Surname	Centre Number	Candidate Number
First name(s)		0



GCSE

C300UB0-1



FRIDAY, 10 NOVEMBER 2023 – MORNING

MATHEMATICS – Component 2 Calculator-Allowed Mathematics HIGHER TIER

2 hours 15 minutes

ADDITIONAL MATERIALS

An additional formulae sheet.

A calculator will be required for this examination.

A ruler, 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(s) at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.142 or use the π button on your calculator.

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.

You are reminded of the need for good English and orderly, clear presentation in your answers.



For Examiner's use only					
Question	Maximum Mark	Mark Awarded			
1.	3				
2.	4				
3.	5				
4.	5				
5.	8				
6.	4				
7.	6				
8.	7				
9.	6				
10.	2				
11.	4				
12.	2				
13.	10				
14.	5				
15.	4				
16.	6				
17.	4				
18.	5				
19.	7				
20.	9				
21.	5				
22.	6				
23.	3				
Total	120				

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Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone = πrl Surface area of a sphere = $4\pi r^2$ Volume of a sphere = $\frac{4}{3}\pi r^3$ Volume of a cone = $\frac{1}{3}\pi r^2h$

Kinematics formulae

Where *a* is constant acceleration, *u* is initial velocity, *v* is final velocity, *s* is displacement from the position when t = 0 and *t* is time taken:

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



C300UB01 03

1.	Shor Thei	tbread biscuits are made from flour, butter and sugar. r masses are in the ratio 4 : 3 : 2 respectively.	E	Examiner only
	(a)	What fraction of a shortbread biscuit is made up of sugar?	[1]	
	(b)	1400g of flour is used to make a batch of shortbread biscuits. How many grams of butter is used for this batch of shortbread biscuits?	[2]	
		g of butter.		
				č



	Ex
Lucy bought a car 9 years ago for £12250.	
The car depreciated in value by 18% in the first year. In each of the following years, her car depreciated by 15% of its previous year's value.	
By how much has the car decreased in value in the last 9 years? [4	F]
Lucy's car has decreased in value by	

Examiner only

[4]

C300UB01 05

Regan c He meas	aught 70 fish on a fishing trip. sured the length of each of the fish i	n centimetres.
The tabl	e shows his results.	
	Length, <i>l</i> (centimetres)	Number of fish
	60 ≤ <i>l</i> < 65	19
	65 <i>≤ l</i> < 70	17
	70 <i>≤ l<</i> 75	23
	75 <i>≤ l</i> < 80	10
	80 <i>≤ l</i> < 85	1
(a) Ca	alculate an estimate for the mean le	ngth of these fish.
••••••		

Regan thinks that the median length of fish is in the group 70 $\leq l <$ 75. Is Regan correct? Yes No Give the reason for your answer. [1]



(b)





(b)	Jan cuts out the maximum number of circles from the card. What area of card is left over?	[4]	Examiner only
.			
	Area of card left over		
			00UB01
			C 30
]







09





	n is a jewellery maker. Special o 5% disco	ffer unt
(a)	He pays £1451.60 for a silver bar after a 5% discount has been applied. What was the original cost of the silver bar?	[3]
(u)	The silver bar is in the shape of a cuboid and has the following dimensions.	
	length 8·1 cm, width 7·3 cm and depth 4 cm. Bjorn melts down the silver bar and uses the silver to make 200 identical pieces o iewellery.	f
	length 8·1 cm, width 7·3 cm and depth 4 cm. Bjorn melts down the silver bar and uses the silver to make 200 identical pieces o jewellery. The density of silver is 10·49 g/cm ³ .	f
	 length 8·1 cm, width 7·3 cm and depth 4 cm. Bjorn melts down the silver bar and uses the silver to make 200 identical pieces of jewellery. The density of silver is 10·49 g/cm³. Calculate the mass of each piece of jewellery. Give your answer in grams. 	f [4]
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Examiner only

9. The diagram below shows a scale drawing of Amy's garden. The garden is enclosed by a fence, a patio, a hedge, and a wall. In Amy's garden there is a tap, a bird house and a water feature.

Scale: $\frac{1}{2}$ cm represents 1 metre





13 Examiner only **10.** Make *e* the subject of the formula. [2] g = 4e - 3f**11.** Some boxes of medicine must be stored on shelves in a refrigerator. The vertical height between the shelves is 38 cm, correct to the nearest cm. 7 identical boxes of medicine are stacked on top of each other on one shelf. C300UB01 13 Each box of medicine has a height of 45 mm, correct to the nearest mm. What is the largest possible gap between the top of this stack of boxes and the shelf above? [4] The largest possible gap is



		Examiner
12.	The equation $2x^3 - 3x^2 - 2 = 0$ has only one positive solution.	Offiy
	Akriti savs.	
	The positive solution lies between 1.81 and 1.82.	
	Is Akriti correct?	
	Yes No	
	Show calculations and explain your decision. [2]	
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Cody	randomly selects one sweet at a time and eats it.	
(a)	Calculate the probability that the first two sweets Cody eats are red.	[2]
(b)	Calculate the probability that the first two sweets Cody eats are the same colour.	[2]
•••••		







FI	rede	rick has a circular watch.	0
(a)	The hour hand has a length of 11 mm. Find the area of the sector covered by the hour hand as it moves through an angle of 131°. [2]	
(b)	The minute hand of the watch has a length of y mm. How far does the tip of the minute hand move in 21 minutes? Give your expression in its simplest form in terms of π and y . [2]	



mech	nanics, m , working that day.	
f the	re are 3 mechanics working, the waiting time is 38 minutes.	
(a)	Find a formula for <i>t</i> in terms of <i>m</i> .	[3]
(b)	The garage wants to reduce the waiting time to no more than 12 minutes.	
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Question number	Additional page, if required. Write the question number(s) in the left-hand margin.	Examine only



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