Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0580/12**

Paper 1 (Core) **May/June 2021**

1 hour

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

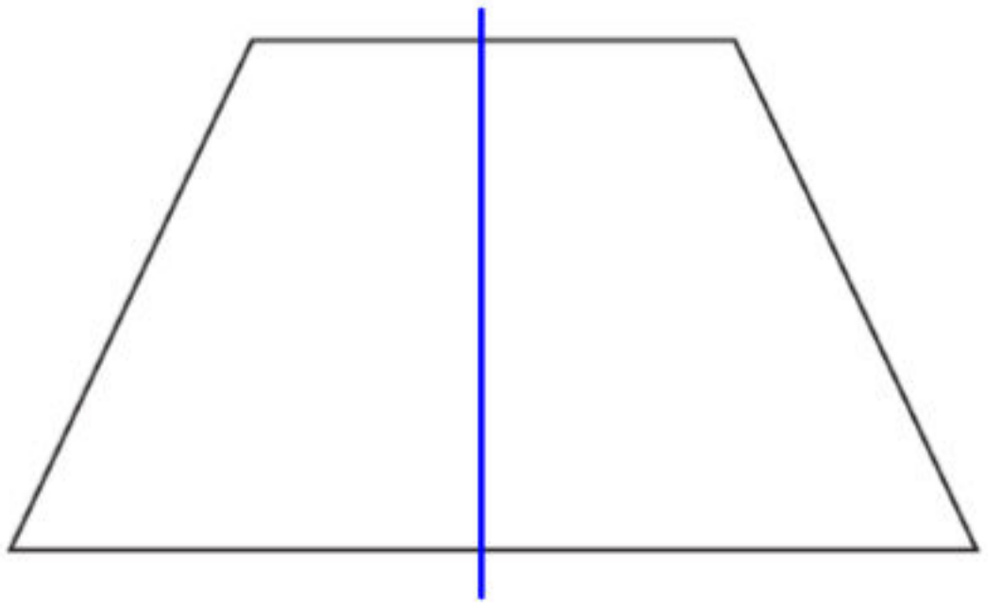
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 56.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages.

1

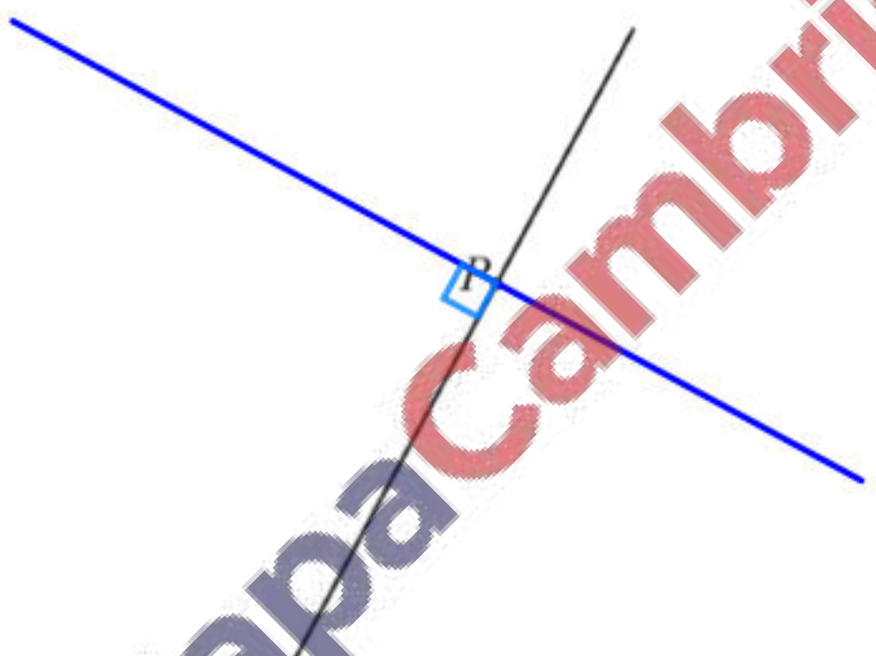


Draw the line of symmetry on this shape. [1]

2 Write down all the factors of 42.

1, 2, 3, 6, 7, 14, 21, 42 ..... [2]

3 *P* is a point on a line.



Draw a line through point *P* that is perpendicular to this line. [1]

4

253 306 185 270 386

Calculate the mean of these numbers.

* Mean = $\frac{253 + 306 + 185 + 270 + 386}{5}$

280 ..... [2]

⇒ Mean = 280 //

5 The formula for changing a temperature measured in Celsius (°C) to Fahrenheit (°F) is

$$F = \frac{9C}{5} + 32.$$

Use this formula to change 65°C to Fahrenheit.

* $F = \left(\frac{9 \times 65}{5} + 32\right)°F = 149°F$ //

149 °F [2]

6 **(a)** **Without using a calculator**, work out $9 + 5 \times 7 - 4 \div 2$.
You must show all your working.

$\Rightarrow 9 + 35 - 4 \div 2$
$\Rightarrow 9 + 35 - 2$
$\Rightarrow 44 - 2$
$\Rightarrow 42$ //

42 [2]

(b) Insert one pair of brackets into this statement to make it correct.

$$(9 + 5) \times 7 - 4 \div 2 = 96$$

[1]

7 $\mathbf{a} = \begin{pmatrix} 5 \\ -7 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} -2 \\ 6 \end{pmatrix}$

Work out $\mathbf{a} - \mathbf{b}$. $= \begin{pmatrix} 5-(-2) \\ -7-6 \end{pmatrix}$

$= \begin{pmatrix} 7 \\ -13 \end{pmatrix}$ //

$\begin{pmatrix} 7 \\ -13 \end{pmatrix}$ [1]

8 Write down the number that you

(a) add to -4 to give an answer of 9,

* $-4 + x = 9$
$\Rightarrow x = 13$ //

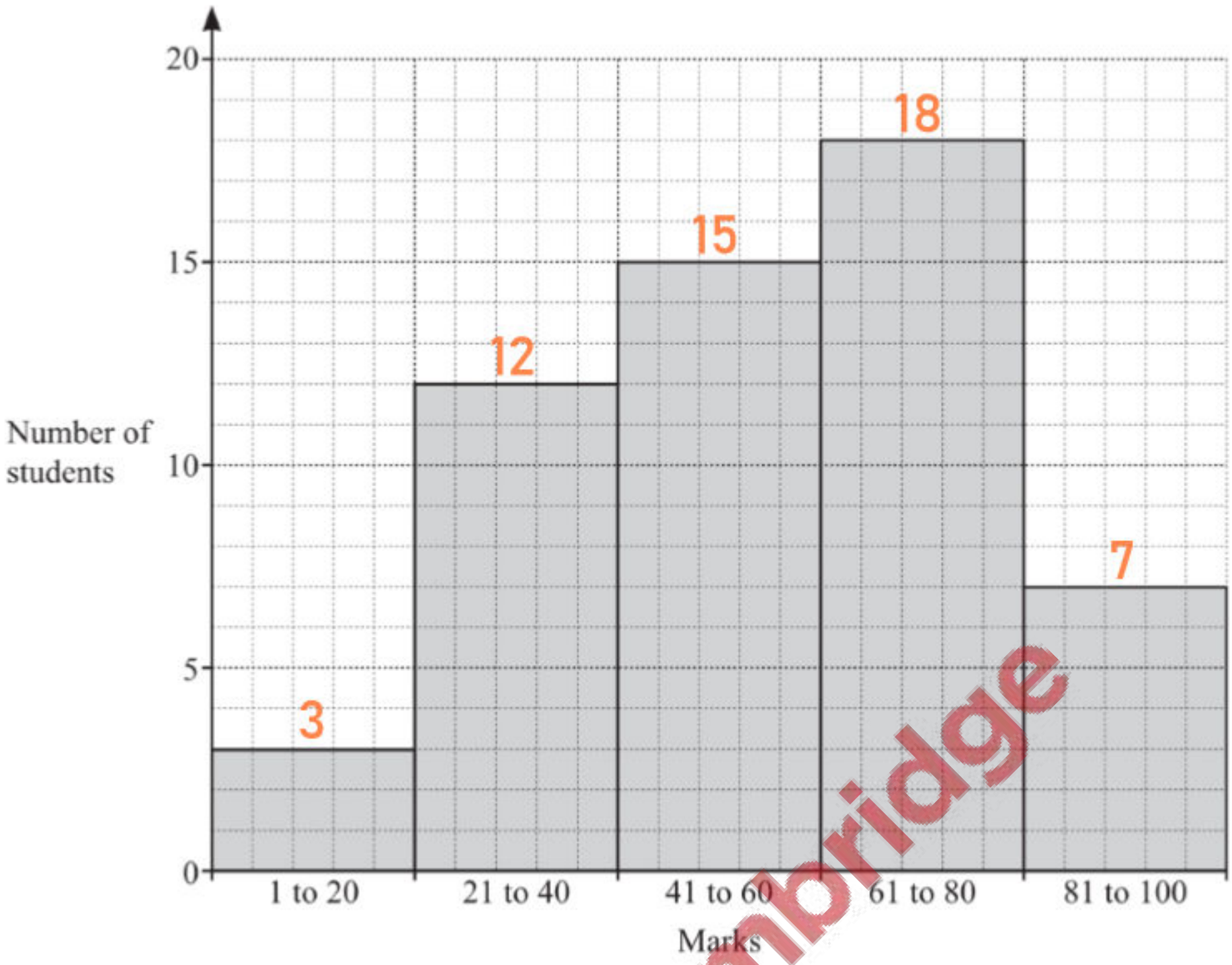
13 [1]

(b) subtract from -9 to give an answer of -4.

* $-9 - x = -4$
$\Rightarrow x = -9 + 4$
$\Rightarrow x = -5$ //

-5 [1]

9



The bar chart shows the marks scored by a group of 55 students in an examination.

Work out the percentage of this group of students who scored marks from 21 to 80.

* Percentage = $\frac{12+15+18}{3+12+15+18+7} \times 100\%$

= 81·8% (3 sig. figs.)

81·8 ..... % [3]

10 The probability that Jane wins a game is $\frac{7}{10}$.

Find the probability that Jane does not win the game.

* P = 1 − 7/10

⇒ P = 3/10

3/10 ..... [1]

11 Calculate $\sqrt[4]{0.0256}$.

0·4 [1]

12 Emma has 15 mathematics questions to complete.
The stem-and-leaf diagram shows the time, in minutes, it takes her to complete each question.

0	3	5	6	7	7	8	8
1	1	2	2	3	6	6	6
2	0						

Key: 2 | 0 = 20 minutes

* Median position = $\frac{1}{2}(15+1)$th
= 8th

Complete the table.

Mode	16 ..... min
Median	11 ..... min
Range	17 ..... min

* Range = Highest − Lowest
⇒ Range = 20 − 3
⇒ Range = 17 [3]

13 **(a)** Complete these statements.

The reciprocal of 0.2 is 5

A prime number between 90 and 100 is 97 [2]

(b)

$\frac{7}{5}$ 0.6 $\sqrt{7}$ 8 $\sqrt{9}$

From this list, write down an irrational number.

$\sqrt{7}$ [1]

14 Find the value of x when $7^x \div 7^4 = 7^9$.

⇒ $7^{x-4} = 7^9$

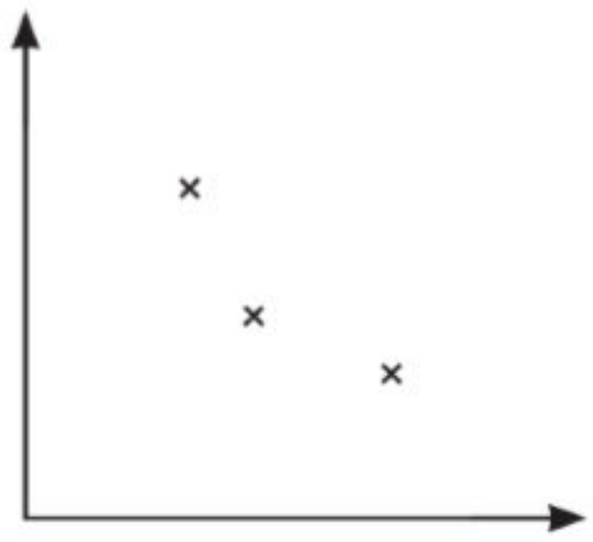
Since the bases are equal,

⇒ $x - 4 = 9$

⇒ $x = 13$

$x =$ 13 [1]

15 (a) Henrik draws this scatter diagram.



Put a ring around the **one** correct statement about this scatter diagram.

It shows no correlation.

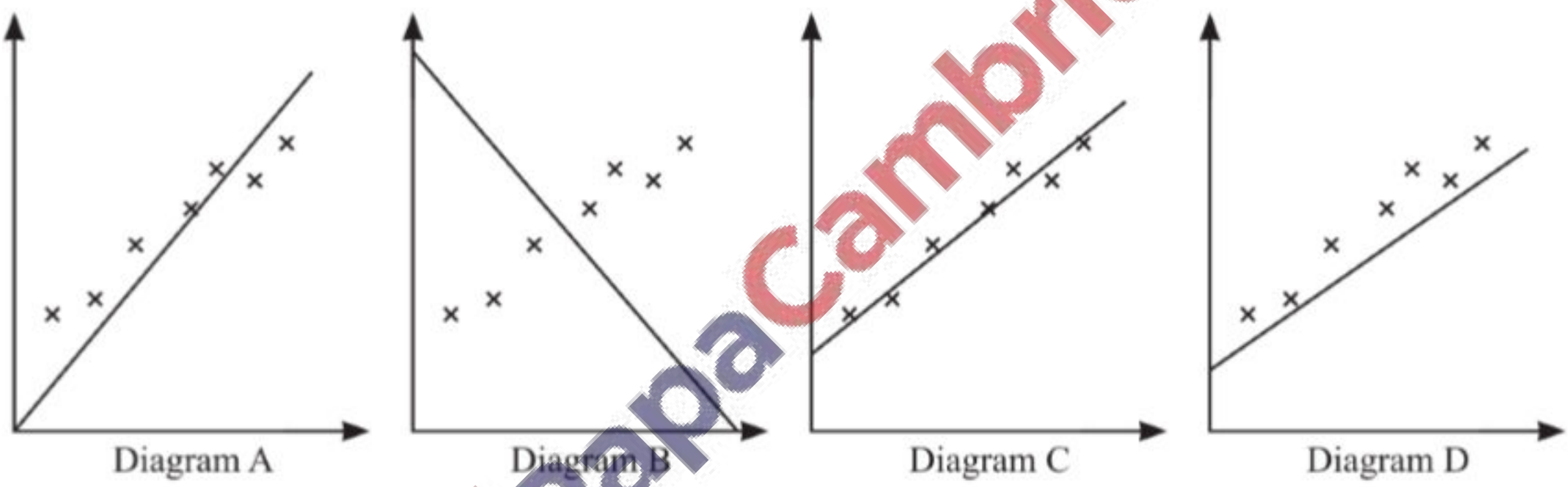
It is not possible to tell if there is correlation as there are not enough points.

It shows negative correlation.

It shows positive correlation.

[1]

(b) Each of the four scatter diagrams shows the same set of data.
A line has been drawn on each diagram.



Complete the statement.

The line in Diagram C is the most appropriate line of best fit. [1]

16 A cuboid has a square base.
The volume of this cuboid is 867 cm^3 and its height is 12 cm.

Calculate the length of one side of the square base.

$* V = l \times w \times h$ $\Rightarrow l = \left(\sqrt{\frac{867}{12}}\right) cm = 8.5 cm$

$\Rightarrow V = l^2 \times h$

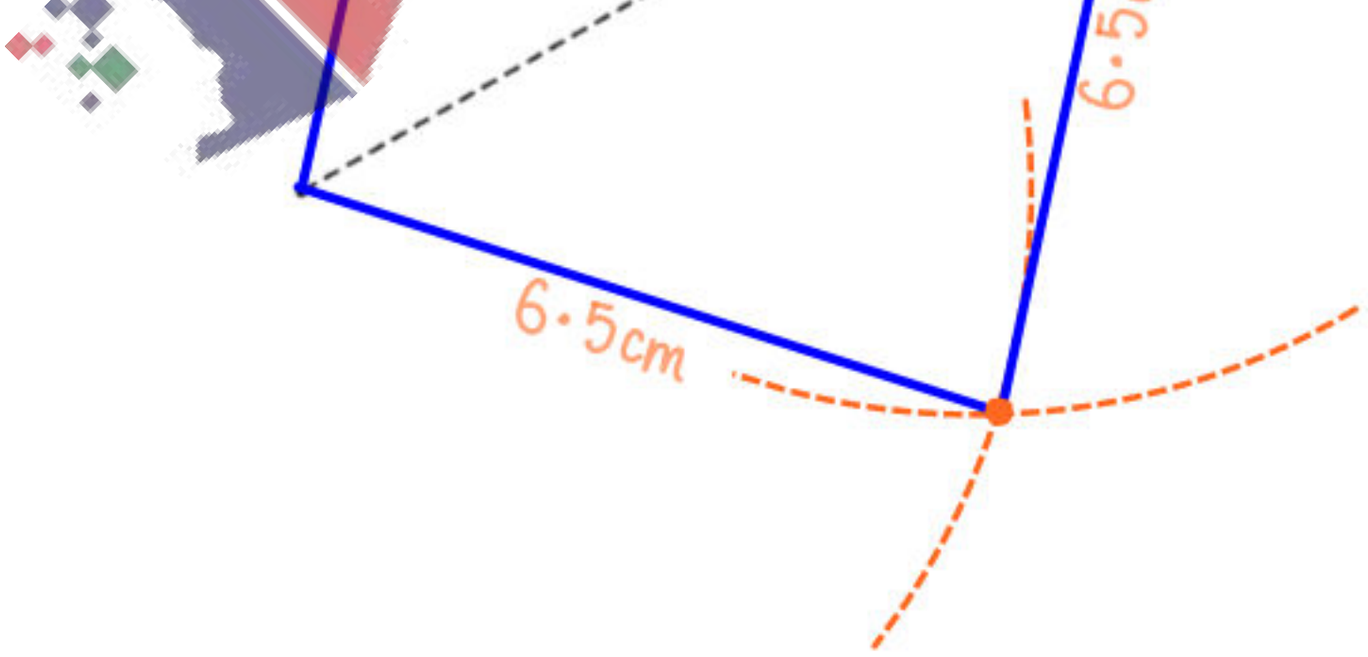
$\Rightarrow l^2 = \frac{V}{h}$

$\Rightarrow l = \sqrt{\frac{V}{h}}$

..... 8.5 ..... cm [3]

17 A rhombus has side length 6.5 cm.
The rhombus can be constructed by drawing two triangles.

Using a ruler and compasses only, construct the rhombus.
Leave in your construction arcs.
One diagonal of the rhombus has been drawn for you.



[2]

18 **Without using a calculator**, work out $\frac{2}{3} \div 1\frac{3}{7}$.

You must show all your working and give your answer as a fraction in its simplest form.

$\Rightarrow \frac{2}{3} \div \frac{10}{7}$

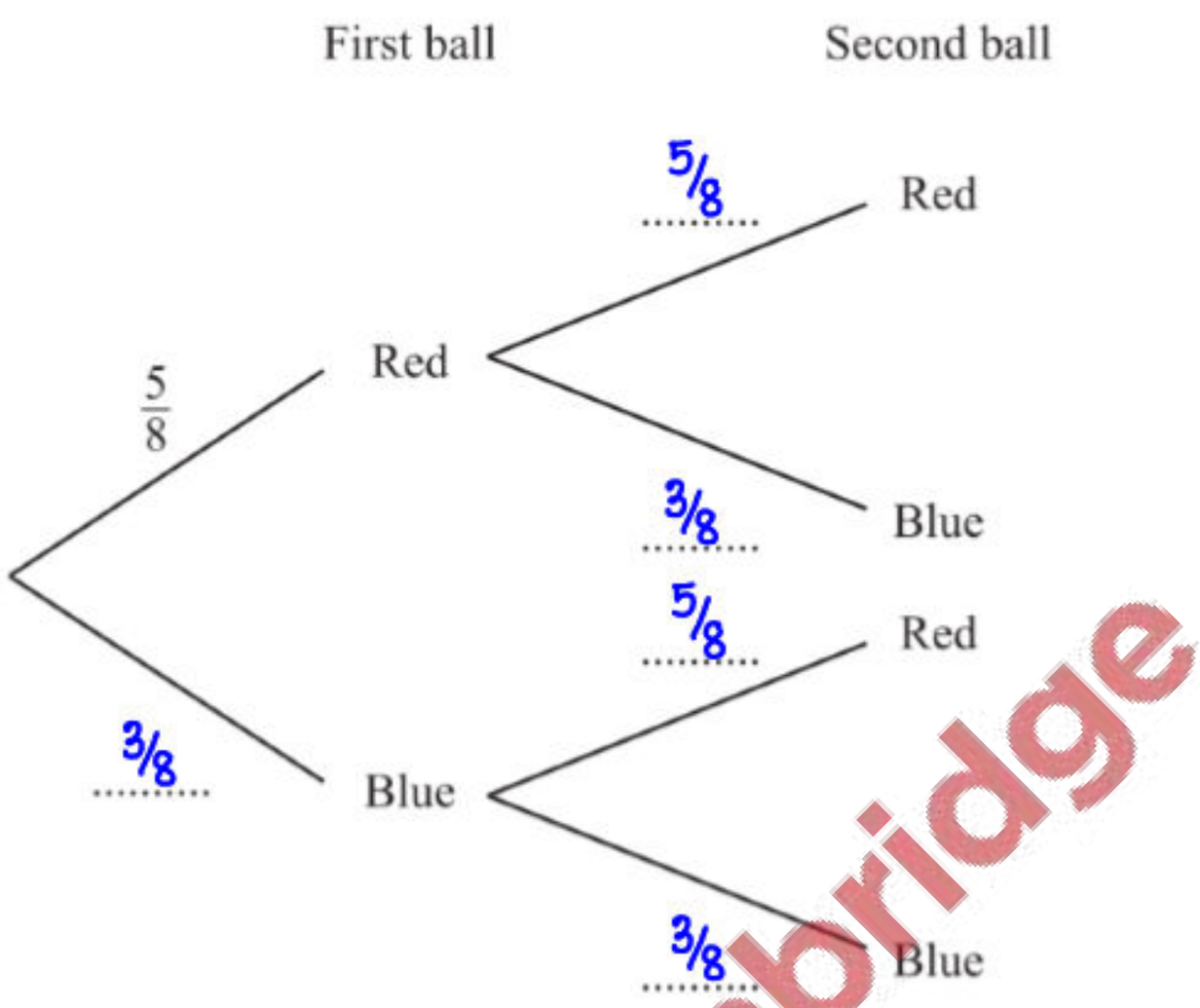
$\Rightarrow \frac{2^{1}}{3} \times \frac{7}{\cancel{10}_{5}}$

$\Rightarrow \frac{7}{15}$

$\frac{7}{15}$ ..... [3]

19 A bag contains 5 red balls and 3 blue balls.
Sophie takes a ball at random, notes its colour and then puts it back in the bag.
She does this a second time.

(a) Complete the tree diagram.



[2]

(b) Work out the probability that both of the balls she takes are blue.

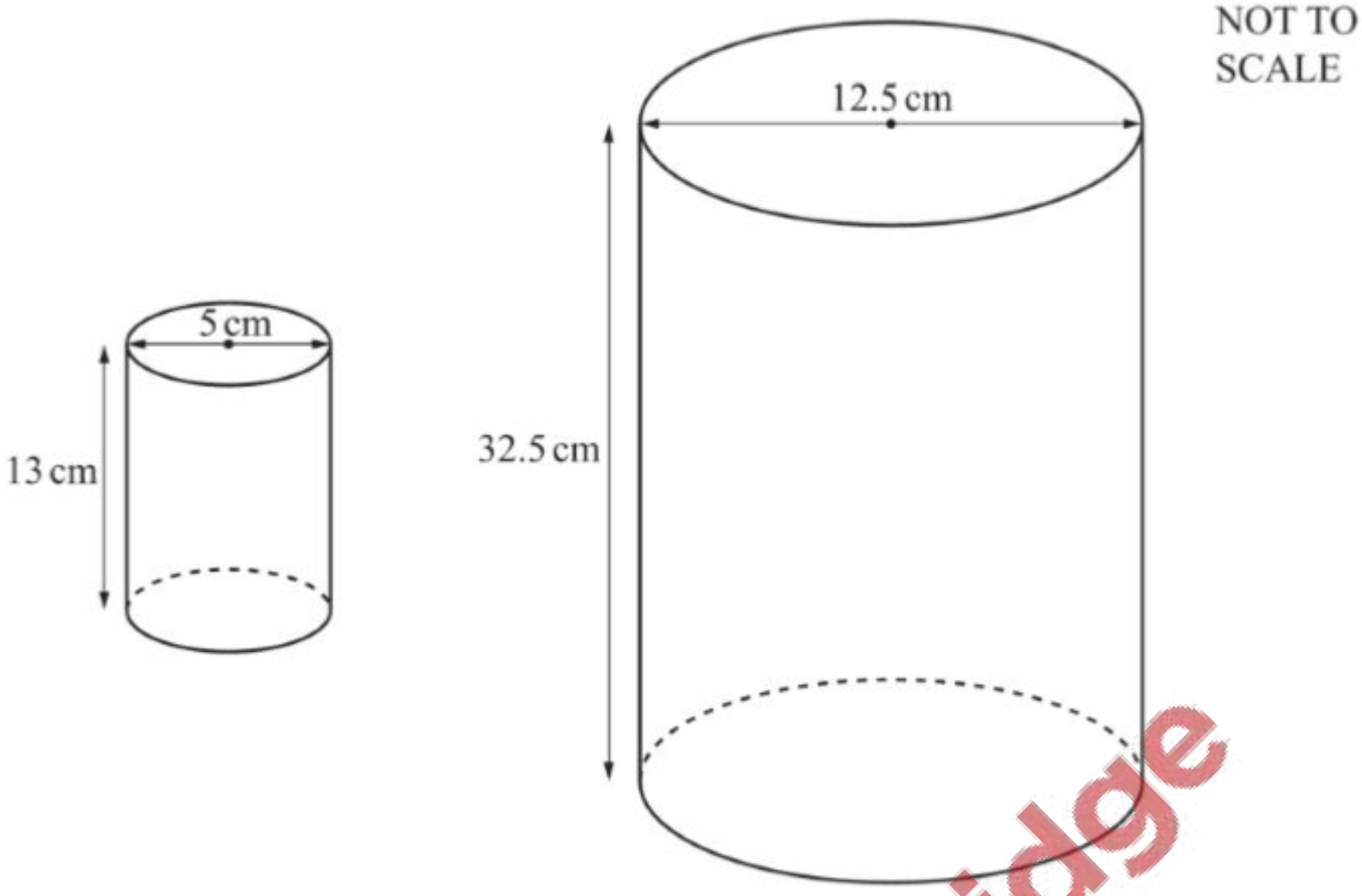
★ P = P(Blue on 1st pick) and P(Blue on 2nd pick)

⇒ $P = \frac{3}{8} \times \frac{3}{8}$

⇒ $P = \frac{9}{64}$

$\frac{9}{64}$ [2]

20



The diagram shows two cylinders.

Show that the two cylinders are mathematically similar.

Ratio of Heights: $\frac{32.5\text{cm}}{13\text{cm}} = 2.5$ // OR $\frac{13\text{cm}}{32.5\text{cm}} = 0.4$ //

Ratio of Diameters: $\frac{12.5\text{cm}}{5\text{cm}} = 2.5$ // OR $\frac{5\text{cm}}{12.5\text{cm}} = 0.4$ //

Since the ratio of their corresponding dimensions are equal, the two cylinders are mathematically similar.

[2]

21 **(a)** Write 0.006 54 in standard form.

$0.006\overset{-1\ -2\ -3}{54}$

6.54×10^{-3}

6.54×10^{-3} [1]

(b) The number 1.467×10^{102} is written as an ordinary number.

Write down the number of zeros that follow the digit 7.

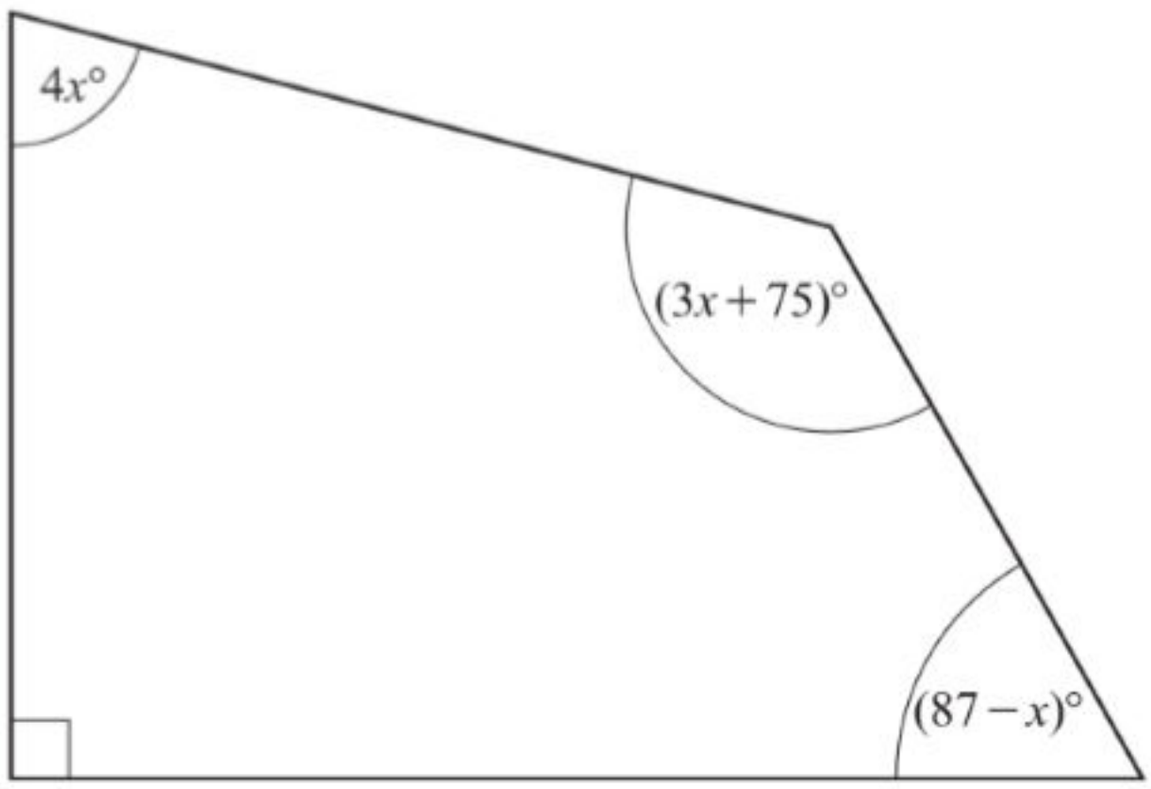
$1.\underset{1\ 2\ 3}{467} \times 10^{102}$

$1467 \times 10^{102-3}$

1467×10^{99}

99 [1]

22



NOT TO SCALE

The diagram shows a quadrilateral.

Work out the value of x.

* $90 + 4x + 3x + 75 + 87 - x = 360$

$\Rightarrow 252 + 6x = 360$

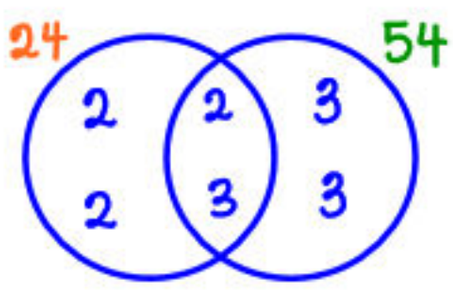
$\Rightarrow 6x = 108$

$\Rightarrow x = 18$ //

$x =$ ..... 18 ..... [4]

23 Work out the lowest common multiple (LCM) of 24 and 54.

* $24 = 2 \times 2 \times 2 \times 3$
* $54 = 2 \times 3 \times 3 \times 3$



$\therefore$ LCM (24 and 54) $= 2 \times 2 \times 2 \times 3 \times 3 \times 3$

$= 216$ //

..... 216 ..... [2]

Questions 24 and 25 are printed on the next page.

24 Expand and simplify.

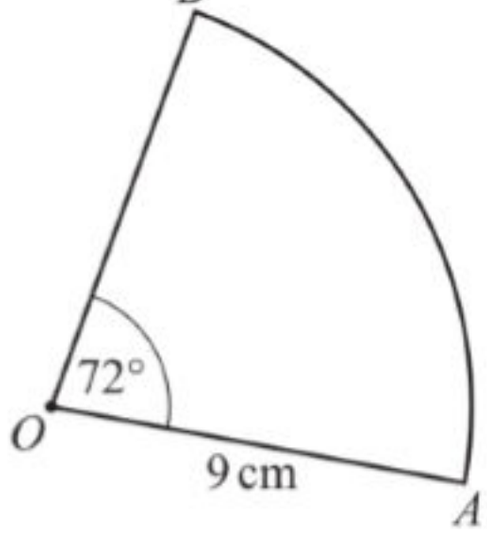
$$5(2x-7)-3(x-5)$$

$\Rightarrow 10x-35-3x+15$

$\Rightarrow 7x-20$ //

.....7x-20..... [2]

25



NOT TO SCALE

The diagram shows a sector of a circle, centre O, radius 9 cm.
The sector angle is 72°.

(a) Calculate the length of the arc AB.

* $AB = \frac{72°}{360°} \times 2\pi(9\,cm)$

$\Rightarrow AB = 11.3\,cm$ (3 sig. figs.) //

.....11.3..... cm [2]

(b) Calculate the area of the sector AOB.

* $A_{AOB} = \frac{72°}{360°} \times \pi(9\,cm)^2$

$\Rightarrow A_{AOB} = 50.9\,cm^2$ // (3 sig. figs.)

.....50.9..... cm^2 [2]