Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3300U40-1

A20-3300U40-1

WEDNESDAY, 11 NOVEMBER 2020 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

1 hour 45 minutes

ADDITIONAL MATERIALS

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 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 **9**, 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.	**7**	
2.	**4**	
3.	**4**	
4.	**4**	
5.	**4**	
6.	**6**	
7.	**3**	
8.	**2**	
9.	**7**	
10.	**4**	
11.	**5**	
12.	**4**	
13.	**2**	
14.	**4**	
15.	**5**	
16.	**2**	
17.	**3**	
18.	**4**	
19.	**6**	
Total	**80**	

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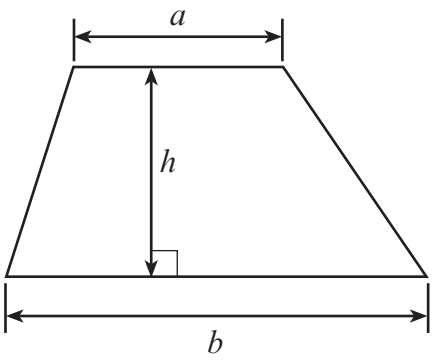
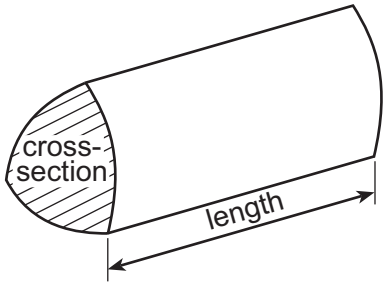
Formula List – Intermediate Tier

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



Volume of prism = area of cross-section × length



Examiner only

1. *(a)* (i) Evaluate $\frac{1}{0{\cdot}25^2}$. [1]

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(ii) Evaluate $5{\cdot}4^3 \times 3{\cdot}7^2$.
Give your answer correct to the nearest 10. [2]

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(b) Find 62% of 7·8. [2]

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(c) (i) Which one of the following numbers is a multiple of 19?
Circle your answer. [1]

91 151 199 219 247

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(ii) Which one of the following numbers is a cube number?
Circle your answer. [1]

1197 2197 3197 4197 5197

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2. *(a)* Write down the next two numbers in the following sequence. [2]

50 39 28 17 ....

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(b) Use the formula $x = 4a + 3b$ to find the value of x when $a = 7{\cdot}2$ and $b = -4{\cdot}6$. [2]

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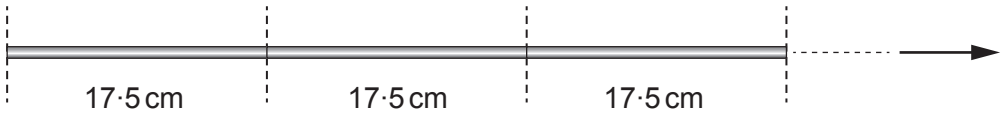
3. Identical rods can be placed end to end, as shown below.
Each rod is 17·5 cm long.



How many of these rods can be placed, in this way, between two points 4 metres apart? [4]

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Number of rods = ...

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4. A game uses 15 coloured cards.
There are:

- 5 red (R) cards numbered 1 to 5,
- 5 yellow (Y) cards numbered 1 to 5,
- 5 pink (P) cards numbered 1 to 5.

The cards are all placed in a box.
One card is chosen at random from the box.

(a) The grid below is used to show all the possible outcomes.
Fill in **all** the spaces with a label or an outcome.
Some of the spaces have already been filled in. [2]

		Number				
Colour						
				Y3		
	Pink					

(b) What is the probability that the card chosen at random is a pink card showing a number greater than 3? [2]

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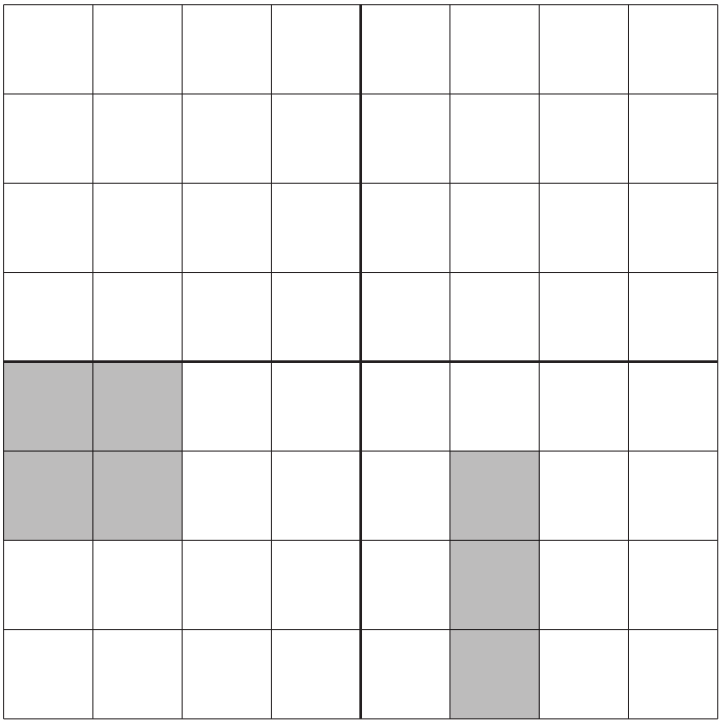
5. *(a)* Shade the least number of squares so that the grid has rotational symmetry of order 2. The squares you shade must be in the upper two quadrants. [2]



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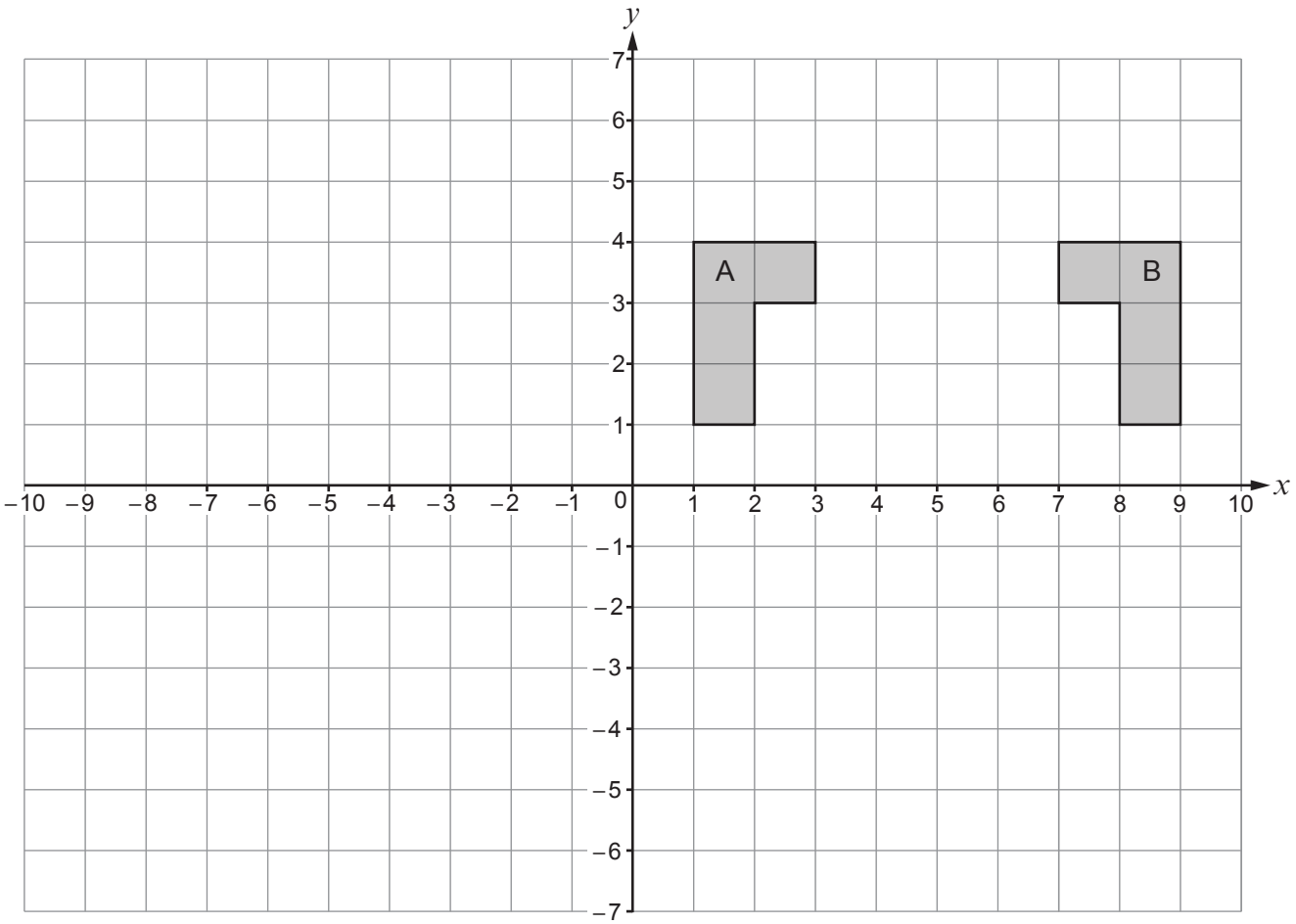
(b) Describe fully the **single** transformation that transforms shape A onto shape B. [2]



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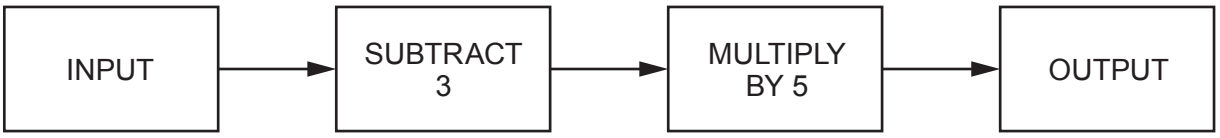
6. *(a)* Solve $5(2x + 3) = 20$. [3]

(b) Factorise $7a + 21$. [1]

(c) A number machine is shown below.



Write down an expression for the OUTPUT when the INPUT is n. [2]

Examiner only

7. *(a)* Is it possible for an isosceles triangle to have an angle of 140°?
Circle your answer.
You **must** give an explanation for your answer. [1]

YES NO

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(b) Is it possible for a rhombus to have an angle of 120° and an angle of 30°?
Circle your answer.
You **must** give an explanation for your answer. [1]

YES NO

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(c)

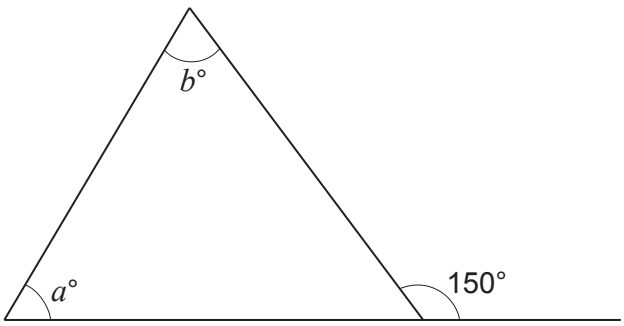

Diagram not drawn to scale

Which of the following equations is correct for the diagram shown above?
Circle your answer. [1]

$a + b = 30$ $a + b = 210$ $b - a = 150$

$a - b = 150$ $a + b = 150$

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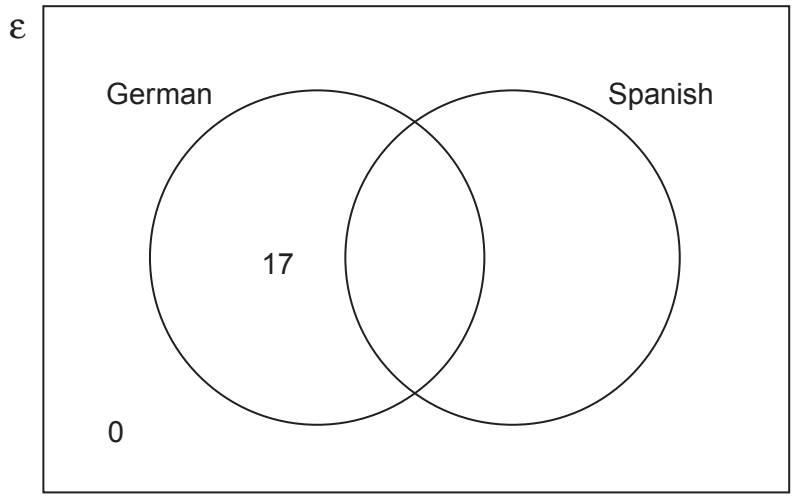
8. Each of 30 students studies German, Spanish or both languages.

A student is chosen at random.
The probability that the student studies both German and Spanish is $\frac{1}{3}$.

Complete the Venn diagram. [2]



Space for working:

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

In the diagram below, *ABCD* is a rectangle with *AB* = 5 cm.
ABP is a quarter of a circle with centre *A*.
AP = *PD*.

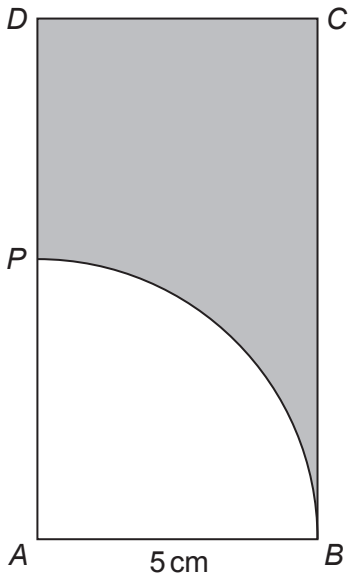

Diagram not drawn to scale

Calculate the area of the shaded section shown above.
You must show all your working. [5 + 2 OCW]

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10. *(a)* Caryl has two fair dice.

Dice A is a cube. It shows the numbers 1 to 6.
Dice B is a tetrahedron. It shows the numbers 1 to 4.

Caryl throws both dice.

What is the probability that she throws a 5 on dice A and a 3 on dice B? [2]

(b) Asif has a biased four-sided dice.
The dice shows the numbers 10, 20, 30 and 40.

Asif throws the dice once.

The table below gives the probability of obtaining each number.

Number	10	20	30	40
Probability	$\frac{1}{2}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{10}$

What is the probability that Asif throws a 30 or a 40? [2]

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11. The diagram shows two right-angled triangles, joined together along a common side.
AB = 10·8 cm, *BC* = 14·4 cm and *CD* = 24 cm.

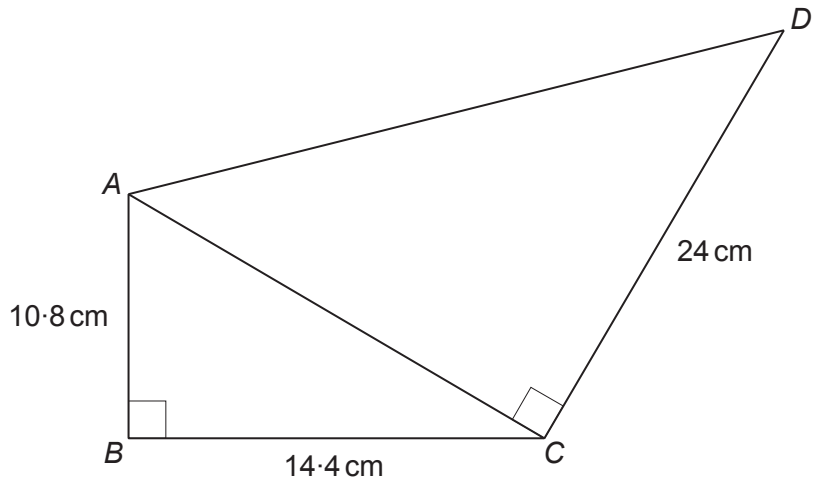

Diagram not drawn to scale

Calculate the area of triangle *ACD*.
You must show all your working. [5]

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12. A solution of the equation

$$x^3 - 5x - 350 = 0$$

lies between 7·2 and 7·3.

Use the method of trial and improvement to find this solution correct to 2 decimal places. You must show all your working. [4]

Examiner only

13. *(a)* Which one of the following options describes $2x + 5y$?
Circle your answer. [1]

an equation a formula an expression

an inequality none of these

(b) Which one of the following options describes $3x - 2 = 7$?
Circle your answer. [1]

an equation a formula an expression

an inequality none of these

14. Data for different values of t are shown in the table below.

t	Frequency
$0 \leqslant t < 5$	8
$5 \leqslant t < 10$	0
$10 \leqslant t < 15$	7
$15 \leqslant t < 20$	5

Calculate an estimate for the mean value of t. [4]

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Examiner only

15. In the diagram below, *AB*, *BC* and *CD* are three sides of a **regular polygon**.
The polygon has 15 sides.
The length of each side is 8 cm.

The exterior angle of the polygon is $x°$.
BRC is a right-angled triangle.

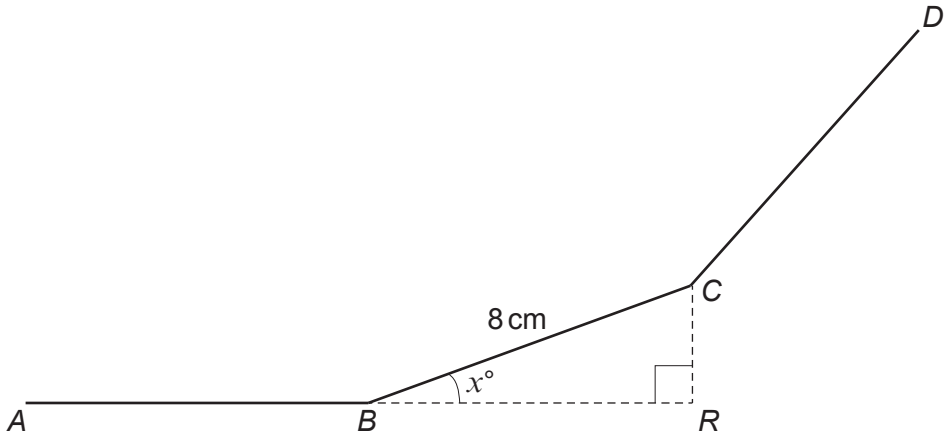

Diagram not drawn to scale

Calculate the length of *BR*. [5]

Examiner only

16. Calculate the value of $(3{\cdot}2 \times 10^{7}) \times (8{\cdot}3 \times 10^{-2})$.
Give your answer in standard form. [2]

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17. The lengths of the sides of a rectangle are given as 24 cm and 15 cm.
Each measurement is given correct to the nearest centimetre.

Calculate the difference between the greatest possible perimeter of the rectangle and the least possible perimeter of the rectangle. [3]

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Examiner only

18. Solve the following simultaneous equations using an algebraic (not graphical) method.

$$3x - 2y = 14$$
$$7x + 3y = 25$$

You **must** show all your working. [4]

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19. The diagram below shows a circle with centre at point *O*.
A, *B*, *C* and *D* are all points on the circumference of the circle.

AB = 7·5 cm and *BC* = 4·7 cm.

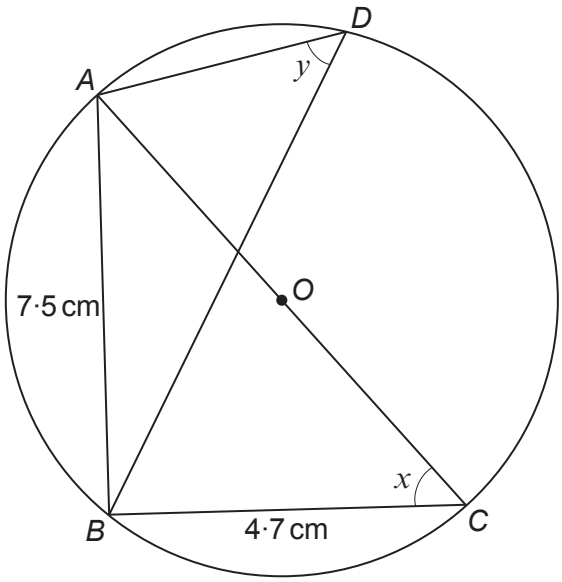

Diagram not drawn to scale

(a) (i) Give the reason why $\hat{ABC}$ is 90°. [1]

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(ii) Calculate the size of angle x. [3]

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(b) Write down the size of angle y.
State the circle theorem you have used to find your answer. [2]

y = ...

Circle theorem used: .....

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END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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