OCR
Oxford Cambridge and RSA

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Thursday 05 November 2020 – Morning

GCSE (9–1) Mathematics

J560/02 Paper 2 (Foundation Tier)

Time allowed: 1 hour 30 minutes

You can use:
- geometrical instruments
- tracing paper

Do not use:
- a calculator

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.

INFORMATION
- The total mark for this paper is **100**.
- The marks for each question are shown in brackets **[ ]**.
- This document has **20** pages.

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

Answer **all** the questions.

1 **(a)** Work out.

(i) $-1 + 6$

6 − 1

(a)(i) 5 **[1]**

(ii) $7 - -3$

7 + 3

(ii) 10 **[1]**

(b) Write down two prime numbers between 10 and 20.

(b) 13 and 17 **[2]**

2 **(a)** **(i)** Write 350 centimetres in metres.

100cm = 1m ÷100

350 ÷ 100 = 3.5

(a)(i) 3.5 m **[1]**

(ii) Write 1.52 litres in millilitres.

1L = 1000ml ×1000

1.52 × 1000 = 1520

(ii) 1520 ml **[1]**

(b) Work out.

5.7 cm + 30 mm.

Give your answer in centimetres.

10mm = 1cm ÷10

30mm ÷ 10 = 3cm

$$\begin{array}{r} 5.7 \\ +\ 3.0 \\ \hline 8.7 \end{array}$$

(b) 8.7 cm **[2]**

3 **(a)** Complete each statement by writing the missing value in the box.

(i) $\frac{1}{3} \overset{\times 2}{=} \frac{2}{\boxed{6}}$ **[1]**

(ii) $1\frac{1}{7} = \frac{\boxed{8}}{7}$ $1 \times 7 + 1 = 8$ **[1]**

(b) Work out.

(i) $0.8 \div 2$

$$2 \overline{)\, 0.8} \quad = \quad 0.4$$

(b)(i) 0.4 **[1]**

(ii) 1.7×2

$$\begin{array}{r} {}^{1}1.7 \\ \times \quad 2 \\ \hline 3.4 \end{array}$$

(ii) 3.4 **[1]**

4 **(a)** Write 0.16 as a fraction in its simplest form.

$$\frac{16}{100} \overset{\div 4}{\underset{\div 4}{}} = \frac{4}{25}$$

(a) $\frac{4}{25}$ **[2]**

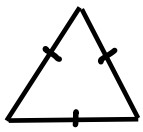
(b) Write $\frac{7}{20}$ as a decimal.

$$\frac{7}{20} \overset{\times 5}{\underset{\times 5}{}} = \frac{35}{100} = 0.35$$

(b) 0.35 **[2]**

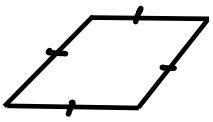
5 **(a)** Write down the mathematical name of each of these shapes.

(i) A triangle with 3 equal sides.



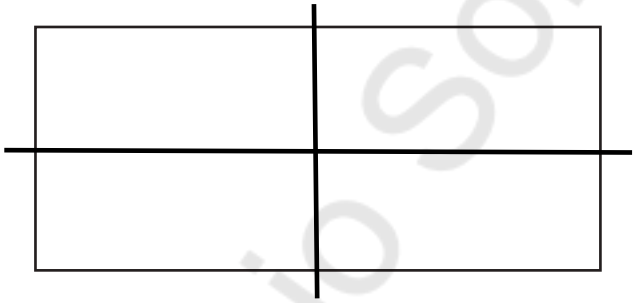
(a)(i) .....Equilateral..... triangle **[1]**

(ii) A quadrilateral with 4 equal sides and no right angles.



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

(b) Here is a rectangle.



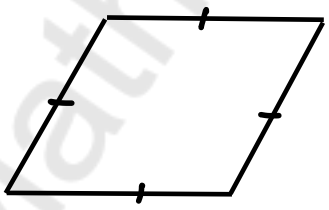
(i) On the diagram, draw the rectangle's two lines of symmetry. **[1]**

(ii) The rectangle has rotation symmetry of order 2.

Amaya says

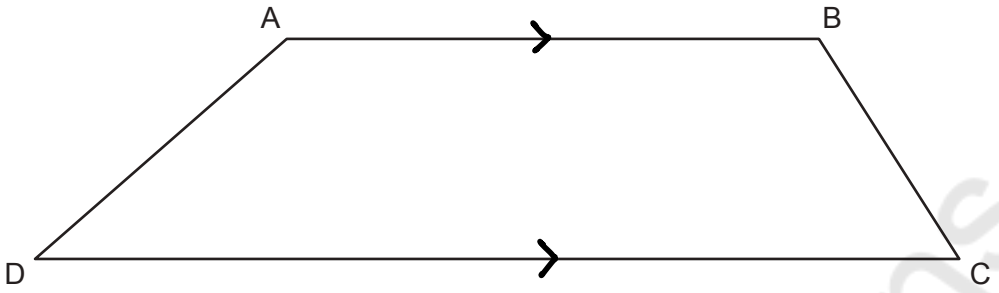
A rectangle is the only quadrilateral that has rotation symmetry of order 2.

Is she correct?
Show how you decide.



.....Amaya is wrong. A rhombus has rotation symmetry of order 2..... **[2]**

(c) Add the correct symbols to this diagram to show that line AB is parallel to line DC.



[1]

6 Clara travels from her home to Stoke.

The distance from her home to Stoke is 100 miles.
She travels at an average speed of 50 miles per hour.
She stops for 20 minutes on the journey.

Clara arrives in Stoke at 10:10 am.

At what time did she leave home?

D
S T

$T = \frac{D}{S}$

$= \frac{100}{50}$

$= 2$ hours

Total time $= 2h + 20$ mins
$= 2h\ 20$ mins

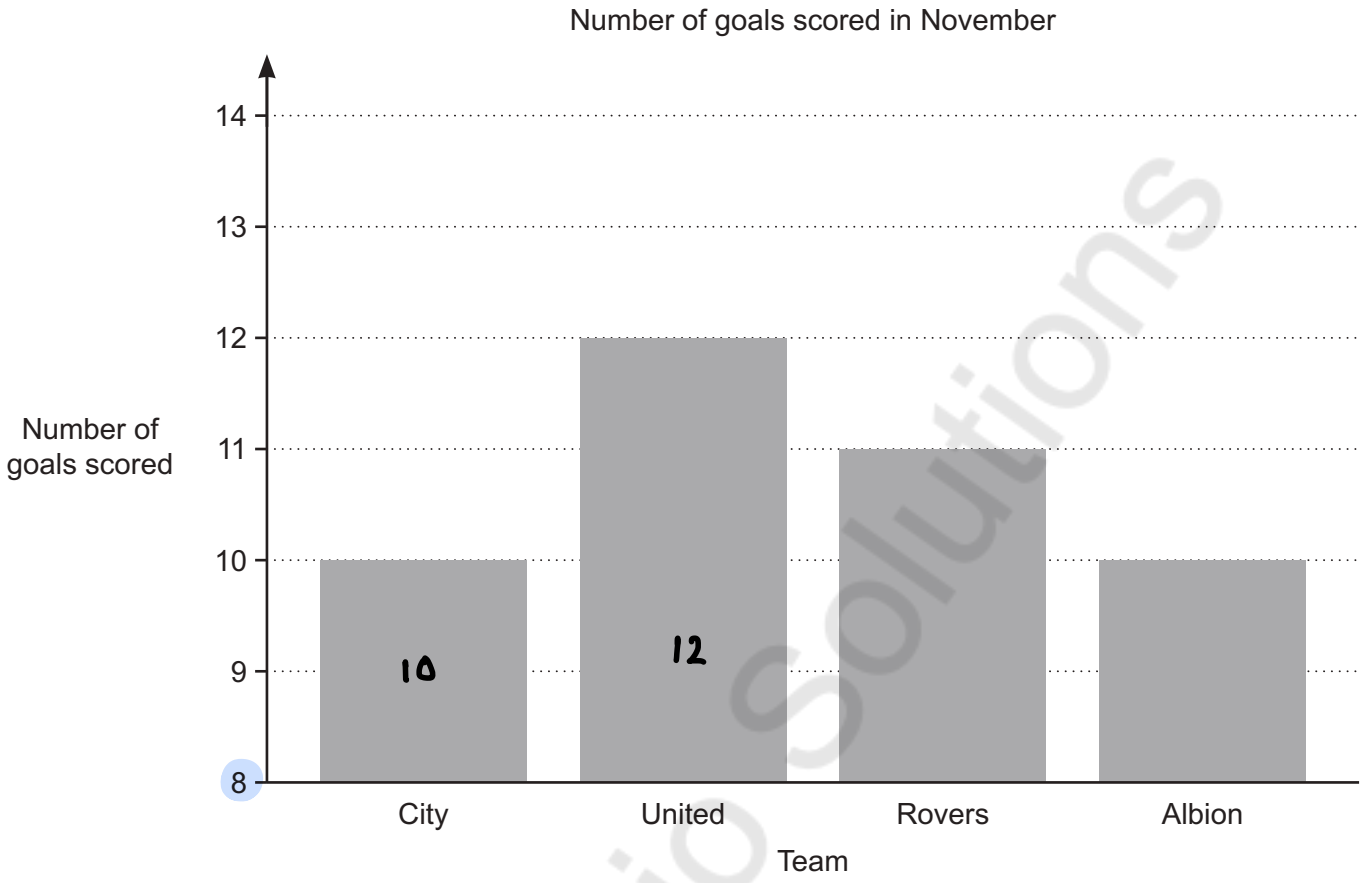
10:10 Am − 20 mins = 09:50 Am

09:50 Am − 2 hours = 07:50 Am

07:50 AM

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

7 This is Nadia's bar chart to show the number of goals scored by four teams during November.



(a) Blake says

Nadia's bar chart shows that United scored twice as many goals as City.

Is Blake correct?
Give a reason for your answer.

No because United scored 2 more goals than City.

[1]

(b) Give one way in which Nadia can improve her bar chart.

Vertical axis starts from 0.

[1]

(c) Kareem says

Out of these four teams, United achieved the highest mean number of goals per game during November.

What assumption has Kareem made?

All teams played the same number of games.

[1]

8 **(a)** Write $3 \times 3 \times 3 \times 3$ as a power of 3.

(a) 3^4 **[1]**

(b) Show that the answer to $2^6 \times 4^{-1}$ is a square number.

$4 = 2^2$

$2^6 \times (2^2)^{-1}$

$2^6 \times 2^{-2}$

2^4

$2 \times 2 \times 2 \times 2 = 16$ - square number

[3]

9 Write each of the following ratios in their simplest form.

(a) 12 : 15

÷3 ÷3

4 : 5

(a) 4 : 5 **[1]**

(b) 600 g : 1.8 kg

1000g = 1kg

×1000

1.8 × 1000 = 1800g

600g : 1800g

÷600 ÷600

1 : 3

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

10 Simplify.

(a) $\frac{5b^6}{1b^2}$ ÷

$5 \div 1 = 5$

$b^6 \div b^2 = b^4$

(a) $5b^4$ **[1]**

(b) $(x^4)^3$

(b) x^{12} **[1]**

11 Theo invests £500 at a rate of 6% per year simple interest.

(a) Work out the interest he receives in one year.

1% = £5

×6 ×6

6% = £30

(a) £ 30 **[2]**

(b) Work out the value of his investment after 5 years.

£30 × 5 = £150 interest

£500 + £150 = £650

(b) £ 650 **[2]**

12 A jacket has its price reduced by 20% in a sale.
The sale price is £56.

Work out the price of the jacket before the sale.

100% − 20% = 80%

80% = £56

÷0.8 ÷0.8

100% = £70

56 ÷ 0.8

×10 ×10

560 ÷ 8

$$8\overline{)560} = 70$$

£ 70 **[3]**

13 A bag only contains red, blue, yellow and white counters.
A counter is taken at random from the bag.
The table shows the probability it is red and the probability it is blue.

Colour	red	blue	yellow	white
Probability	0.24	0.34	0.28	0.14

= 1

There are twice as many yellow counters as white counters in the bag.

Complete the table. **[5]**

0.24 + 0.34 = 0.58

1.00 − 0.58 = 0.42

Y : W
2 : 1 = 3 parts

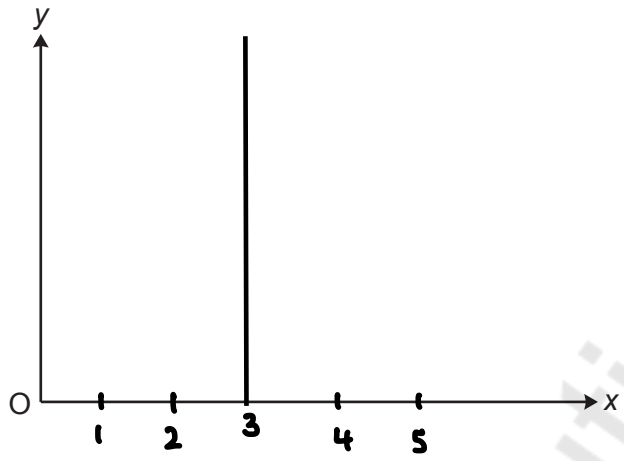
0.42 ÷ 3

$3 \overline{)0.42} = 0.14$

2 × 0.14 = 0.28

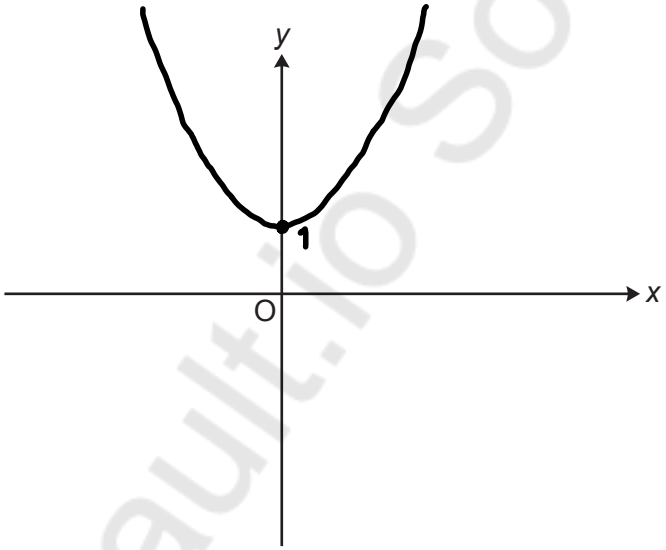
1 × 0.14 = 0.14

14 (a) (i) Sketch the graph of $x = 3$.
Show clearly the value of any intercepts.



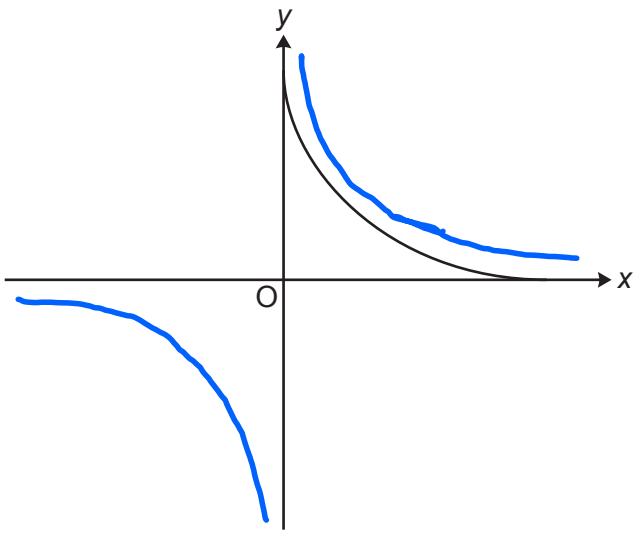
[2]

(ii) Sketch the graph of $y = x^2 + 1$.
Show clearly the value of any intercepts.



[2]

(b) Toby has sketched the graph of $y = \frac{1}{x}$ below.



Make two comments about the accuracy of his sketch.

1 The curve should not touch the axes

2 There should be another curve in the 3rd quadrant.

[2]

15 **(a)** Simplify.

$4a - 2b - 2a + 5b$

$2a + 3b$

(a) $2a + 3b$ **[2]**

(b) **(i)** Multiply out.

$4(x + 3)$

$4x + 12$

(b)(i) $4x + 12$ **[1]**

(ii) Multiply out and simplify.

$(x + 5)(x - 2)$

$x^2 - 2x + 5x - 10$

$x^2 + 3x - 10$

(ii) $x^2 + 3x - 10$ **[2]**

16 The diagram shows a square.

Not to scale

By setting up and solving an equation, show that the perimeter of the square is numerically equal to the area of the square.

$4x - 10 = 11 - 2x$

$+2x \qquad +2x$

$6x - 10 = 11$

$+10 \quad +10$

$6x = 21$

$\div 6 \qquad \div 6$

$$6\overline{)21.^{3}0} \quad 3.5$$

$x = 3.5$

$4x - 10 = 4(3.5) - 10$

$$\begin{array}{r} {}^{2}3.5 \\ \times \quad 4 \\ \hline 14.0 \end{array}$$

$= 14 - 10$

$= 4$

Perimeter $= 4 + 4 + 4 + 4$

$= 16$ cm

Area $= l \times w$

$= 4 \times 4$

$= 16$ cm^2

Perimeter = area = 16 ..... **[6]**

17 Dora has the following number cards.

She takes a card at random, replaces the card and then takes a second card.
She adds the numbers on the two cards she has taken and records the total.

(a) Complete the following table to show all of her possible totals.

		First card				
	Total	2	2	3	5	6
Second card	2	4	4	5	7	8
	2	4	4	5	7	8
	3	5	5	6	8	9
	5	7	7	8	10	11
	6	8	8	9	11	12

[1]

(b) Find the probability that her total is

(i) an even number,

$\frac{13}{25}$

(b)(i) $\frac{13}{25}$ **[2]**

(ii) a multiple of 3 or 4.

$\frac{14}{25}$

(ii) $\frac{14}{25}$ **[2]**

18 Charlie and Jasmine share cartons of apple juice.

Charlie drinks $\frac{1}{3}$ of a carton every day.

Jasmine drinks $\frac{2}{5}$ of a carton every day.

Any apple juice left in a carton at the end of the day is used the following day.

The cost of a carton is 70p.
Charlie and Jasmine buy just enough cartons to last them for 10 days.

How much do they spend in total for these cartons?
Give your answer in £.
Show your working.

Charlie : $\frac{1}{3} \times 10 = \frac{10}{3} = 3\frac{1}{3}$ cartons in 10 days

Jasmine : $\frac{2}{5} \times 10 = \frac{20}{5} = 4$ cartons in 10 days

Total cartons $= 3\frac{1}{3} + 4$

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

$\simeq 8$

Total cost $= 8 \times £0.70$

$= £5.60$

$$\begin{array}{r} {}^{5}0.7 \\ \times \quad 8 \\ \hline 5.6 \end{array}$$

£ 5.60 **[6]**

19 A clock chimes every 20 minutes.
A light flashes every 8 minutes.
The clock chimes and the light flashes together at 08:00.

How many times between 08:01 and 12:30 will the clock chime and the light flash together?
Show your working.

LCM of 8 and 20 = 40

Clock : 20 40 60 80

Light : 8, 16 24 32 40 48

08:00

08:40

+ 40 mins

09:20

10:00 + 40 mins

+ 40 mins

10:40

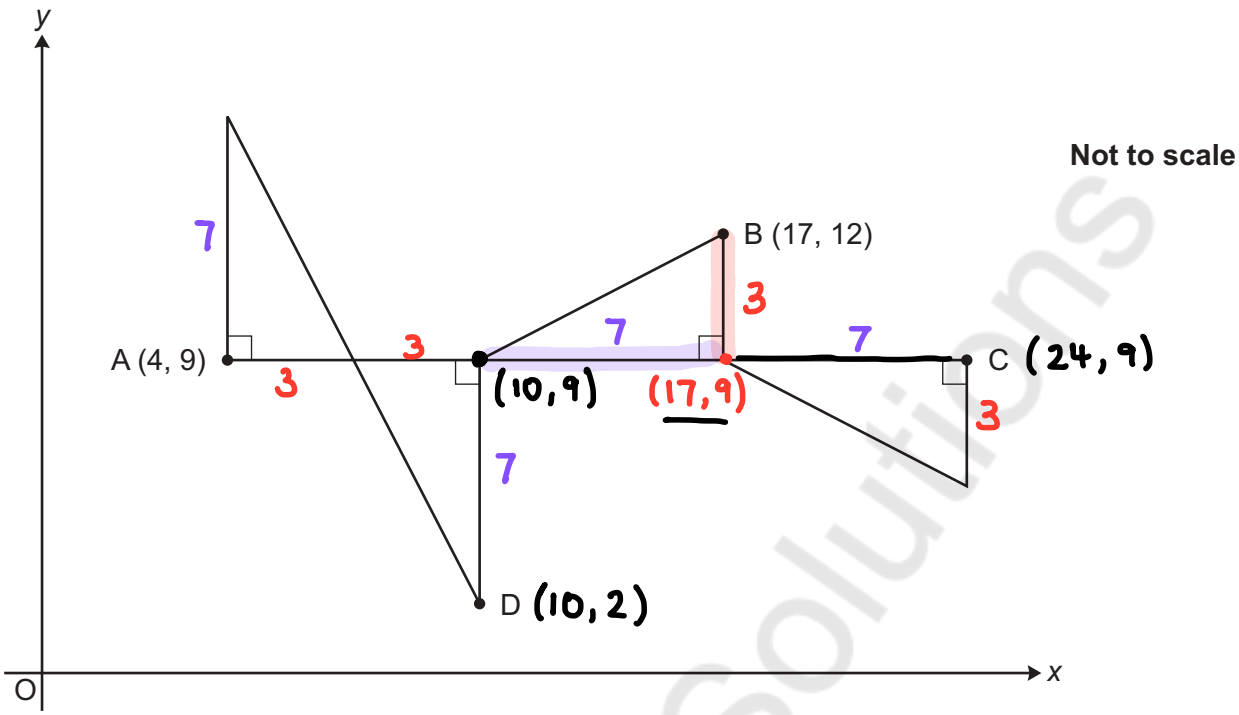
11:20

12:00

12:40

.....6..... **[5]**

20 A pattern is made from four congruent right-angled triangles.



The line AC is parallel to the *x*-axis.
The point A has coordinates (4, 9) and the point B has coordinates (17, 12).

Work out the coordinates of point C and point D.

C (24 , 9)

D (10 , 2) **[5]**

21 Solve the simultaneous equations.

$2x + 3y = 10$ x 3
$3x + 5y = 17$ x 2

$6x + 9y = 30$
$6x + 10y = 34$
$-y = -4$
$y = 4$

$2x + 3y = 10$
$2x + 3(4) = 10$
$2x + 12 = 10$
$-12 \quad -12$
$2x = -2$
$\div 2 \quad \div 2$
$x = -1$

$x =$ ..... -1 .....

$y =$ ..... 4 ..... **[4]**

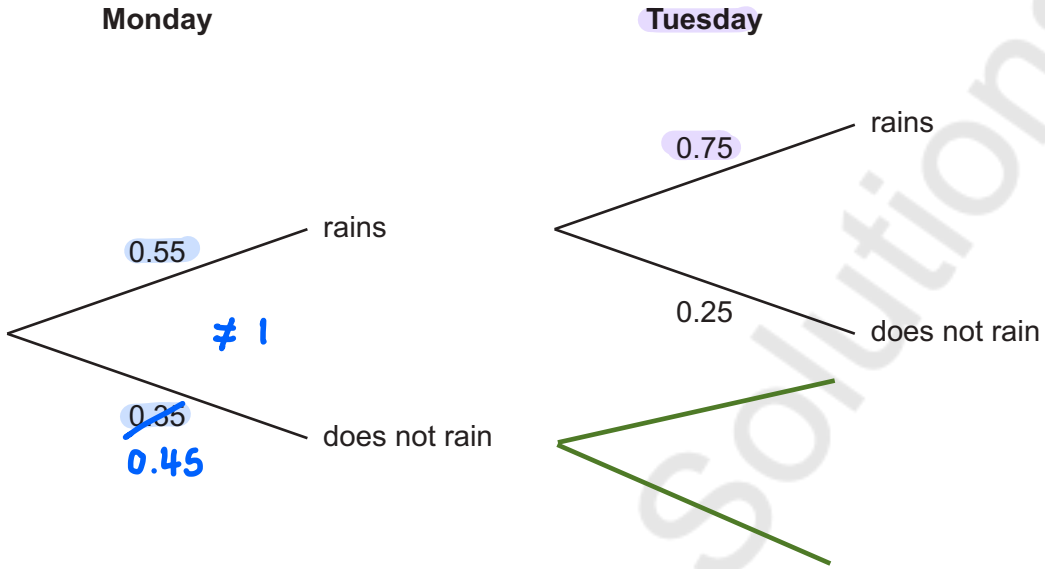
22 A weather forecast says

- the probability that it will rain on Monday is 0.55

and

- the probability that it will rain on Tuesday is 0.25.

Ella draws a tree diagram to show this information.



Write down three errors that Ella has made with her tree diagram.

1 On Tuesday, 0.75 and 0.25 should be swapped.

2 The probability that it does not rain on Monday should be 0.45

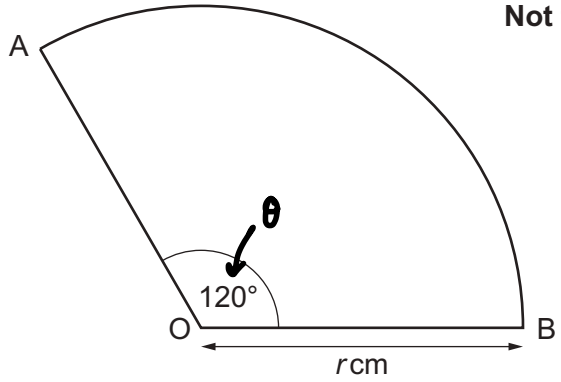
3 A pair of branches missing for Tuesday after it does not rain on Monday.

[3]

Turn over for Question 23

23 AOB is a sector of a circle, centre O.

Not to scale



The area of the sector is $8\,cm^2$.

Work out the exact value of the radius, r cm.

$$\text{Area} = \frac{\theta}{360} \times \pi r^2$$

$$8 = \frac{120}{360} \times \pi r^2 \quad \div 120$$

$$8 = \frac{1}{3} \times \pi r^2 \quad \div 120$$

$$\times 3 \qquad \times 3$$

$$24 = \pi r^2$$

$$\div \pi \qquad \div \pi$$

$$\frac{24}{\pi} = r^2$$

$$\sqrt{\ } \qquad \sqrt{\ }$$

$$r = \sqrt{\frac{24}{\pi}}$$

$r =$ $\sqrt{\frac{24}{\pi}}$ cm **[4]**

END OF QUESTION PAPER