

Surname	Centre Number	Candidate Number
First name(s)		0



GCSE

3300U50-1



THURSDAY, 15 MAY 2025 – MORNING

MATHEMATICS
UNIT 1: NON-CALCULATOR
HIGHER TIER

1 hour 45 minutes

ADDITIONAL MATERIALS

The use of a calculator is not permitted in this examination.
A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.
You may use a pencil for graphs and diagrams only.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer **all** the questions in the spaces provided.
If you run out of space use the additional page at the back of the booklet. Question numbers must be given for all work written on the additional page.
Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.
Unless stated, diagrams are not drawn to scale.
Scale drawing solutions will not be acceptable where you are asked to calculate.
The number of marks is given in brackets at the end of each question or part-question.
In question 3, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

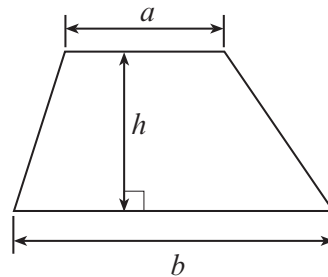
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	6	
2.	6	
3.	6	
4.	4	
5.	3	
6.	4	
7.	6	
8.	2	
9.	2	
10.	3	
11.	4	
12.	2	
13.	3	
14.	3	
15.	5	
16.	3	
17.	2	
18.	4	
19.	5	
20.	7	
Total	80	



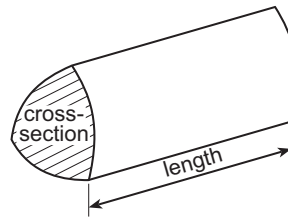
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Formula List – Higher Tier

Area of trapezium $= \frac{1}{2} (a + b)h$

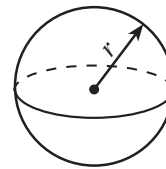


Volume of prism = area of cross-section $\times$ length



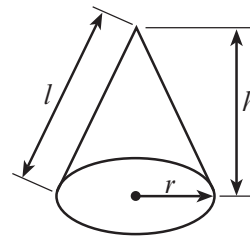
Volume of sphere $= \frac{4}{3} \pi r^3$

Surface area of sphere $= 4\pi r^2$



Volume of cone $= \frac{1}{3} \pi r^2 h$

Curved surface area of cone $= \pi r l$

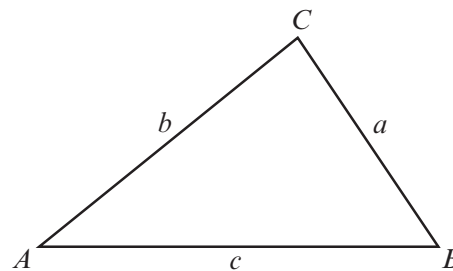


In any triangle ABC

Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle $= \frac{1}{2} ab \sin C$



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Annual Equivalent Rate (AER)

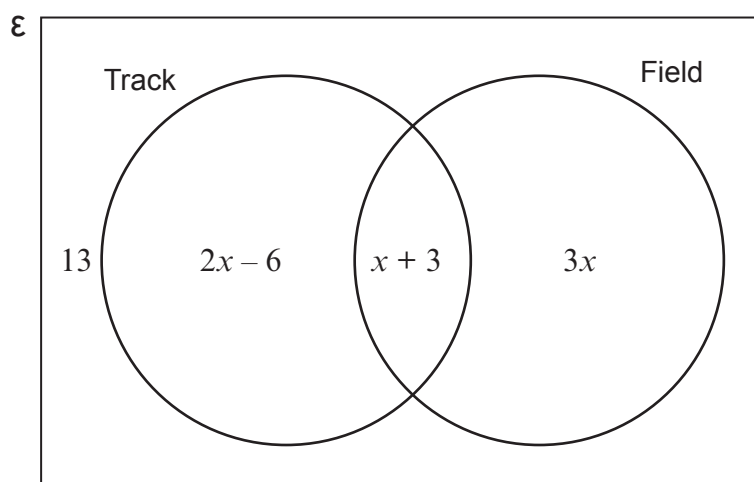
AER, as a decimal, is calculated using the formula $\left(1 + \frac{i}{n}\right)^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.



1. A group of 100 pupils attended their school sports day.
13 pupils did not compete in either Track or Field events.

The expressions in the following Venn diagram represent the number of pupils in each category.

The universal set, ϵ , contains all the pupils.



- (a) Find the value of x .

[4]

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- (b) One pupil is chosen at random from the group.
What is the probability that this pupil competed only in Track events?

[2]

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2. The table below shows some of the values of $y = 2x^2 - 6$ for values of x from -3 to 2 .

x	-3	-2	-1	0	1	2
$y = 2x^2 - 6$		2	-4	-6		2

(a) Complete the table above.

[2]

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(b) On the graph paper opposite, draw the graph of $y = 2x^2 - 6$ for values of x from -3 to 2 .

[2]

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(c) Draw the line $y = 1$ on the graph paper.
Write down the values of x where the line $y = 1$ cuts the curve $y = 2x^2 - 6$.
Give your answers correct to 1 decimal place.

[2]

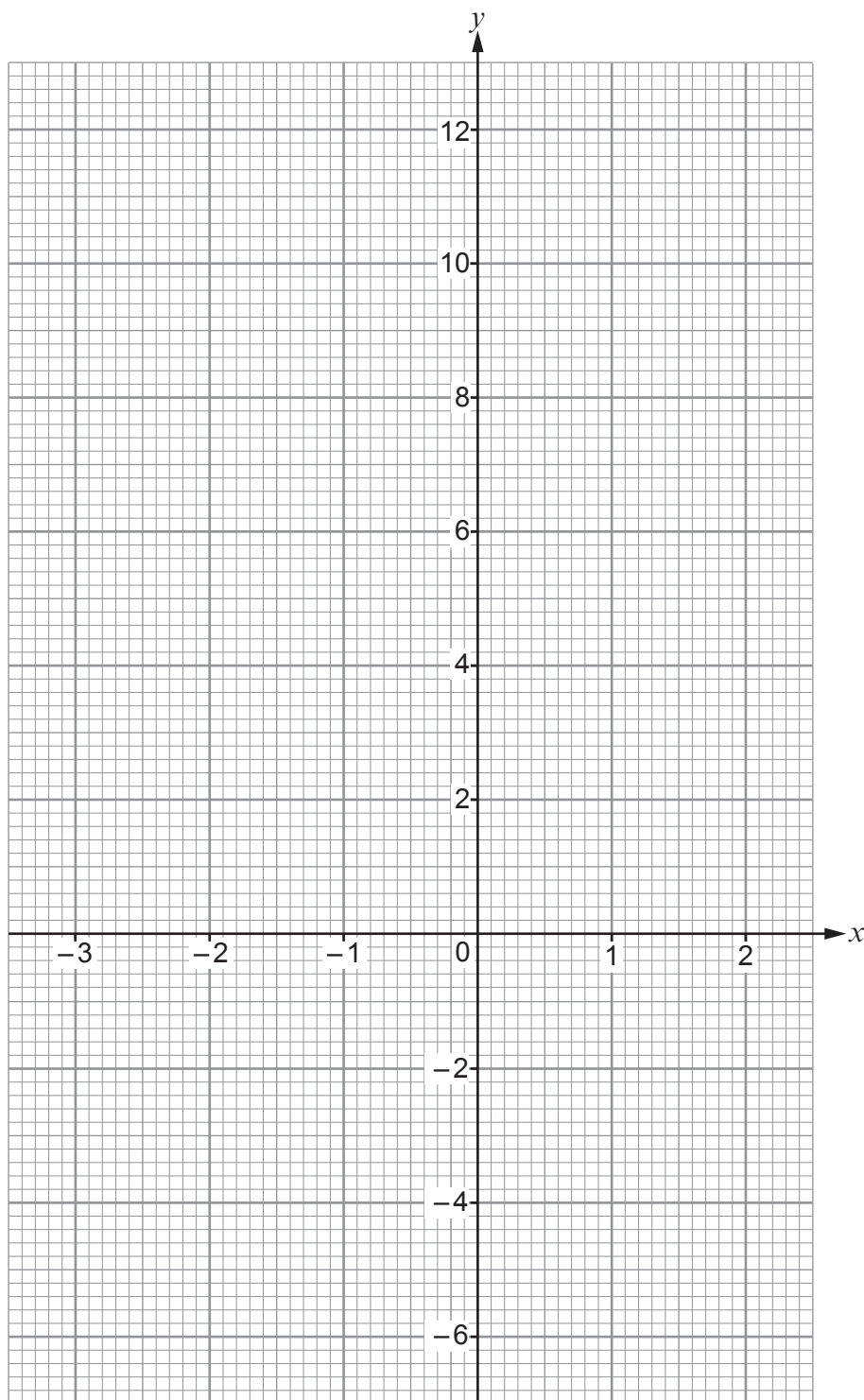
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$x = \dots\dots\dots$ and $x = \dots\dots\dots$



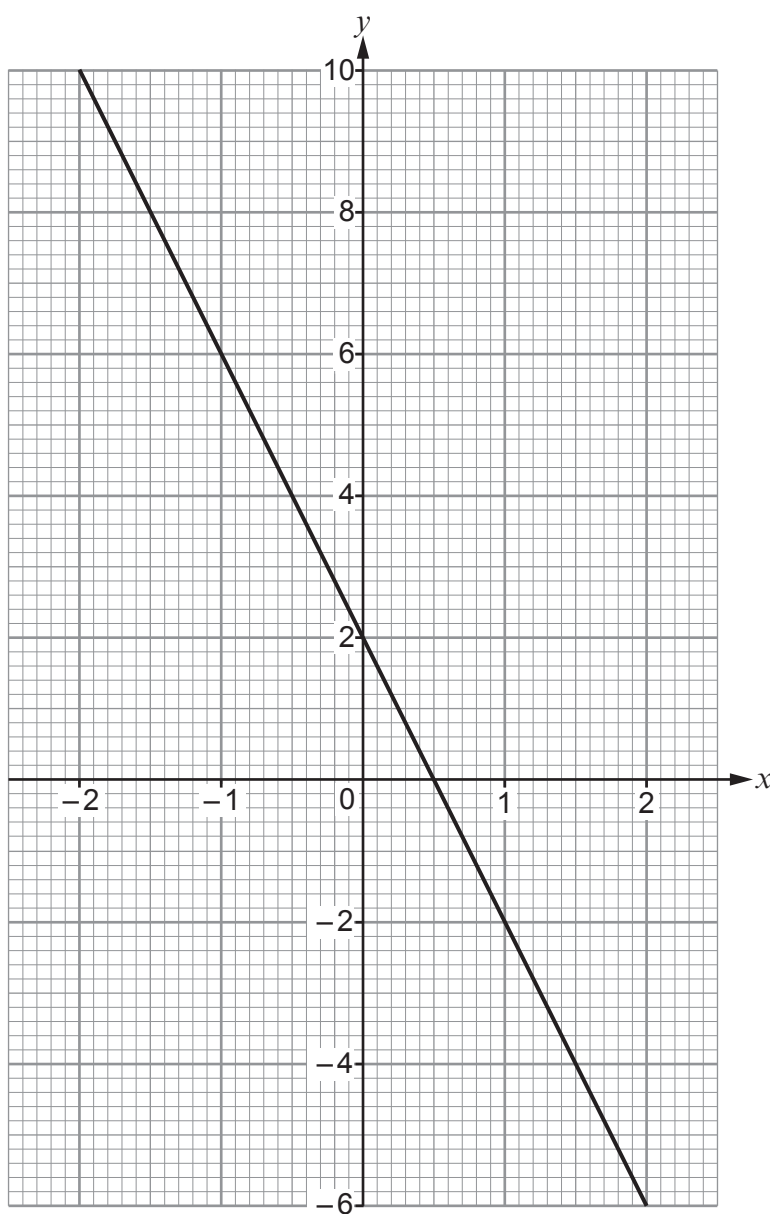


- The mean of three of these numbers is 22.
The other two numbers have a difference of 6.

[4]

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5. The diagram below shows the graph of a straight line for values of x from -2 to 2 .



- (a) Write down the gradient of the straight line in the diagram.

[1]

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Gradient is



- (b) Write down the equation of the straight line in the form $y = mx + c$, where m and c are whole numbers. [1]

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- (c) Write down the equation of a different straight line that is parallel to the straight line in the diagram. [1]

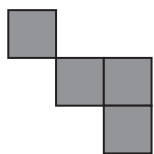
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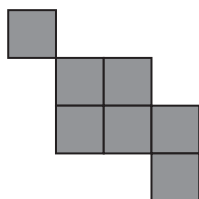
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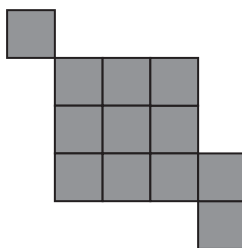
6. Grey tiles are used to make patterns as follows.



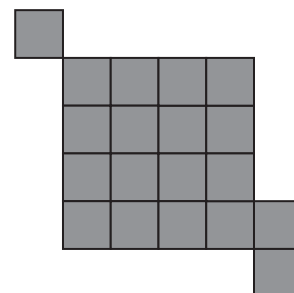
Pattern 1



Pattern 2



Pattern 3



Pattern 4

(a) How many grey tiles would you need to make Pattern n ?

[2]

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(b) What is the number of the pattern you would make when you use exactly 147 grey tiles?

[2]

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- The cost of 1 kg of cherries is £ x .
The cost of 1 kg of grapes is £ y .



Use an algebraic method, not trial and improvement, to find the total cost of $\frac{1}{2}$ kg of cherries and 6 kg of grapes.

You must show all your working.

[6]

The total cost of $\frac{1}{2}$ kg of cherries and 6 kg of grapes is £



8. The length of each side of a square is 15 cm, correct to the nearest 1 cm.
Calculate the greatest possible perimeter of this square.

[2]

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9. Factorise $x^2 - 11x + 24$.

[2]

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10. In the diagram below, $ABCD$ and $ABCE$ are cyclic quadrilaterals.

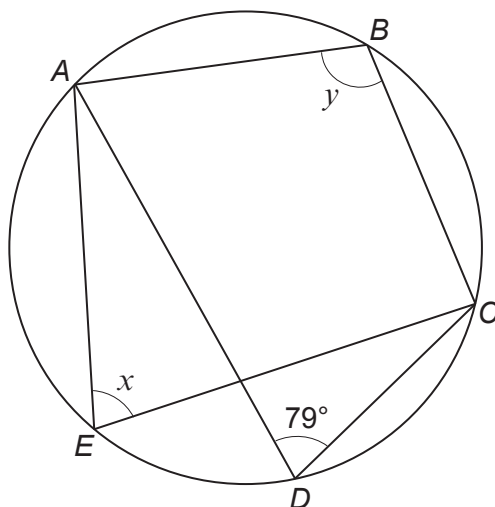


Diagram not drawn to scale

- (a) Find the size of angle x .

[1]

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$$x = \text{.....}^\circ$$

- (b) Calculate the size of angle y .
State the **circle theorem** that you have used to find your answer.

[2]

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$$y = \text{.....}^\circ$$

Circle Theorem:

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11. Express $\frac{3x}{4x-5} - \frac{2x}{6x+1}$ as a single fraction in its simplest form.

[4]

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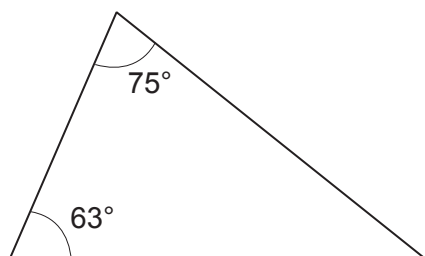
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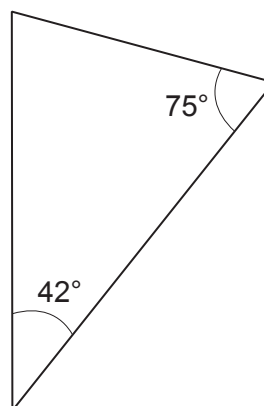


12. Triangle A and Triangle B are shown below.

Triangle A



Triangle B



Diagrams not drawn to scale

Which **one** of the following statements is correct?
Circle the correct answer.

The triangles must
be congruent

The triangles could
be congruent

The triangles cannot
be congruent

You must show your working and **justify** your answer.

[2]

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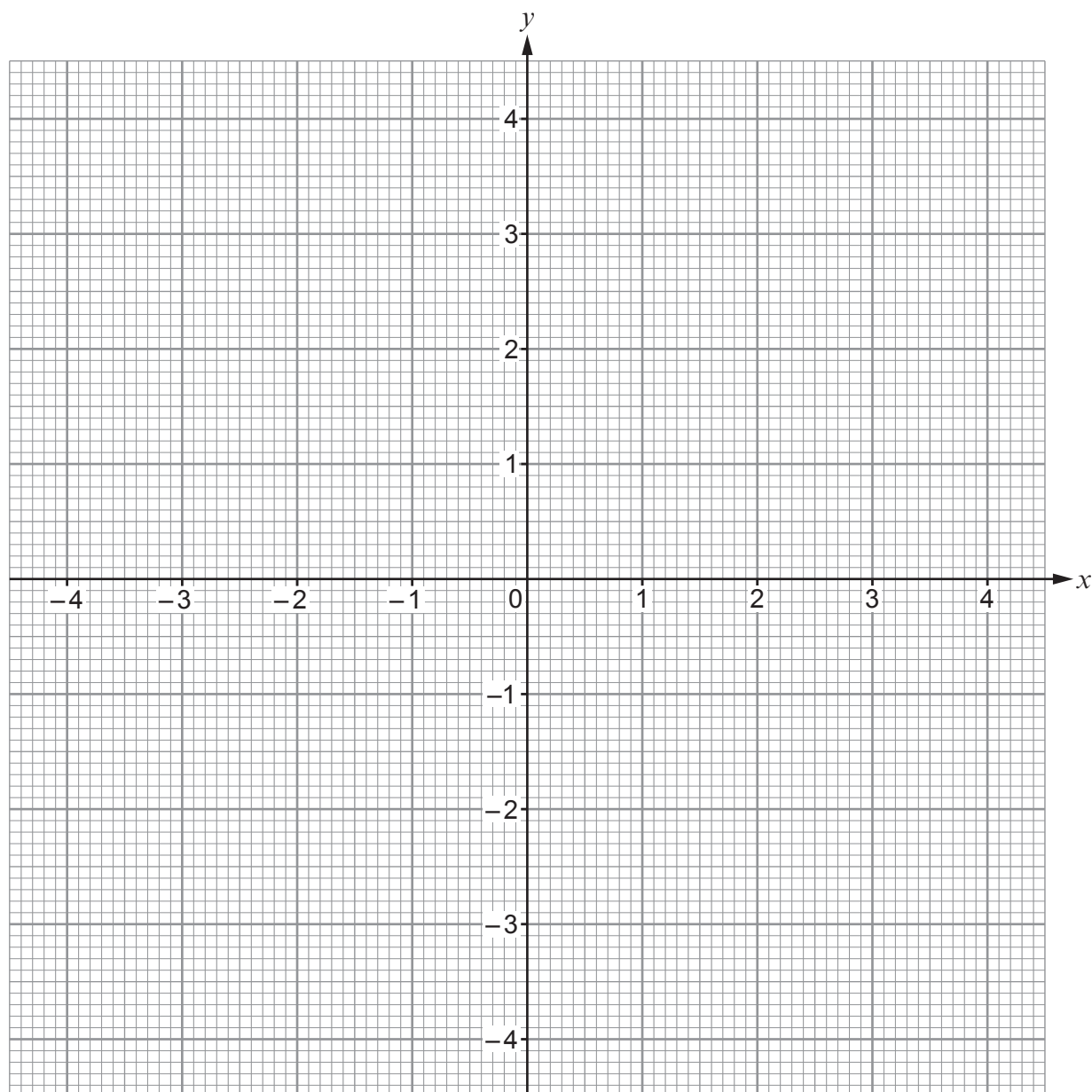


13. Using the axes below, find the region that satisfies the following inequalities.

$$\begin{aligned}y &\leq x + 3 \\x + y &\leq 4 \\y &\geq 1\end{aligned}$$

Make sure that you clearly indicate the region that represents your answer.

[3]



15. (a) (i) Find the value of $8^{-\frac{1}{3}}$.
Circle your answer.

[1]

-2

$-\frac{1}{2}$

$\frac{3}{8}$

$-2\frac{2}{3}$

$\frac{1}{2}$

- (ii) Find the value of $4^{\frac{5}{2}}$.
Circle your answer.

[1]

$\frac{20}{8}$

10

32

512

1024

- (b) Evaluate the following.

[3]

0.215×330



16. Factorise $2x^2 + 3x - 20$.
Hence solve the equation $2x^2 + 3x - 20 = 0$.

[3]

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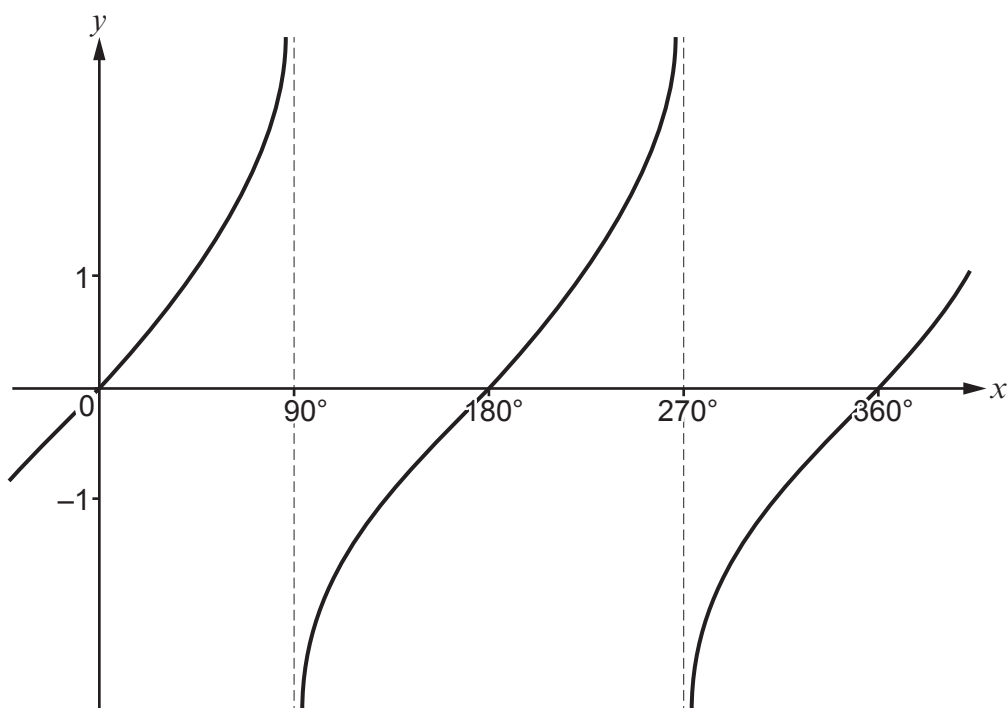
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17. The following diagram shows a sketch of $y = \tan x$ for values of x from 0° to 360° .



Given that $\tan 23^\circ = 0.4245$, correct to 4 decimal places, write down **all** the solutions of the equation

$$\tan x = -0.4245$$

for values of x from 0° to 360° .

[2]

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18. Two similar solids have surface areas of 3 cm^2 and 75 cm^2 .
The volume of the smaller solid is 0.4 cm^3 .

Calculate the volume of the larger solid.

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Volume of larger solid = ... cm^3



19. Simplify the following expression.

$$\frac{\sqrt{250}}{(\sqrt{5})^3} + (4 + \sqrt{2})(3 - \sqrt{2})$$

State whether your answer is rational or irrational.

[5]

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The answer is
rational

☐

The answer is
irrational

☐

20. Mathew has six cards.



He chooses three of the cards at random.
He does **not** replace any of the cards.

- (a) Calculate the probability that the first card is a 7, the second card is a 5 and the third card is a 6. [2]

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- (b) Calculate the probability that the **product** of the numbers on Mathew's three cards is a cube number. [2]

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- (c) Calculate the probability that the **sum** of the numbers on Mathew's three cards is 17. [3]

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