OCR
Oxford Cambridge and RSA

MR BRADDER MATHS H

Mr Bradder Maths

Predicted Paper 5

June 2025 VERSION 2

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 **116**
- The marks for each question are shown in brackets **[ ]**.
- This document consists of **16** pages.

1 Write 90 as a product of its prime factors.

.....[2]

2 A clock chimes every 20 minutes.

A light flashes every 5 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. $4\frac{2}{5} \times \frac{5}{11}$ Give your answer as a mixed number in its simplest form.

.....[3]

4 A car accelerates at 5.04 m/s^2 for 9.8 seconds from an initial velocity of 3.87 m/s.

Harper rounds each value to 1 significant figure.

Harper uses the rounded values and the formula

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

Use Harper's method to estimate the distance travelled in the 9.8 seconds.

[4]

5 The angles in a triangle are in the ratio 10 : 4 : 4.

(a) Show that the triangle is isosceles and work out the length of the largest angle.

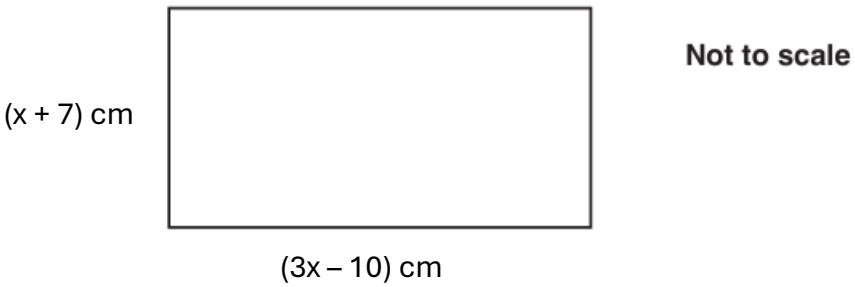
[2]

(b) The longest side of the triangle is 200 cm long.

Calculate the length of the other sides in the triangle.

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

6 This rectangle has length (3x – 10) cm and width (x + 7) cm.



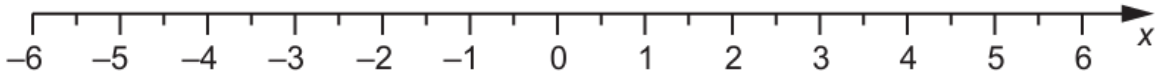
Not to scale

The perimeter of the rectangle is 42 cm.

Calculate the area of the rectangle.

..... **cm²** **[5]**

7 Solve the inequality 4x - 1 > – 9 and represent your solution on the number line



[3]

8 Naomi is given a 20% pay decrease.

Her new wage is £240 per week.

What would be her weekly wage if, instead, she had received a 20% pay increase?

£..... **[5]**

9 (a) Write 2/3 as a recurring decimal.

(a) .....[2]

(b) Convert $0.1\dot{5}\dot{5}$ to a fraction. Give your answer in its lowest terms.

(b) .....[3]

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

Each week they use 550 millilitres of this oil for their vehicles.

The car mechanic says After 9 weeks I will have used over 50% of the oil in this tin.

Are they correct? Show how you decide.

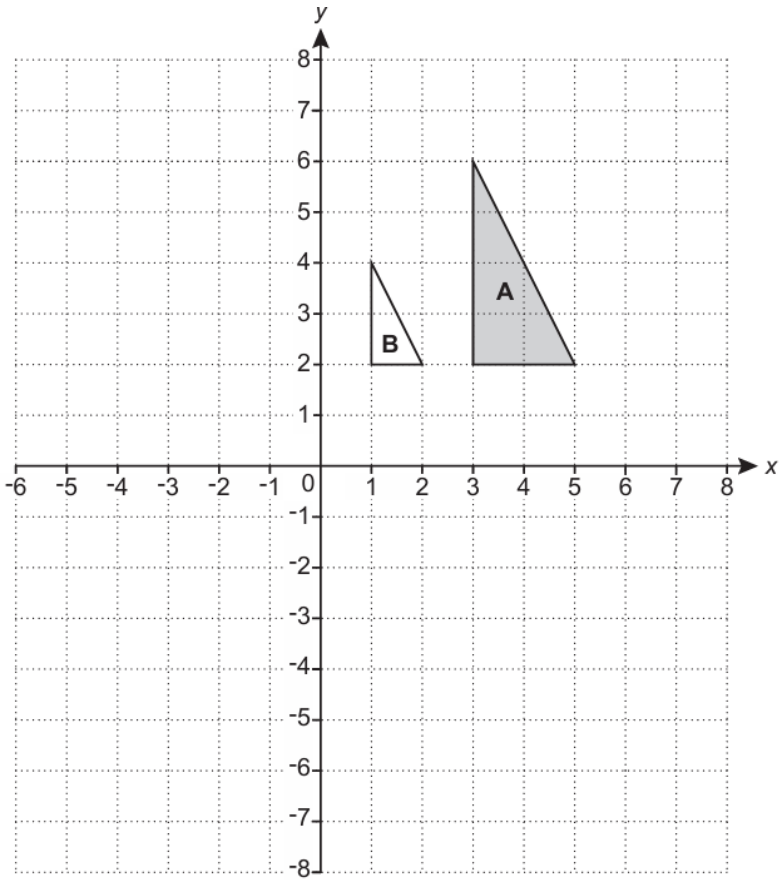
[5]

11 Solve by factorisation.

$$3x^2 + 11x + 6 = 0$$

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

12 Triangle A and triangle B are drawn on the coordinate grid.



(a) (i) Draw the image of triangle A after a rotation of 180 ° about (0, 0).

[2]

(ii) Draw the image of triangle A after a translation by the vector $\begin{pmatrix} 2 \\ -7 \end{pmatrix}$.

[2]

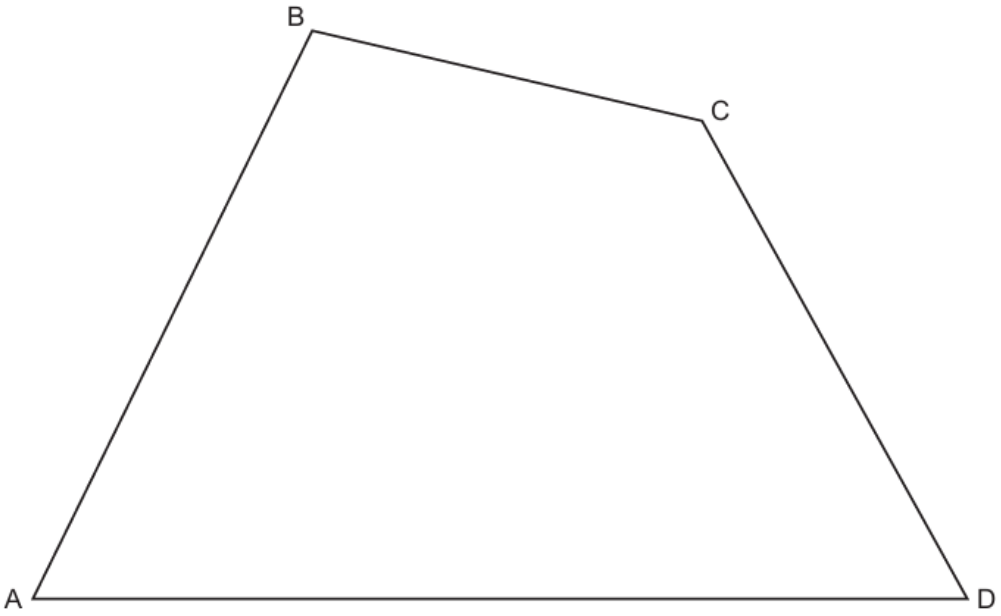
(b) Describe fully the single transformation that maps triangle A onto triangle B.

.....

.....

[3]

13 ABCD is a quadrilateral.



(a) Construct the bisector of angle ABC.
Show all your construction lines. **[2]**

(b) Construct the perpendicular bisector of BC.
Show all your construction lines. **[2]**

(c) Shade the region which is

- nearer to BC than to AB

and

- nearer to B than to C.

[1]

14 Use algebra to prove that an odd number multiplied by a different odd number always gives an answer that is an odd number. **[4]**

15 Evaluate $27^{-\frac{2}{3}}$

[3]

16 A sphere has radius x cm.
A cone has radius R cm and height $2R$ cm.

The volume of the sphere is equal to the volume of the cone.

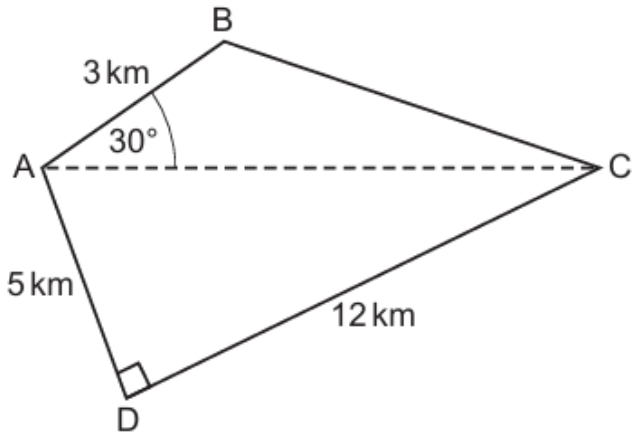
Write R in terms of x.

[The volume V of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.

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 some land in the shape of a quadrilateral, ABCD.



Not to scale

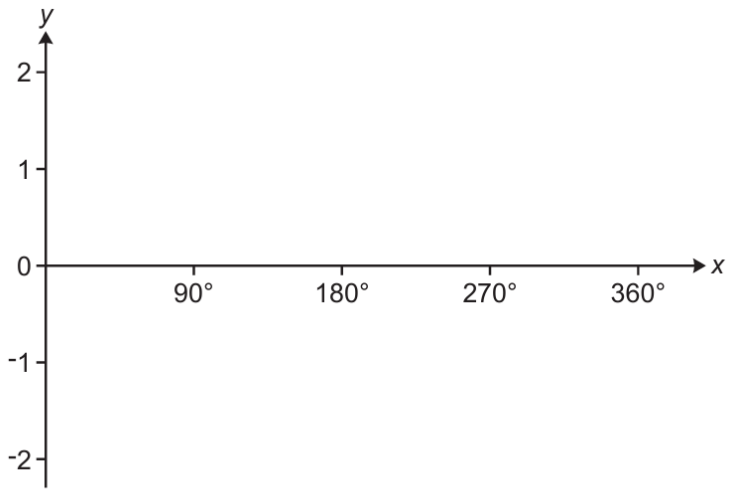
AB = 3 km, AD = 5 km, CD = 12 km and angle BAC = 30°.

The land is sold for £10 million per square kilometre.

Calculate the total cost of the land.

£..... million **[7]**

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



[2]

(b) The graph of y = cos (x + 20) 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 Adam has 10 sweets in a bag.
5 are cherry sweets, 4 are lemon sweets and 1 is an orange sweet.
Adam chooses a sweet at random from the bag and eats it. He then takes another sweet at random from the bag and eats it.

(a) Adam says

The probability that I choose two cherry sweets is $\frac{25}{100}$.

He is incorrect. Explain his error.

.....

.....

[2]

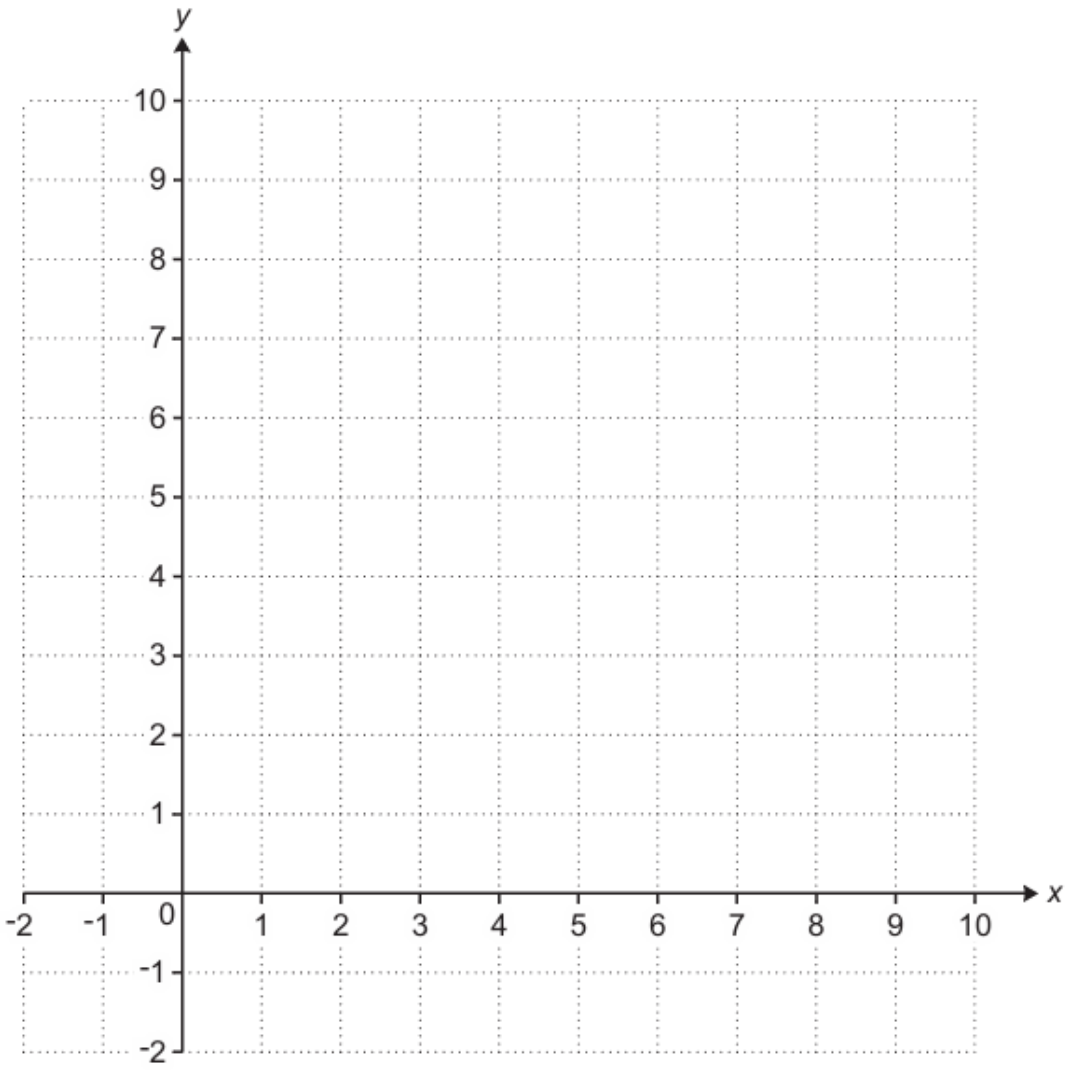
(b) Find the probability that the two sweets he chooses have different flavours. (b)

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

20 Region **R** satisfies these inequalities.

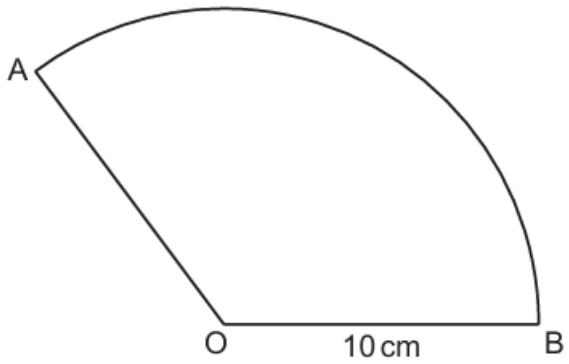
$y > 3$
$y \geqslant x$
$x + y \leqslant 9$

By drawing three straight lines on the grid, find and label the region **R**.



[6]

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



Not to scale

The area of the sector is 20π cm^2 .

Work out the perimeter of the sector.

Give your answer in the form $a + b\pi$.

You must show your working.

..... **cm [6]**

22 Simplify fully.

$$\frac{x^2 - 100}{x^2 - 7x - 30}$$

.....[5]

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

2 6 12 20

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

a = ...

b = ...

c = ...

[4]

24 (a) (i) Write $x^2 + 6x - 20$ in the form $(x + a)^2 - b$

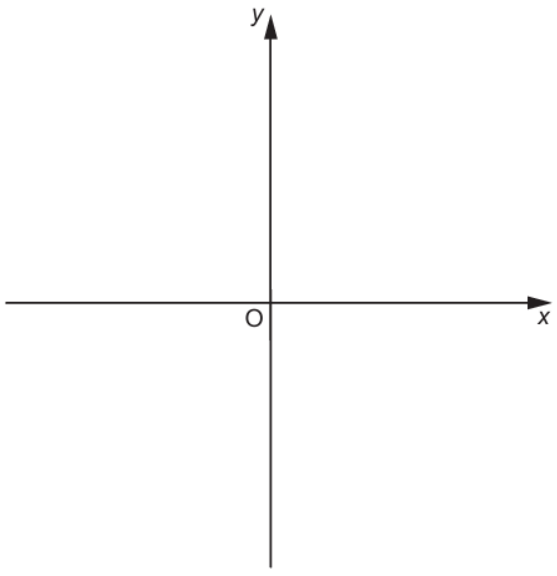
(a)(i) ..... [3]

(ii) Solve the equation $x^2 + 6x - 20 = 0$

Give your answers in surd form as simply as possible.

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

(b) Sketch the graph of $x^2 + 6x - 20$ showing clearly the coordinates of any turning points.



[3]