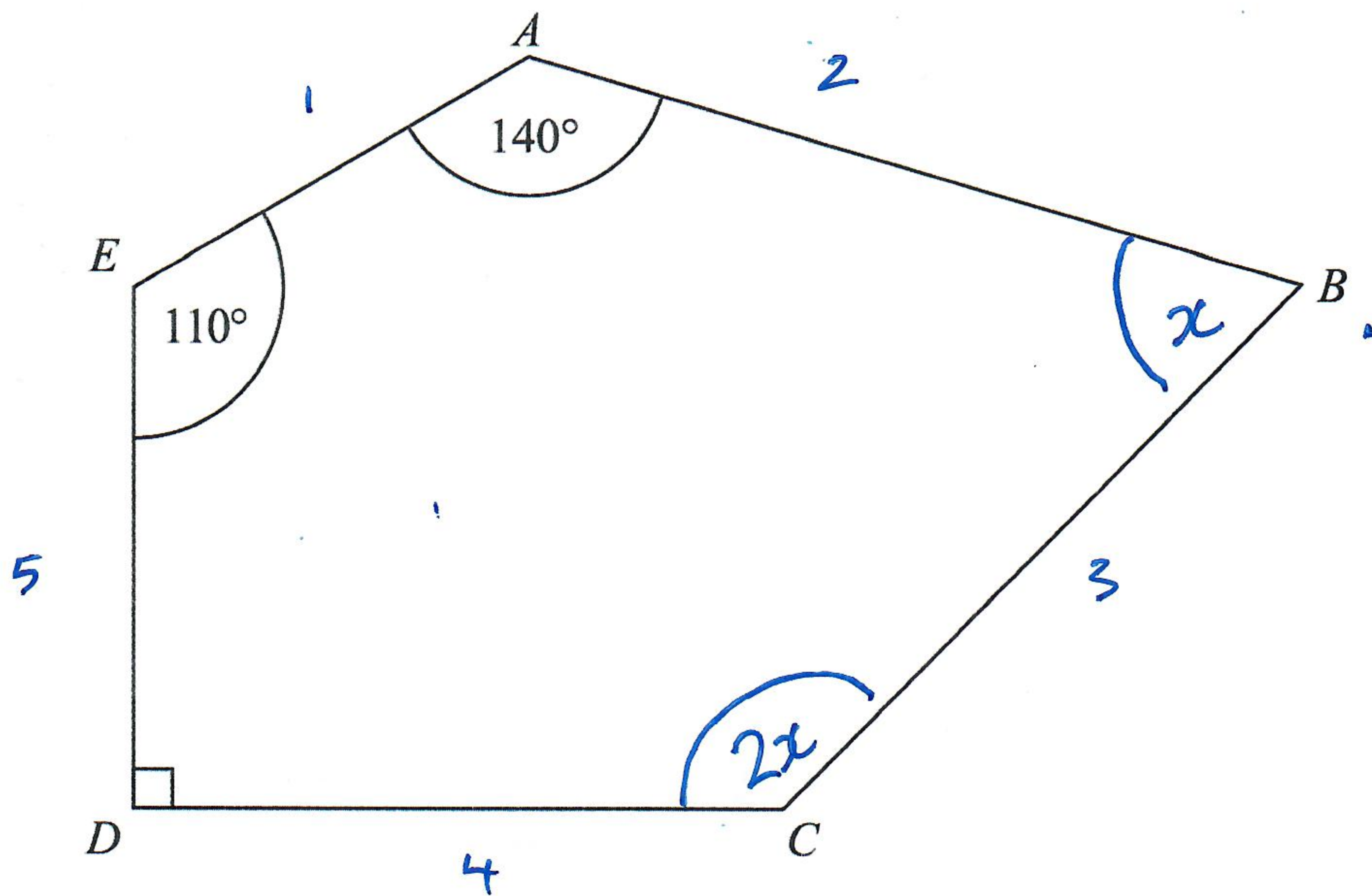
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26 $ABCDE$ is a pentagon.



Angle $BCD = 2 \times$ angle ABC

Work out the size of angle BCD .
You must show all your working.

$$\begin{aligned} \sum \text{Interior angles} &= 180(5-2) \\ &= 180 \times 3 \\ &= 540^\circ \end{aligned}$$

$$110 + 140 + x + 2x + 90 = 540$$

$$\begin{aligned} & \downarrow -340 \\ 3x + 340 &= 540 \\ & \downarrow -340 \\ 3x &= 200 \\ & \downarrow \div 3 \\ x &= 66\frac{2}{3} \end{aligned}$$

$$\begin{aligned} \therefore \angle BCD = 2x &= 2(66\frac{2}{3}) \\ &= 133\frac{1}{3}^\circ \end{aligned}$$

..... $133\frac{1}{3}^\circ$

(Total for Question 26 is 5 marks)

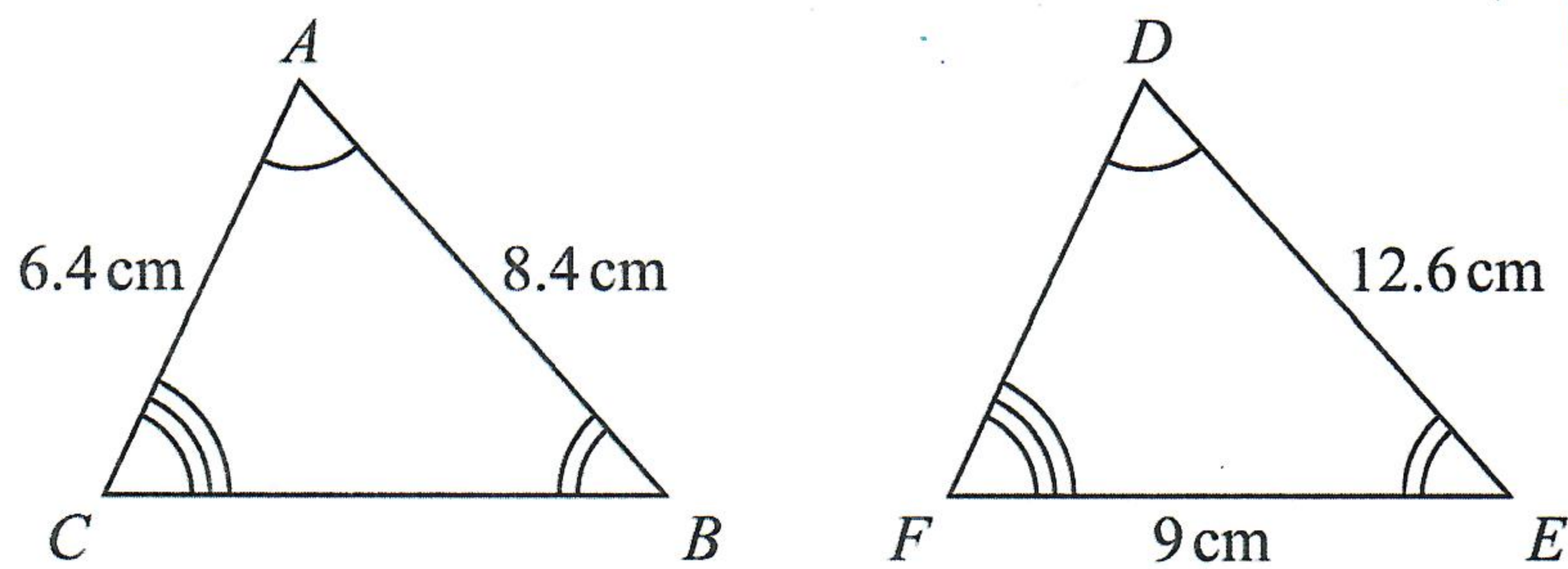


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27 Triangle ABC and triangle DEF are similar.



$$\frac{12.6}{8.4} = \frac{3}{2} = 1.5$$

(a) Work out the length of DF .

$$8.4 \times 1.5 = 12.6 \quad \text{So the multiplier} = 1.5$$

$$6.4 \times 1.5 = 9.6 \text{ cm}$$

$$\dots\dots\dots 9.6 \text{ cm}$$

(2)

(b) Work out the length of CB .

Reciprocal of $1.5 = \frac{3}{2}$ is $\frac{2}{3}$

$$\frac{2}{3} \times 9 = 6 \text{ cm}$$

$$\dots\dots\dots 6 \text{ cm}$$

(2)

(Total for Question 27 is 4 marks)



28 Make k the subject of the formula

$$T = \sqrt{\frac{k+4}{2}}$$
$$T^2 = \frac{k+4}{2}$$
$$2T^2 = k+4$$
$$2T^2 - 4 = k$$
$$\therefore k = 2T^2 - 4$$

$$k = 2T^2 - 4$$

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS

