OCR
Oxford Cambridge and RSA

MR BRADDER MATHS H

Mr Bradder Maths

Predicted Paper 5

June 2025

MR BRADDER MATHS

You may 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 may use an HB pencil for graphs and diagrams.
- Answer **all** the questions.
- Read each question carefully before you start to write your answer.
- Where appropriate, your answers should be supported with working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided.
- Additional paper may be used if required but you must clearly show your candidate number, centre number and question number(s).

INFORMATION

- The total mark for this paper is **113**
- The marks for each question are shown in brackets **[ ]**.
- This document consists of **16** pages.

1 Write 75 as a product of its prime factors.

.....[2]

2 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.

..... [5]

3 Work out. $3\frac{4}{7} \times \frac{7}{9}$ Give your answer as a mixed number in its simplest form.

.....[3]

4 A car accelerates at 4.06 m/s^2 for 10.1 seconds from an initial velocity of 2.93 m/s.

Harper rounds each value to 1 significant figure.

Harper uses the rounded values and the formula

$$s = ut + \frac{1}{2}at^2$$

to estimate the distance travelled in the 10.1 seconds.

Harper's answer is 430 metres.

Using Harper's method, show that their answer is wrong.

[4]

5 The angles in a triangle are in the ratio 1 : 2 : 3.

(a) Show that the triangle is a right-angled triangle.

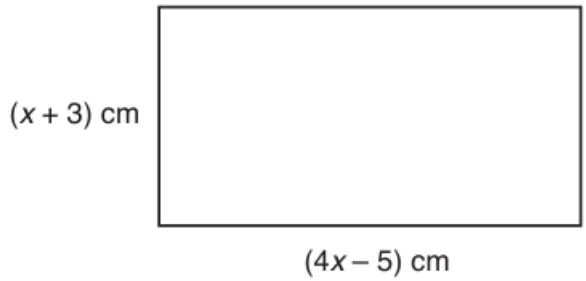
[2]

(b) The hypotenuse of the triangle is 15 cm long.

Calculate the length of the shortest side in the triangle.

(b) ..... cm [2]

6 This rectangle has length (4x – 5) cm and width (x + 3) cm.



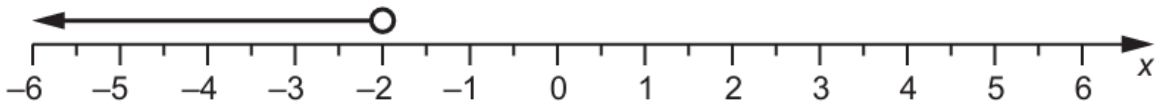
Not to scale

The perimeter of the rectangle is 46 cm.

Calculate the area of the rectangle.

..... **cm² [5]**

7 Gemma's solution to the inequality 3x + 1 > – 5 is shown on the number line



Is Gemma's solution correct? Explain your reasoning.

.....**[3]**

8 Naomi is given a 10% pay decrease.

Her new wage is £252 per week.

What would be her weekly wage if, instead, she had received a 10% pay increase?

£..... **[5]**

9 (a) Write 5/6 as a recurring decimal.

(a) .....[2]

(b) Convert $0.1\dot{2}6$ to a fraction. Give your answer in its lowest terms.

(b) .....[3]

10 A car mechanic has a tin containing 5 litres of engine oil.

Each week they use 450 millilitres of this oil for their vehicles.

The car mechanic says After 9 weeks I will have used over 80% of the oil in this tin.

Are they correct? Show how you decide.

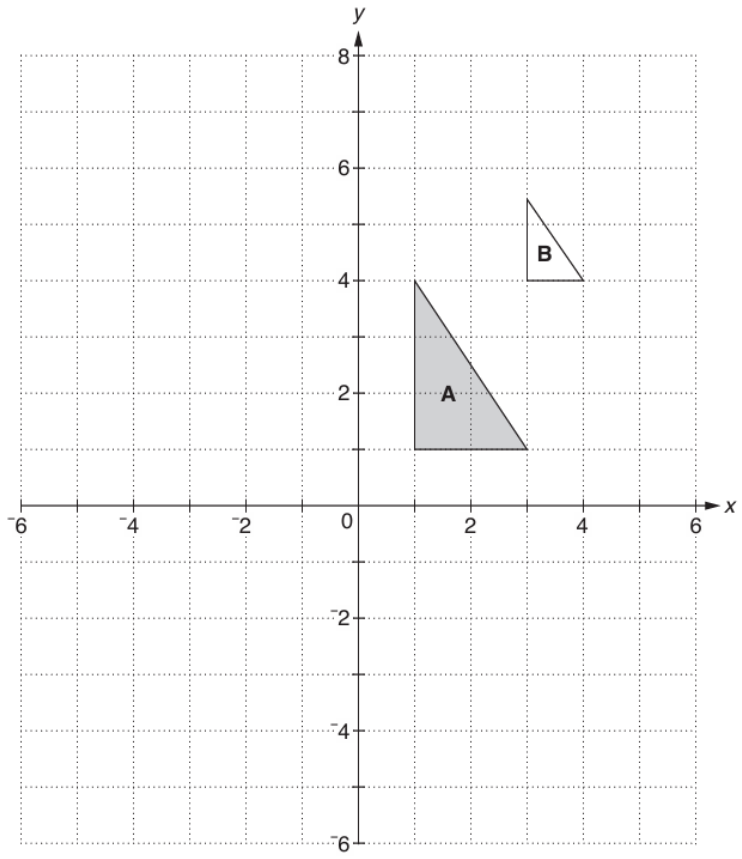
[5]

11 Solve by factorisation.

$$2x^2 - 19x - 33 = 0$$

x = ... or x = ... [3]

12 Here is a coordinate grid.



(a) Draw the image of triangle A after a reflection in the line y = –1.

[2]

(b) Describe fully the single transformation that maps triangle A onto triangle B.

.....

.....

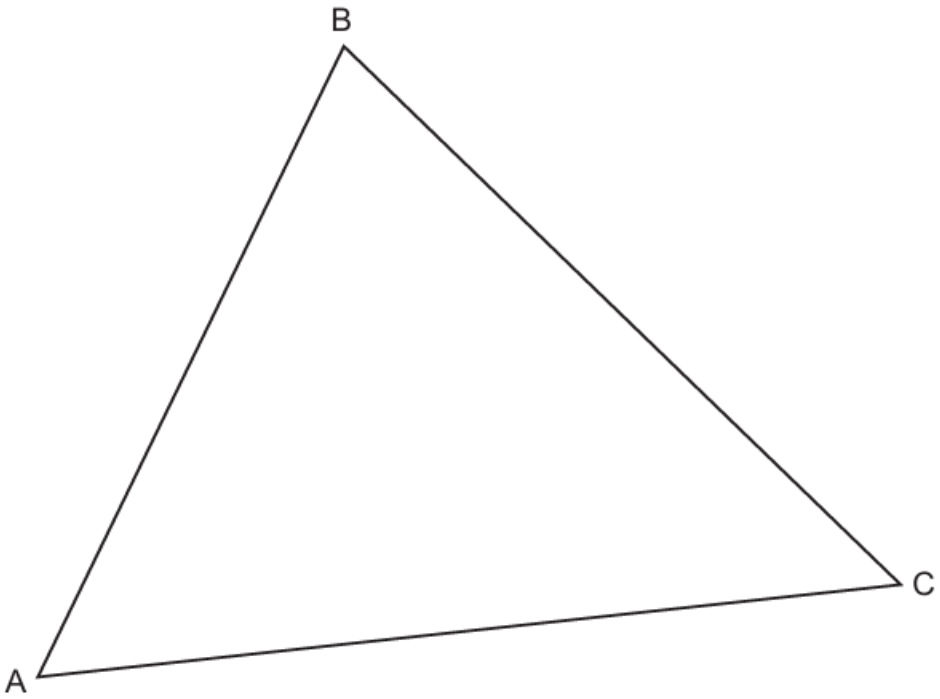
[3]

(c) Complete this statement.

A rotation of 180° around (0, 0) has the same effect as an enlargement by scale factor ..... with centre of enlargement (..... , ...).

[2]

13 The diagram shows triangle ABC.



(a) Construct the bisector of angle BAC.

[2]

(b) Construct the perpendicular bisector of AC.

[2]

(c) Shade the region inside triangle ABC that is

- nearer to AC than to AB
- nearer to A than to C.

[4]

14 Prove that the difference between two consecutive square numbers is always odd.

[4]

15 Carol says that: $64^{-\frac{1}{2}} = \frac{1}{32}$

Explain her error and give the correct value of $64^{-\frac{1}{2}}$ in the form $\frac{p}{q}$.

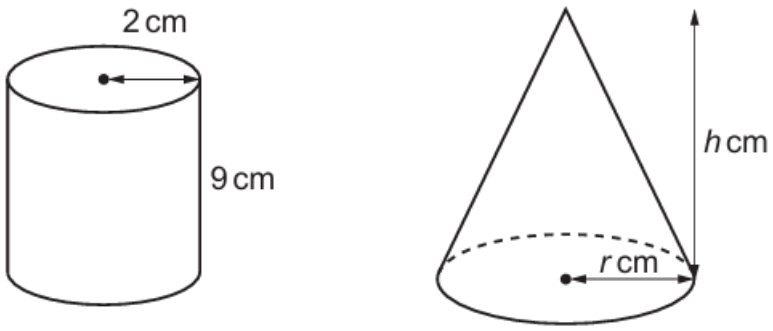
.....

.....

.....

[3]

16 The diagram shows a cylinder and a cone.



The cylinder has radius 2 cm and height 9 cm.

The cone has radius r cm and height h cm. r cm The ratio r : h is 1 : 4.

The volume of the cone is **equal to** the volume of the cylinder.

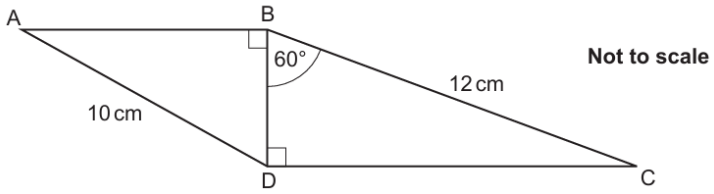
Work out the value of **r**.

[The volume V of a cone with radius r and height h is $V = \frac{1}{3}\pi r^2 h$]

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

17 The diagram shows two right-angled triangles ABD and BCD, sharing a common side BD.

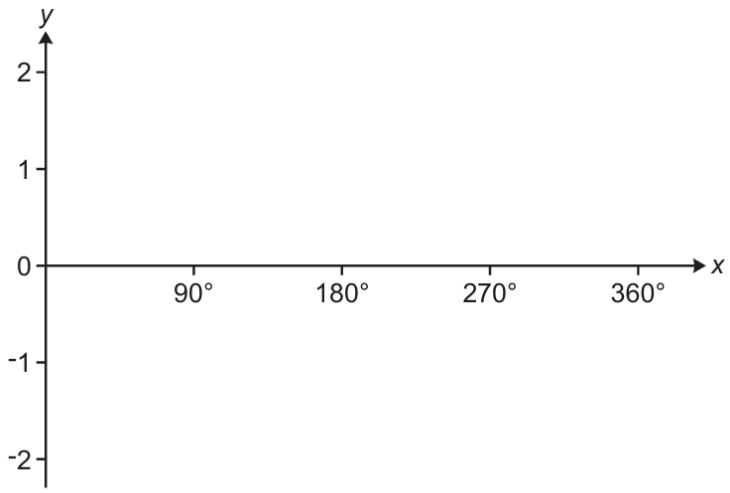
AD = 10 cm, BC = 12 cm and angle DBC = 60°.



Work out the length of AB.

..... cm [6]

18 (a) Sketch the graph of y = sin x for $0° \leqslant x \leqslant 360°$



[2]

(b) The graph of $y = \cos(x - 30)$ for $0° \leqslant x \leqslant 360°$ crosses the x-axis in two places.

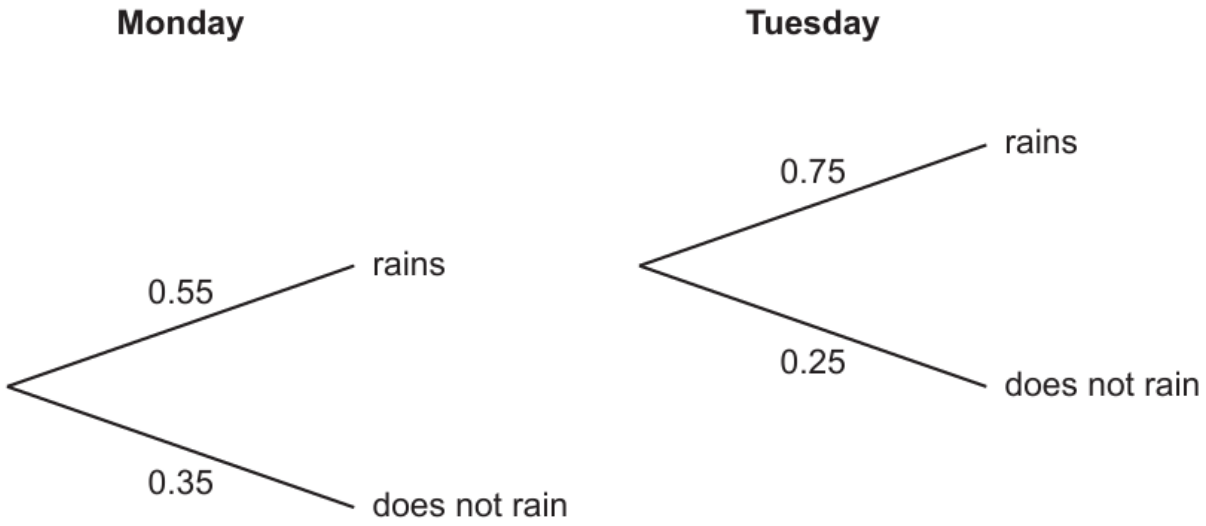
Write down the values of x where this occurs.

x = ... and ..... [2]

19 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.....

.....

2.....

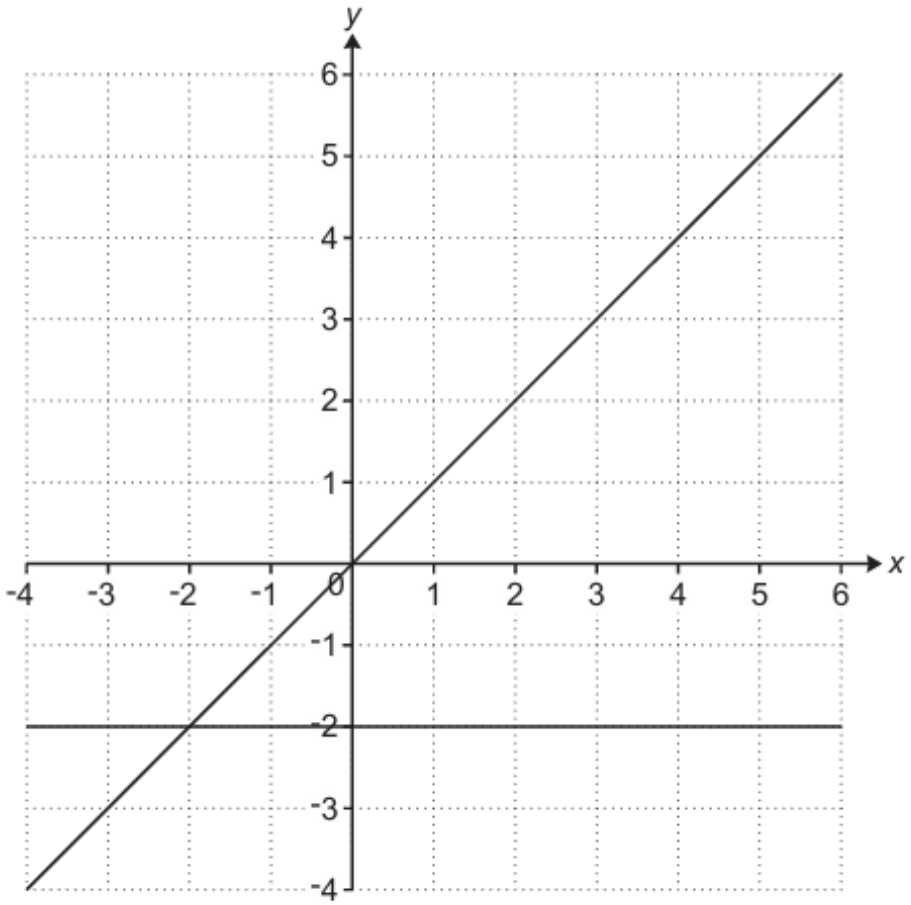
.....

3.....

.....

[3]

20 The graphs of y = -2 and y = x are drawn on the grid



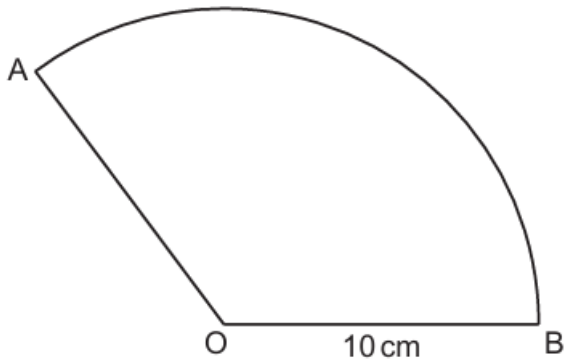
The region R satisfies the following conditions:

$y \leq x$ $y \geq -2$ $x < 4$

By drawing one more line, find and label the region R.

[4]

21 AOB is a sector of a circle, centre O and radius 10 cm.



Not to scale

The area of the sector is 40π cm^2 .

Work out the perimeter of the sector.

Give your answer in the form $a + b\pi$, where a and b are integers.

You must show your working.

..... cm [6]

22 Simplify fully.

$$\frac{2x^2 - 50}{x^2 + 7x + 10}$$

.....[5]

23 Here are the first four terms of a quadratic sequence.

2 15 34 59

The nth term is $an^2 + bn + c$.
Find the values of a, b and c.

a = ...

b = ...

c = ...

[4]

24 (a) (i) Write $x^2 + 4x - 16$ in the form $(x + a)^2 - b$

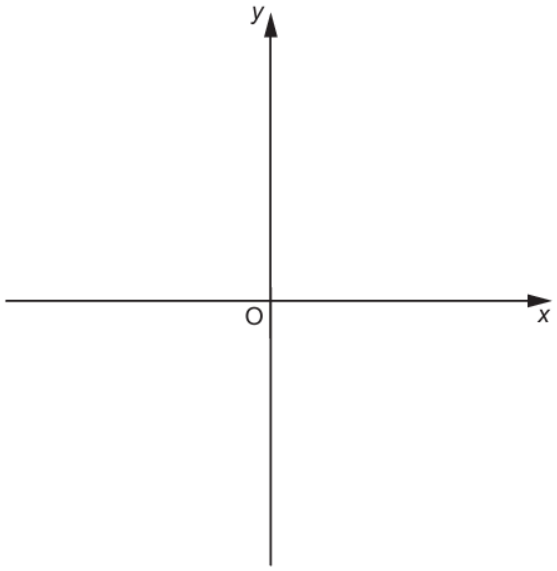
(a)(i) ..... [3]

(ii) Solve the equation $x^2 + 4x - 16 = 0$

Give your answers in surd form as simply as possible.

(ii) x = ... or x = ... [4]

(b) Sketch the graph of $x^2 + 4x - 16$ showing clearly the coordinates of any turning points.



[3]