Surname	Centre Number	Candidate Number
First name(s)		0



GCSE

3300U50-1



MONDAY, 8 NOVEMBER 2021 - MORNING

MATHEMATICS UNIT 1: NON-CALCULATOR HIGHER TIER

1 hour 35 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.

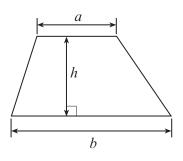
In question 1, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Ex	For Examiner's use only					
Question	Maximum Mark	Mark Awarded				
1.	5					
2.	5					
3.	4					
4.	3					
5.	5					
6.	3					
7.	5					
8.	5					
9.	3					
10.	4					
11.	2					
12.	3					
13.	3					
14.	5					
15.	5					
16.	3					
17.	2					
18.	5					
Total	70					

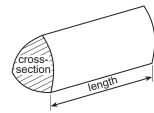


Formula List - Higher Tier

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



Volume of prism = area of cross-section × length



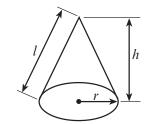
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

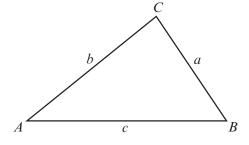


In any triangle ABC

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 $a \ne 0$ are given by $x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

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. In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.

The sizes of angles a and b in the triangle shown below are in the ratio 2 : 3.

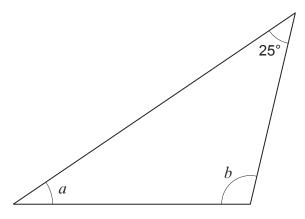


Diagram not drawn to scale

You must show all your working.	[3 + 2 OCW]
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(a)	Find the Lowest Common Multiple (LCM) of 60 and 72.	[2]
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• • • • • • • • • • • • • • • • • • • •		
	LCM of 60 and 72 is	
(b)	Express 882 as a product of its prime factors. Give your answer in index form.	[3]
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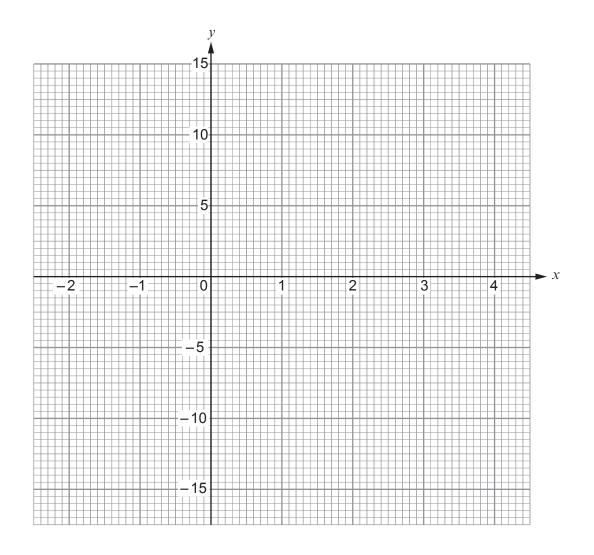


3.

Complete the table below. Draw the graph of $y = 7 - x^2$ for values of x between -2 and 4. Use the graph paper below.

[4]

x	-2	-1	0	1	2	3	4
$y = 7 - x^2$	3		7	6	3		-9



_			Exami only
Ca Ta	alculate the total perimeter of a semicircle of radius 4 cm. lke π to be 3·14.	[3]	
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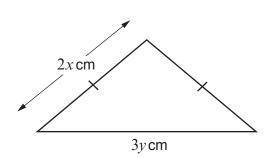
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5.	(a)	Rearrange the following formula to make k the subject. $p = 3k + 2$	[2]
	(b)	Does the midpoint of the straight line joining points (3, 15) and (7, 19) lie on the line	
		y = 3x + 2? You must show all your working.	[3]
6.	(a)	Express 0·0058 in standard form.	[1]
	(b)	Calculate the value of $\frac{1.4 \times 10^9}{2 \times 10^3}$. Give your answer in standard form.	[2]



7.				r names forward to carry the Welsh flag at a sporting event. es, Mid Wales or South Wales.
	The prob	pability of c	hoosing a pe	hosen at random. erson who lives in North Wales is 0·3. erson who lives in Mid Wales is 0·25.
	The prob	pability of c	hoosing a pe	erson who is under 18 years old is 0·2.
	The peo	ple's ages	are independ	dent of where they live.
	(a) Co	omplete the	e tree diagrar	m shown below. [3]
			Home	Age
				Under 18 years
		,	North / Wales	
	0.3			18 years or over
				Under 18 years
<	<u>/</u> ()-25	Mid Wales	
				18 years or over
			0 "	Under 18 years
		Ì	South Wales	
				18 years or over
		hat is the years old?		of choosing a person who lives in South Wales and is under [2]





Perimeter of triangle = 19 cm

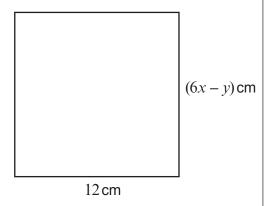


Diagram not drawn to scale

Use an algebraic method (not trial and improvement) to find the value of x and the value of you must show all your working.	<i>y</i> . [5]
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Turn over.

Describe fully the **single** transformation that transforms shape A onto shape B. [3] y 6 3-2 -2 -3 -5 6



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Examiner only

10.	Express $\frac{5x}{2x-1}$	$-\frac{4x}{4x+3}$ as a single fraction in its simplest form.	[4]	Examin only



Two similar solids are shown below.
A 5 cm B
Diagrams not drawn to scale
Solid A has a height of 5 cm. Solid B has a height of 7 cm.
Mari claims that the surface area of solid B is more than double the surface area of solid A. Is Mari correct?
You must justify your answer. [2]



12.	Rearrange the following formula to make w the subject.	Examin only
	$xw + 4 = 3y - 8w ag{3}$	



You must use an algebraic method and show all your working. [3	e the equation		
You must use an algebraic method and show all your working. [3		t = 0.	
			[3]
	nust use an aigebraic method and show air	your working.	[0]
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(a)	Evaluate $4^{-\frac{3}{2}}$.	[2]
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• • • • • • • • • • • • • • • • • • • •		
•••••		
(b)	Evaluate $\frac{1}{3} + 0.0\dot{2}$.	
	Express your answer as a fraction.	[3]
•••••		

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Examiner only

16 **15.** A solid object is made out of a hemisphere and a cylinder. Diagram not drawn to scale The radius of the common circular surface is 3 cm. The volume of the whole object is $63\pi\,\text{cm}^3$. Calculate the total height of the object. [5]

Examiner only



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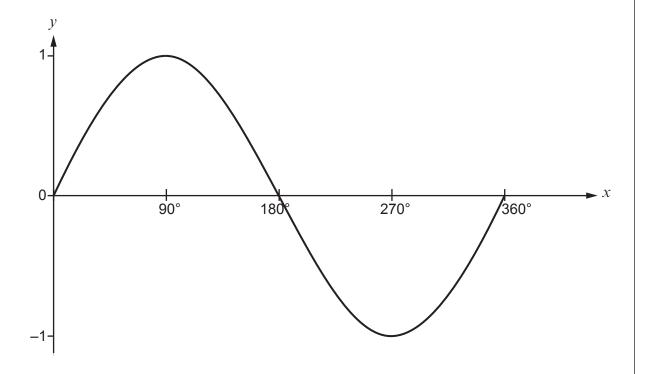
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(a)	are given that $c = \sqrt{1}$ e the correct answer c is equal to	iii cacii Oi lile	ioliowing.			[1]
• •		3√2	4.5	9	9√2	
(b)	$\frac{d}{e}$ is equal to					[1]
	1/2	√2	2	√6	4	
(c)	e^5 is equal to					[1]
	√15	5	5√3	9√3	15	

Examiner only

[2]

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



Given that $\sin 38^\circ = 0.6157$, correct to 4 decimal places, write down all the solutions of the equation

$$\sin x = -0.6157$$

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for values of x from 0° to 360°.

only



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