

Surname	Centre Number	Candidate Number
First name(s)		0



GCSE

3300U60-1



WEDNESDAY, 16 NOVEMBER 2022 – MORNING

**MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
HIGHER TIER**

1 hour 45 minutes

ADDITIONAL MATERIALS

A calculator will be required for 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 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.

In question 4, the assessment will take into account the quality of your organisation, communication and accuracy in writing.

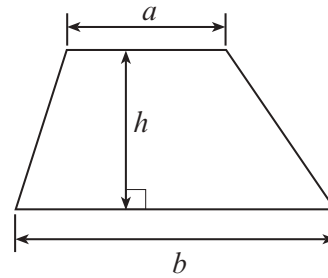
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	4	
3.	5	
4.	9	
5.	3	
6.	3	
7.	2	
8.	5	
9.	4	
10.	4	
11.	3	
12.	3	
13.	4	
14.	4	
15.	1	
16.	3	
17.	1	
18.	5	
19.	5	
20.	8	
Total	80	



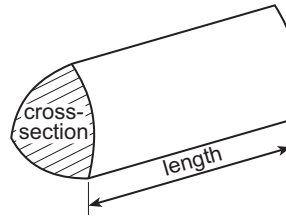
NOV223300U60101

Formula List – Higher Tier

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

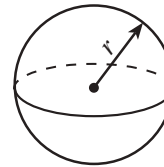


Volume of prism = area of cross-section \times length



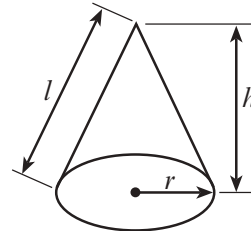
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

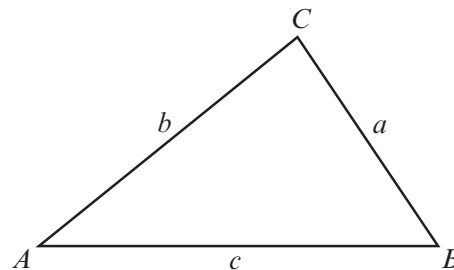


In any triangle ABC

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.



5. Calculate the length of the side YZ in the triangle XYZ shown below.

[3]

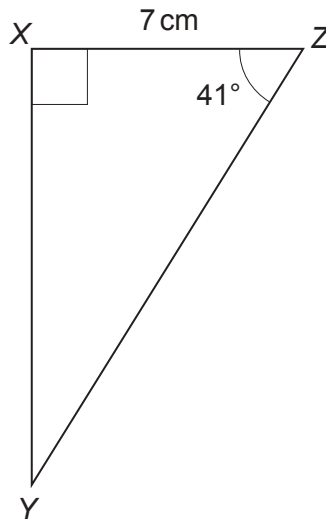


Diagram not drawn to scale

.....

.....

.....

.....

.....

.....

.....

.....

.....



6. Two times are recorded correct to the **nearest 0.1 second**.

12.4 seconds
25.5 seconds

Calculate the greatest possible difference between these times.

[3]

.....

.....

.....

.....

.....

.....

.....

7. A number has been increased by 60% to give an answer of 64.
What was the original number?

[2]

.....

.....

.....

.....

.....

.....

.....



10. (a) Expand and simplify $(2h + 3t)(5h - 7t)$.

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) Simplify $\frac{7(d+5)^8}{(d+5)^{-2}}$.

[1]

.....

.....

.....

.....

.....

.....



11. A cone is joined to a hemisphere, as shown below.
The cone has a base radius of 8 cm and a slant height of 17 cm.
The hemisphere has the same radius as the cone.
Calculate the **surface area** of the composite solid.

[3]

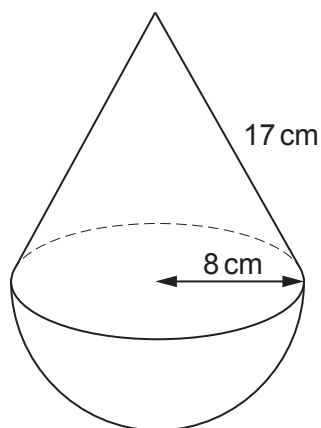


Diagram not drawn to scale

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....



14. DE is the tangent to the circle at point A , as shown below.

$BC = 7\text{ cm}$ and $AC = 13\text{ cm}$.

$\widehat{BAD} = 68^\circ$ and $\widehat{CAE} = 80^\circ$.

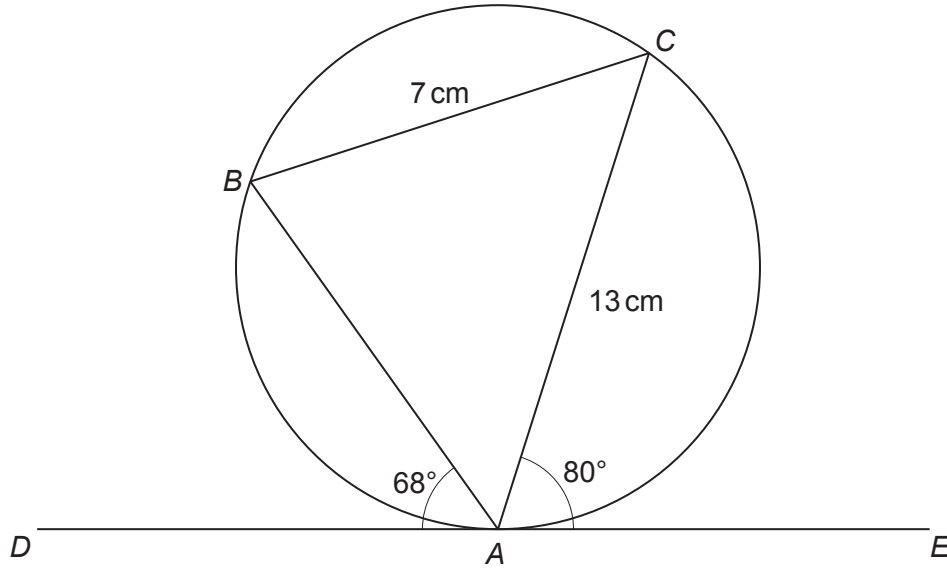


Diagram not drawn to scale

- (a) Find the size of \widehat{ACB} .
State the angle property you have used to find your answer. [2]

.....

.....

.....

- (b) Calculate the area of the triangle ABC . [2]

.....

.....

.....

.....

.....

.....

.....

.....

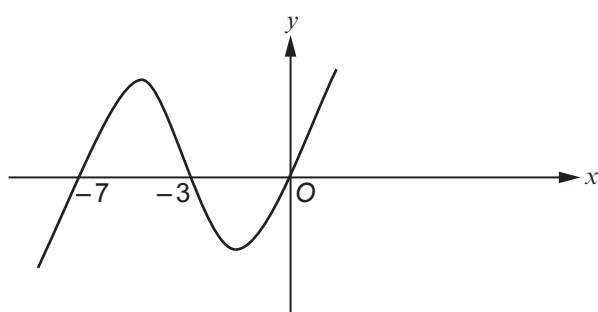
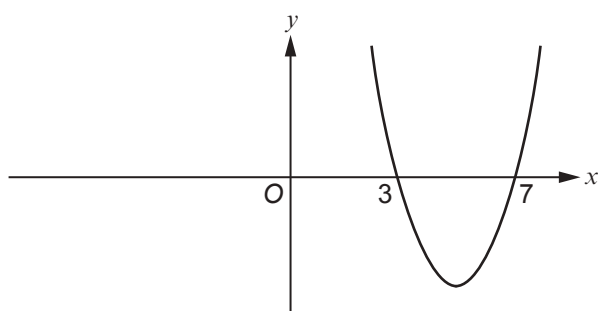
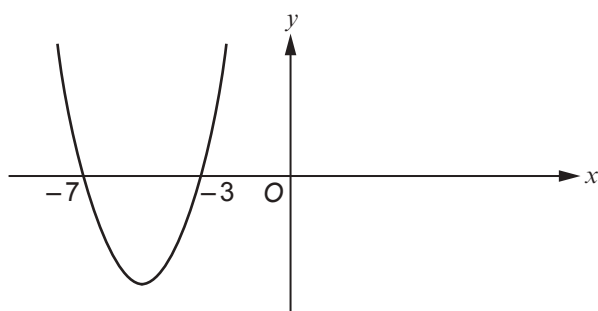
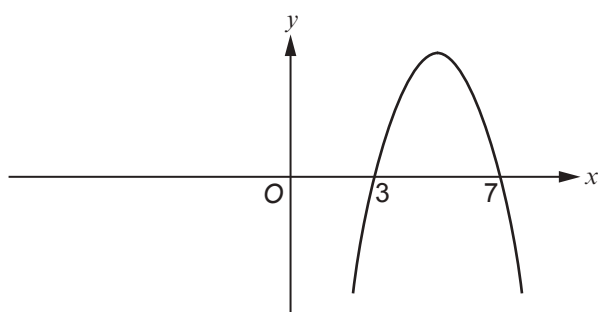
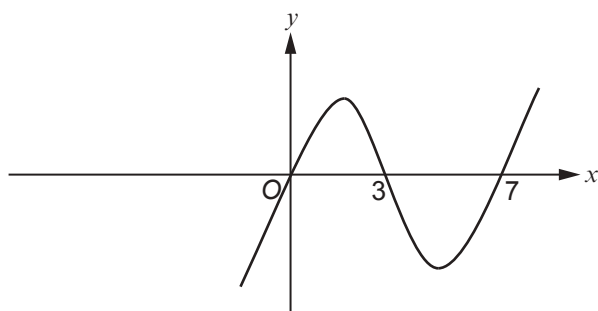
.....

.....



17. The equation $y = (x-3)(x-7)$ describes only **one** of the graphs below.
Put a tick (✓) in the box next to the graph that correctly shows this equation.

[1]



18. The following nine cards are placed in a box.



Catherine chooses **three** cards at random from the box, without replacement.

- (a) Calculate the probability that the three cards drawn show the letters 'A', 'F' and 'O' in that order. [2]

.....

.....

.....

.....

.....

.....

.....

.....

- (b) Calculate the probability that two of the three cards show the same letter. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....



19. Make c the subject of the following formula.

[5]

$$a(b+c^2)+d(e-c^2)=f$$

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

20. The diagram shows a triangle ABC and a circle with centre C .
The points B and D lie on the circumference of the circle.

The length of the line AB is 19 cm.
The length of the line AC is 29 cm.
The radius of the circle is x cm.

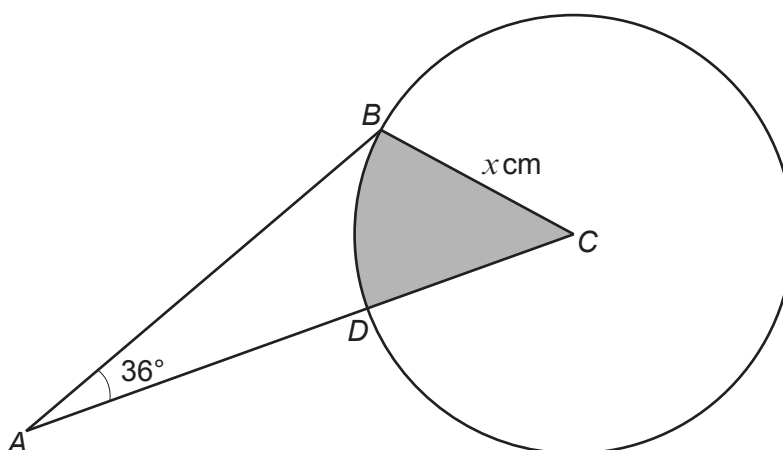


Diagram not drawn to scale



