OCR
Oxford Cambridge and RSA

Tuesday 1 November 2022 – Morning

GCSE (9–1) Mathematics

J560/01 Paper 1 (Foundation Tier)

Time allowed: 1 hour 30 minutes

You must have:
- the Formulae Sheet for Foundation Tier (inside this document)

You can use:
- a scientific or graphical calculator
- geometrical instruments
- tracing paper

F

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | | | | | | Candidate number | | | | |

First name(s) _____

Last name _____

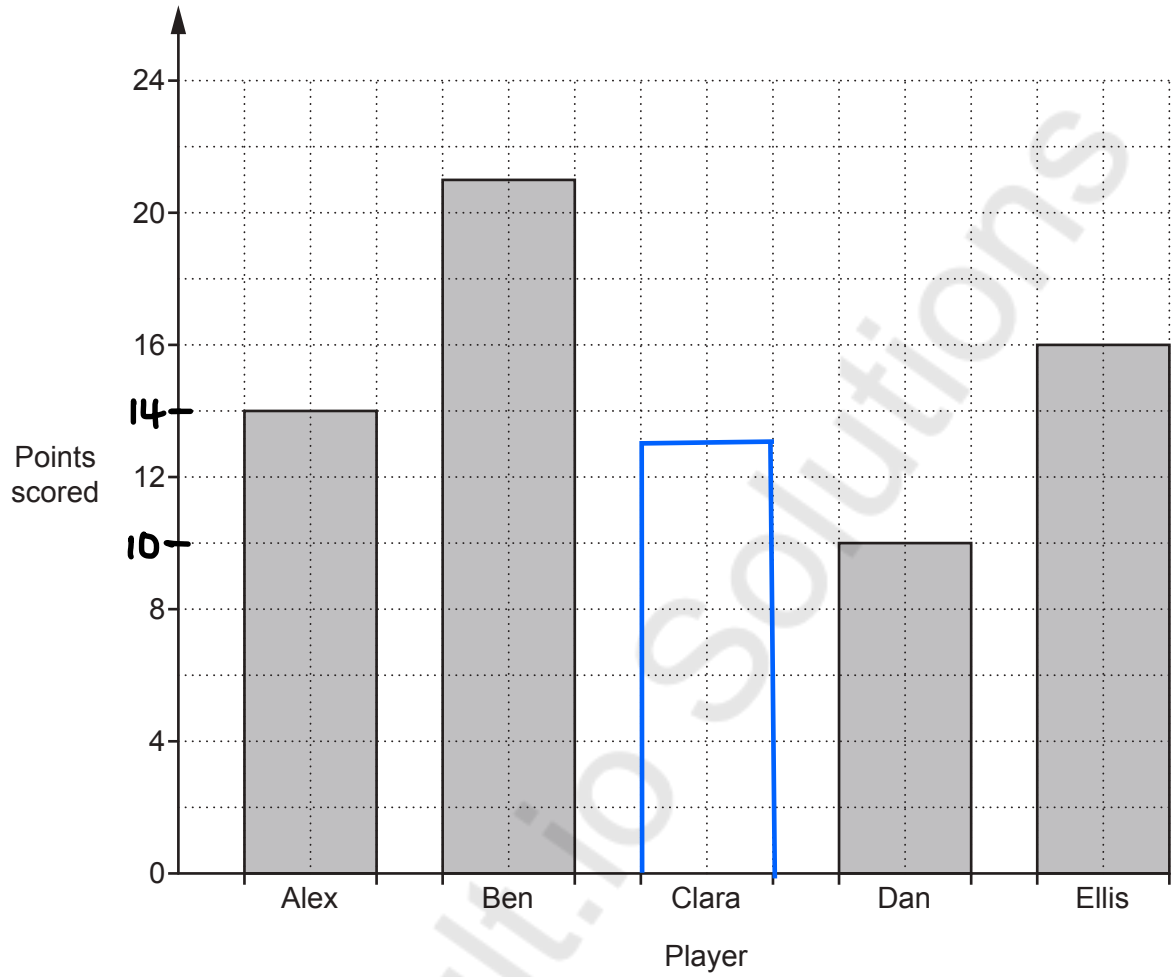
INSTRUCTIONS
- Use black ink. You can use an HB pencil, but only for graphs and diagrams.
- Write your answer to each question in the space provided. You can use extra paper if you need to, but you must clearly show your candidate number, the centre number and the question numbers.
- Answer **all** the questions.
- Where appropriate, your answer should be supported with working. Marks might be given for using a correct method, even if your answer is wrong.
- Use the π button on your calculator or take π to be 3.142 unless the question says something different.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document has **24** pages.

ADVICE
- Read each question carefully before you start your answer.

Answer **all** the questions.

1 The bar chart shows the number of points scored by some quiz players.



(a) How many points were scored by Ellis?

(a) ..... 16 ..... **[1]**

(b) How many more points were scored by Alex than Dan?

14 - 10 = 4

(b) ..... 4 ..... **[1]**

(c) Clara scored 13 points.

Complete the bar chart to show this information. **[1]**

2 **(a)** Write down each of the following.

(i) An even number between 11 and 17.

(a)(i) 12 ..... **[1]**

(ii) A square number between 15 and 35.

(ii) 16 ..... **[1]**

(iii) The cube root of 64.

(iii) 4 ..... **[1]**

(b) 3 is a factor of 51.

Find a factor of 51 between 10 and 20.

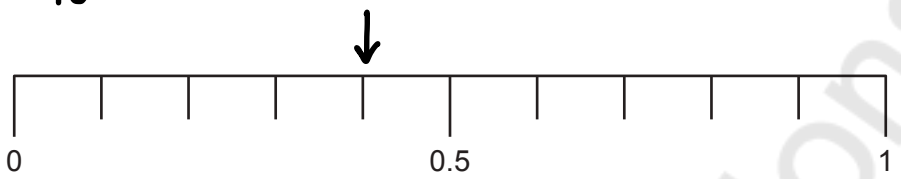
$51 \div 3 = 17$

(b) 17 ..... **[1]**

3 Amit has 10 toy cars in a box.
4 are red, 3 are blue, 2 are white and 1 is black.
Amit takes a toy car at random.

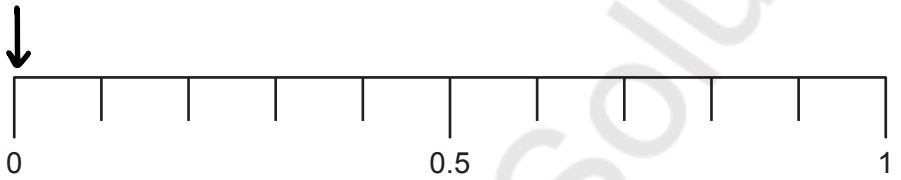
Mark with an arrow (↓) the probability that the toy car is

(a) red, $\frac{4}{10} = 0.4$



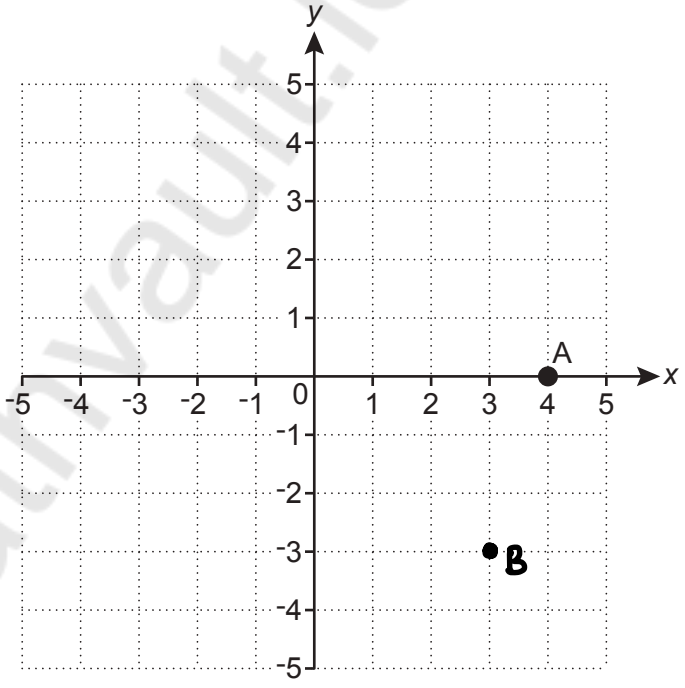
[1]

(b) green.



[1]

4 Point A is shown on this grid.

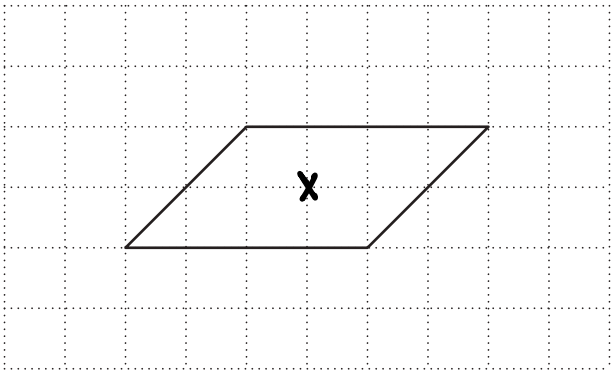


(a) Write down the coordinates of point A.

(a) (..... 4 ..... , ... 0 .....) **[1]**

(b) Plot point B on the grid at (3, −3). **[1]**

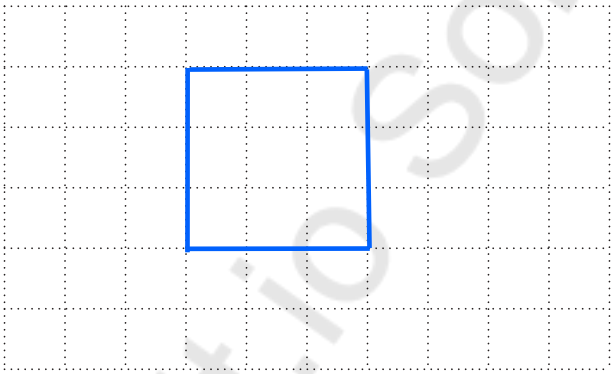
5 **(a)** The diagram shows a parallelogram.



The parallelogram has rotation symmetry of order 2.

Mark the centre of rotation with a cross (X). **[1]**

(b) On the grid below, draw a four-sided shape that has rotation symmetry of order 4.



[1]

6 Use one of these symbols $<$, $=$ or $>$ to make each statement true.

(a) 0.8 ..... = ... $\frac{4}{5}$ = 0.8 **[1]**

(b) 4^2 ..... > ..... 9 **[1]**

16

7 Morgan makes 15 cakes.
Each cake needs a piece of ribbon 18 cm long for decoration.

Ribbon is only sold in rolls of 1.2 metres, which can then be cut into 18 cm pieces.
One roll of ribbon costs 92p.

Calculate the cost of the ribbon that Morgan must buy to decorate the 15 cakes.
You must show your working.

15 x 18 cm = 270 cm needed

1.2m x 100 = 120cm

270 ÷ 120 = 2.25 ⟶ 3 rolls needed

3 x 92p = 276p

↓ ÷100

£2.76

£ 2.76 **[4]**

8 Blake changes £450 into dollars.
£1 is worth 1.34 dollars.

Blake says

450 ÷ 1.34 = 335.82
Therefore, £450 is worth 335.82 dollars.

Is Blake correct or incorrect?
Give a reason for your decision.

Blake is incorrect because 450 should be multiplied by 1.34 **[1]**

9 **(a)** Simplify.

(i) $5r - 7t - 3r + 2t$

$2r - 5t$

(a)(i) ..... $2r - 5t$ ..... **[2]**

(ii) $a \times a \times a \times a \times a$

(ii) ..... a^5 ..... **[1]**

(iii) $7b^5 \div b^1$

(iii) ..... $7b^4$ ..... **[1]**

(b) Factorise.

$4a - 12b$

$4(a - 3b)$

(b) ..... $4(a - 3b)$ ..... **[1]**

10 **(a)** One morning Harper records the first 50 vehicles to pass the school gate.
Harper's results are shown in this table.

Type of vehicle	Number
Car	31
Lorry	3
Motorbike	7
Van	9

Use Harper's results to estimate the probability that the next vehicle will **not** be a motorbike.

50 - 7 = 43

$\frac{43}{50}$

(a) ..... **[2]**

(b) One afternoon Reece records some vehicles that pass the school gate.
$\frac{2}{5}$ of the vehicles they record are cars.

For Reece's results, write down the ratio of cars to not cars.
Give your answer in its simplest form.

Cars : Not cars

2 : 3

(b) ..... 2 ..... : ..... 3 ..... **[1]**

11 Write a number in each box to make each statement true.

(a) $\boxed{-4} - 7 = -11$ **[1]**

-11 + 7 = -4

(b) $\frac{3}{\boxed{5}} \div 2 = \frac{3}{10}$ **[1]**

$\frac{3}{10} \times 2 = \frac{6}{10} = \frac{3}{5}$

(c) $\frac{\boxed{9}}{\boxed{10}} \times \frac{2}{3} = \frac{3}{5}$ **[1]**

$\frac{3}{5} \div \frac{2}{3} = \frac{3}{5} \times \frac{3}{2}$

$= \frac{9}{10}$

12 Here are the first four terms of a sequence.

7 15 23 31
+8 +8 +8 +8

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

(a) 39 **[1]**

(b) Explain how you worked out your answer.

Added 8 to 31 **[1]**

(c) Explain why 80 is **not** a term in this sequence.

All terms in the sequence are odd. **[1]**

13 At the end of each day, a driver works out the mean distance they have driven so far that week.

At the end of 5 days, the mean distance they have driven is 185.5 miles per day.
At the end of 6 days, the mean distance they have driven is 190 miles per day.

Work out how many miles the driver drove on the sixth day of that week.

$$\text{mean} = \frac{\text{total}}{\text{days}}$$

5 days

$$185.5 = \frac{\text{total}}{5}$$

$$\text{total} = 185.5 \times 5$$

$$= 927.5 \text{ miles}$$

6 days

$$190 = \frac{\text{total}}{6}$$

$$\text{total} = 190 \times 6$$

$$= 1140 \text{ miles}$$

$$1140 - 927.5 = 212.5$$

212.5 miles **[4]**

14 Box A contains 56 books.
Box B contains 75 books.

Ling has read $\frac{5}{7}$ of the books in box A.
Ling has also read the same number of books in box B.

Work out the fraction of the books in box B that Ling has read.
Give your answer as a fraction in its lowest form.

Box A

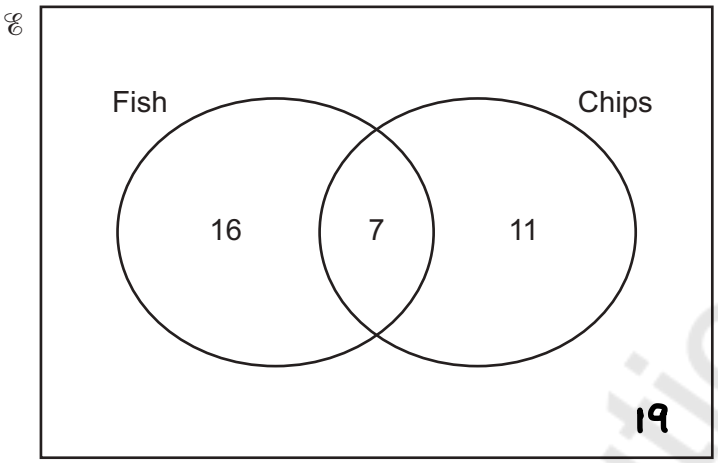
$\frac{5}{7} \times 56 = 40$

Box B

$\frac{40}{75} \begin{matrix} \div 5 \\ \div 5 \end{matrix} = \frac{8}{15}$

$\frac{8}{15}$ ..... **[3]**

15 A researcher asked 53 customers leaving a fish and chip shop what they had bought.
The Venn diagram shows some of the results.



(a) How many customers bought chips but not fish?

(a) 11 **[1]**

(b) Complete the Venn diagram to show the number of customers who did not buy fish or chips.
[2]

16 + 7 + 11 = 34

53 - 34 = 19

(c) One of the 53 customers is chosen at random.

Write down the probability that this customer bought fish.

16 + 7 = 23

(c) $\frac{23}{53}$ **[2]**

16 **(a)** Rearrange this formula to make d the subject.

$f = 5d + 4$

$-4 \quad -4$

$f - 4 = 5d$

$\div 5 \qquad \div 5$

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

(a) $d = \frac{f-4}{5}$ **[2]**

(b) Use the formula

$v = u + at$

to find the final velocity, when

v

- the initial velocity is 5 m/s $= u$
- the acceleration is 7.5 m/s^2 $= a$
- the time is 6 seconds. $= t$

$v = 5 + 7.5 \times 6$

$= 50$

(b) 50 m/s **[2]**

17 The density of gold is 19.3 g/cm^3.
Sam has a gold nugget of volume 7.5 cm^3.

Calculate the mass of the gold nugget.

m
D V

$m = D \times V$

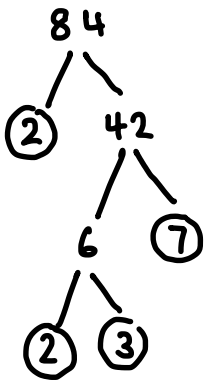
$= 19.3 \times 7.5$

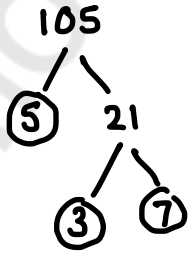
$= 144.75$ g

..... 144.75 ..... g **[2]**

18 In 2019, comet A and comet B were both seen from Earth.
Comet A is seen from Earth every 84 years.
Comet B is seen from Earth every 105 years.

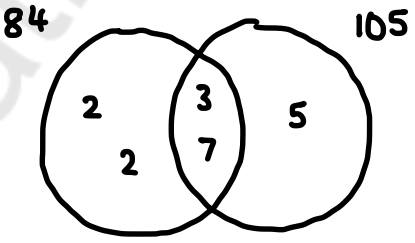
Find the next year when both comets will be seen from Earth.





$84 = 2 \times 2 \times 3 \times 7$

$105 = 5 \times 3 \times 7$



LCM $= 2 \times 2 \times 3 \times 7 \times 5$

$= 420$

..... 2439 ..... **[4]**

$2019 + 420 = 2439$

19 Eve is counting the photos on her phone.
The ratio of the number of photos of her family to photos of her friends is 3 : 7.
She has 450 photos of her family.
80% of the photos of her friends include Jack.

Work out how many of the photos of her friends include Jack.

Family : Friends

3 : 7

×150 ↓ ↓ ×150

450 : 1050

0.8 × 1050 = 840

..... 840 ..... **[4]**

20 Rowan invests £4000 at a rate of 3.5% per year compound interest.

Calculate the value of Rowan's investment after 5 years.
Give your answer correct to the **nearest penny**.

Final amount = investment × multiplier^{n} ← no. of years

Multiplier

100% + 3.5% = 103.5% $\xrightarrow{\div 100}$ 1.035

Final amount = 4000×1.035^{5}

= 4750.745223

= 4750.75

£ 4750.75 **[3]**

21 The table below shows the approximate population of three countries in 2020.

Country	Population
China	1.44×10^9
Kiribati	1.19×10^5
Tuvalu	1.18×10^4

(a) Calculate the approximate total population of Kiribati and Tuvalu in 2020.
Give your answer in standard form, correct to **3** significant figures.

$1.19 \times 10^5 + 1.18 \times 10^4$

130800

$131000 = 1.31 \times 10^5$

(a) 1.31×10^5 **[4]**

(b) Show that in 2020 the population of China was approximately 120 000 times the population of Tuvalu. **[2]**

$1.44 \times 10^9 \div 1.18 \times 10^4$

122033.8983

22 A theatre has an adult price and a child price for their shows.

A group of 4 adults and 5 children paid a total of £136.
A group of 3 adults and 2 children paid a total of £81.

Work out the price for one adult and the price for one child.
You must show your working.

$4a + 5c = 136$ $\times 3$

$3a + 2c = 81$ $\times 4$

$12a + 15c = 408$

$12a + 8c = 324$

$7c = 84$

$\div 7 \quad \div 7$

$c = 12$

$4a + 5c = 136$

$4a + 5(12) = 136$

$4a + 60 = 136$

$-60 \quad -60$

$4a = 76$

$\div 4 \quad \div 4$

$a = 19$

Price for one adult £ 19

Price for one child £ 12 **[5]**

23 An examination has three papers.
Paper 1 is marked out of 60.
Paper 2 is marked out of 40.
Paper 3 is marked out of 100.
The three marks are added together to form the total mark out of 200.

A student scored 65% on Paper 1 and 70% on Paper 2.

Find the mark they need to get on Paper 3 to achieve 64% of the total marks.
You must show your working.

$0.64 \times 200 = 128$ marks needed

Paper 1

$0.65 \times 60 = 39$ marks

Paper 2

$0.7 \times 40 = 28$ marks

Paper 3

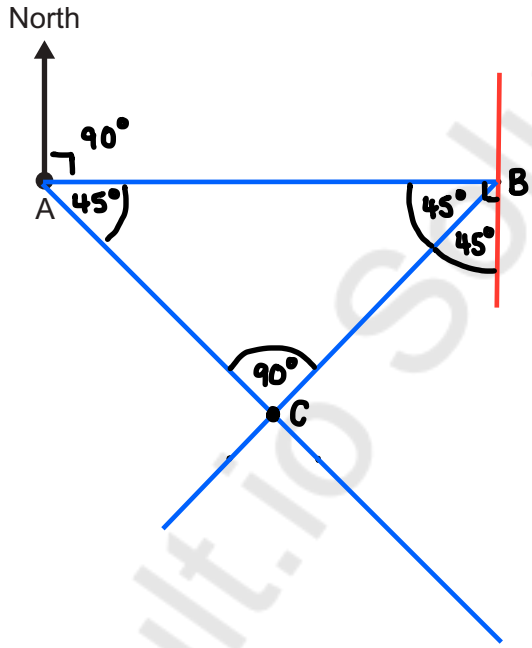
$128 - 39 - 28 = 61$

61 **[5]**

6cm 90° clockwise

24 B is 12 km due east of A.
C is south-east of A and on a bearing of 225° from B.
135°
Complete the diagram to show the positions of A, B and C.
Show clearly the values of all three angles in triangle ABC.

Scale: 1 cm represents 2 km
÷2

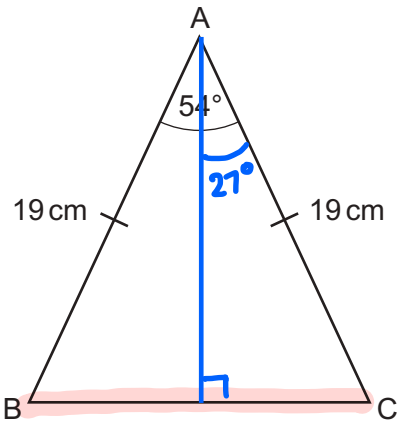


135 - 90 = 45°

225 - 180 = 45°

[4]

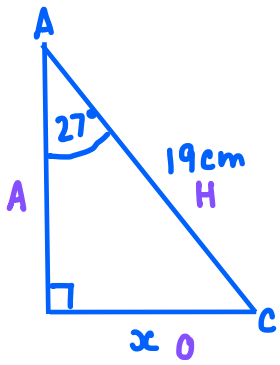
25 The diagram shows an isosceles triangle, ABC.



Not to scale

AB = AC = 19 cm.
Angle BAC = 54°.

Calculate the length of BC.
You must show your working.



SOH CAH TOA

$\sin\theta = \frac{O}{H}$

$\sin(27) = \frac{x}{19}$

$19 \times \sin(27) = x$

$x = 8.625819495$

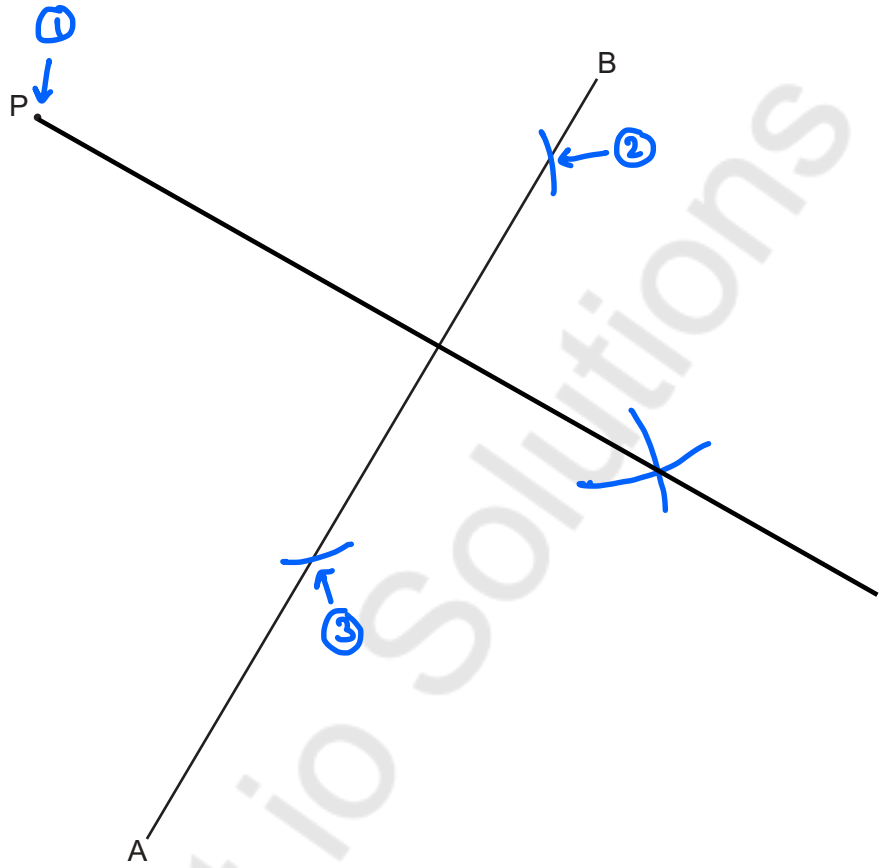
BC = 2 × 8.625...

= 17.25163899

≈ 17.3 cm

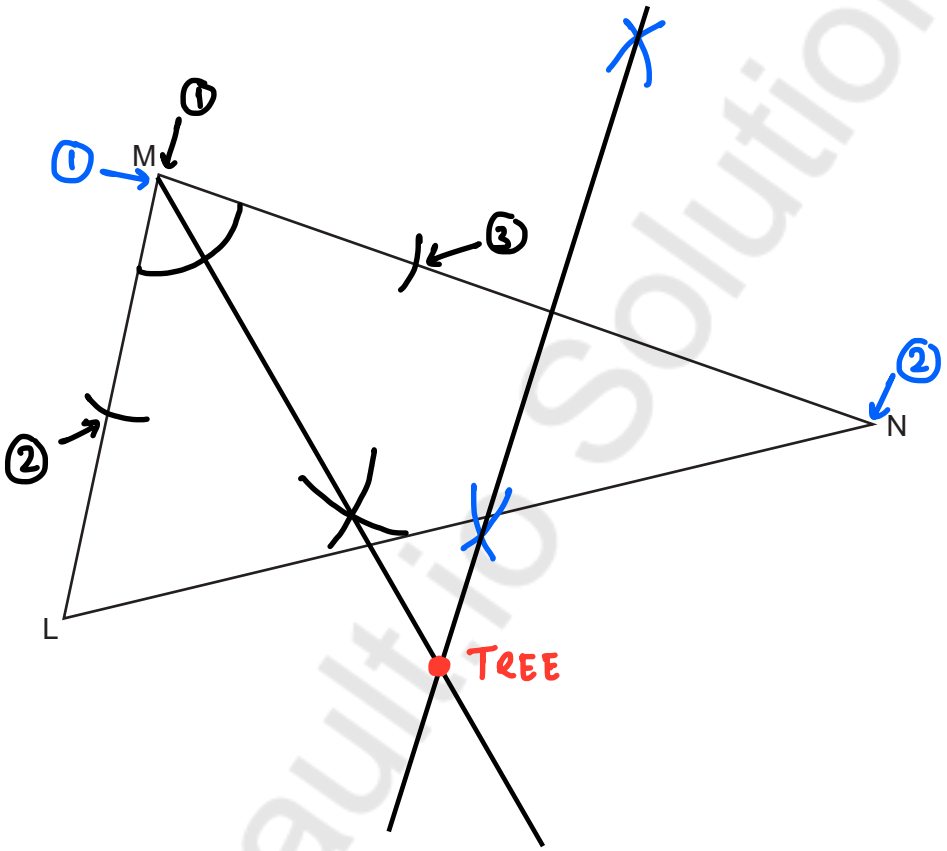
..... 17.3 ..... cm **[5]**

26 **(a)** Construct the perpendicular from the point P to the line AB.



[2]

(b) The diagram shows a field LMN.



A tree is to be planted in the field so that it is

- the same distance from the fences MN and ML angle bisector

and

- the same distance from corner M as from corner N. perpendicular bisector

Show, by construction, whether this can be done or cannot be done.

This .....cannot..... be done. **[5]**

Turn over for Question 27

27 A bag contains 35 balls.
Each ball is either red or green.
The ratio of red balls to green balls is 3 : 2.

Work out the smallest number of balls of each colour that have to be added to the bag so that the ratio of red balls to green balls becomes 7 : 3.
You must show your working.

R : G

3 : 2 = 5 parts

×7 ×7

21 : 14

35 ÷ 5 = 7

R : G

7 : 3 = 10 parts

14 : 6 = 20

21 : 9 = 30

28 : 12 = 40

35 : 15 = 50

Red: 35 − 21 = 14

Green: 15 − 14 = 1

Number of red balls added to the bag = 14

Number of green balls added to the bag = 1 **[5]**

END OF QUESTION PAPER