Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3300U20-1

Z22-3300U20-1

TUESDAY, 14 JUNE 2022 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
FOUNDATION TIER

1 hour 25 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 **11**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication, and accuracy of writing.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**2**	
2.	**2**	
3.	**3**	
4.	**3**	
5.	**3**	
6.	**4**	
7.	**3**	
8.	**4**	
9.	**1**	
10.	**2**	
11.	**5**	
12.	**4**	
13.	**6**	
14.	**8**	
15.	**5**	
16.	**2**	
17.	**3**	
Total	**60**	

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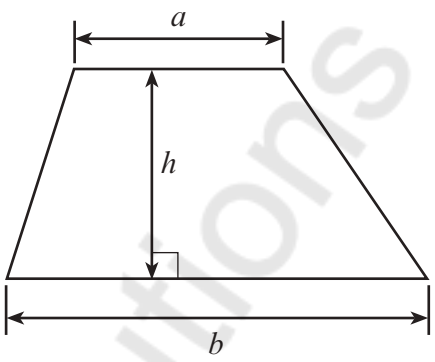
Formula List – Foundation Tier

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



Examiner only

1. (a) Write the number sixty-five thousand and eleven in figures. [1]

65,011

(b) Write the number 5 006 403 in words. [1]

Five million six thousand four hundred and three

2. Use one of the symbols **<** , **>** or **=** to make each of the following statements correct.
The first one has been completed for you. [2]

75 + 7	>	68
45 × 23	<	1050
3552 ÷ 48	=	74
1018	<	2038 ÷ 2

Space for working:

45 × 23 = 1035

3552 ÷ 48 = 74

2038 ÷ 2 = 1019

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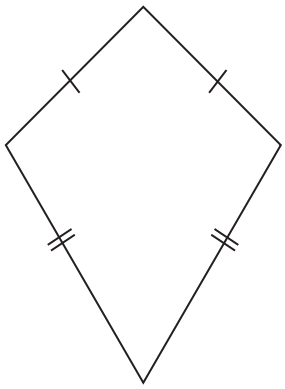
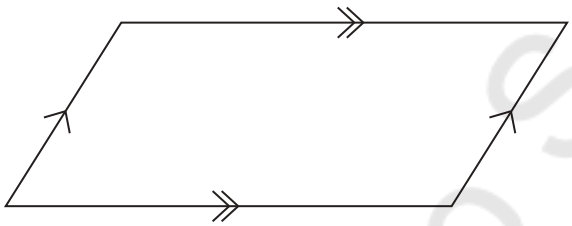
3. (a) Write down the special name of each of the following shapes.

(i)



Kite [1]

(ii)



Parallelogram [1]

(b) Write down the special name of the 3D shape below. [1]

Sphere

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4. (a) Write down the first 4 multiples of 48. [1]

48 96 144 192

(b) Circle the prime number below. [1]

3 4 6 8 9

(c) A number has **exactly** four factors.
Its factors are 1, 3, 13 and the number itself.
What is the number? [1]

39

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5. (a) Elaine writes down two square numbers.

She subtracts the smaller square number from the larger square number.
Her answer is 9.

Which two square numbers did Elaine write down? [2]

x^2 y^2

$y^2 - x^2 = 9$

$y=3 : x=2 \neq 9 \parallel y=4 : x=3 \neq 9$

$y=5 : x=4 \Rightarrow 5^2 - 4^2 = 9$

Elaine's square numbers are 25 and 16

(b) Dylan adds two odd numbers together and gets an answer of 37.

Could Dylan's answer be correct?

Yes ☐ No ☑ Can't tell ☐

Explain your reasoning. [1]

Reasoning: It takes an odd number to be added to an even number to make an odd number

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6. (a) What is the special name given to the perimeter of a circle?
Circle the correct answer. [1]

diameter radius chord tangent circumference

(b) One of the following angles is a reflex angle.
Circle the correct answer. [1]

70° 170° 270° 370° 470°

(c) The diagram below shows two angles on a straight line.
The larger angle is 30° greater than the smaller angle.
Find the size of each angle. [2]

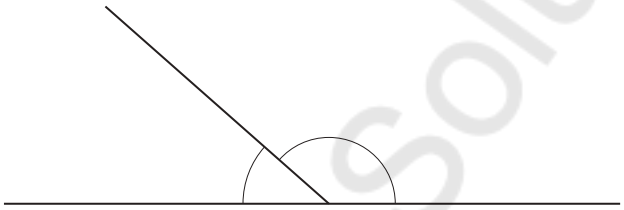

Diagram not drawn to scale

$x : x + (x + 30) = 180$

$2x + 30 = 180$

$x = (180 - 30) \div 2 \Rightarrow 75$

$75 + 30 = 105°$

Smaller angle = 75 ° Larger angle = 105 °

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7. (a) Describe **in words** the rule for continuing the sequence below. [1]

79, 65, 51, 37, ...

Rule:

Subtract fourteen from the previous term

(b) Write down the next term in the sequence below. [1]

46, 92, 184, 368, 736

(c) Adrian has n grapes. He eats 4 of them.
Write down, in terms of n, the total number of grapes Adrian now has. [1]

$n - 4$ grapes

8. Complete the table below so that each row will show equivalent fractions, decimals and percentages.
The first row has been completed for you. [4]

Fraction	Decimal	Percentage
$\frac{1}{4}$	0·25	25%
$\frac{7}{10}$	0.7	70 %
$\frac{1}{20}$	0.05	5%

9. Find $\sqrt{11{\cdot}56} + 2{\cdot}5^2$. [1]

$3.4 + 2.5^2 \rightarrow 3.4 + 6.25$
$= 9.65$

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10. Use the formula $W = 7X + 2Y$ to find the value of W when $X = 35$ and $Y = 29$. [2]

$W = 7(35) + 2(29)$

$= 245 + 58 = 303$

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

Geraint writes down three different **even** numbers.

The smallest number is $\frac{3}{5}$ of 200.

The range of his numbers is 4.

Which three different **even** numbers did Geraint write down?
You must show all your working. [3 + 2 OCW]

Smallest: $3/5 \times 200 \Rightarrow 120$

Largest: $120 + 4 \Rightarrow 124$

Middle no. $= 122$

$\Rightarrow 120, 122, 124$

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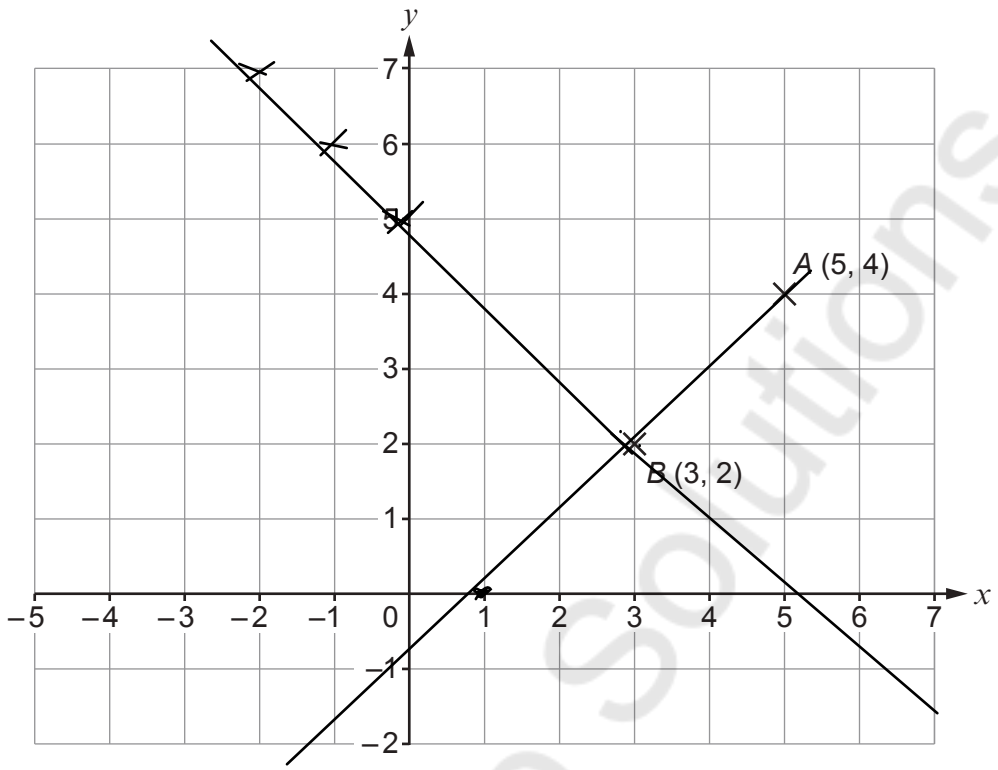
12.



(a) *B* is the midpoint of the line *AC*.
Find the coordinates of *C*. [2]

.....

.....

C (1 , 0)

(b) *A* and *B* are two vertices of a right-angled triangle.
Point *D* is to be plotted on the grid above so that the triangle *ABD* is a right-angled triangle.
The x-coordinate of *D* is negative.
Give the coordinates of a possible position of the point *D* that can be plotted on the grid above. [2]

.....

.....

D (−2 , 7)

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13. By first expressing all the amounts below in litres, calculate the mean of the three amounts. [6]

1·25 litres 2·73 pints 1615 ml

2·73 pints ÷ 1·75 = 1·56 litres

1615 ml ÷ 1000 = 1·615 ml

(1·25 + 1·56 + 1·615) ÷ 3
⇒ 1·475 litres

1·25 litres	2·73 pints ≈ 1·56 litres	1615 ml = 1·615 litres

Mean of the three amounts = 1·475 litres

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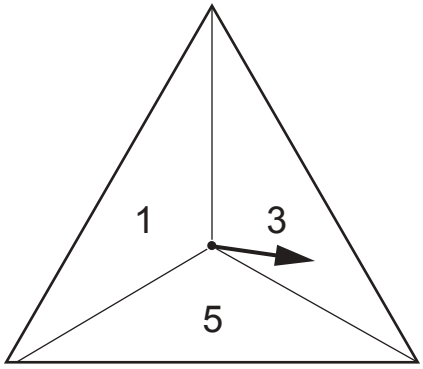
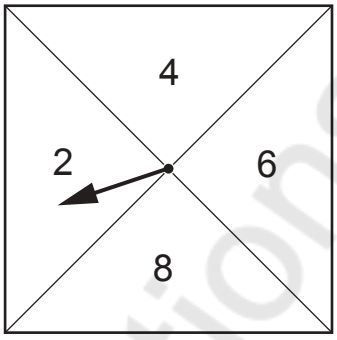
14.



Triangular spinner



Square spinner

Two fair spinners are shown in the diagram above.
In a game, the two spinners are spun.

The two numbers obtained are multiplied together to get a score.
For example, in the diagram above, the score is 6 because $3 \times 2 = 6$.

Some of the scores are shown in the table below.

Triangular spinner \ Square spinner	**2**	**4**	**6**	**8**
1	2	4	6	8
3	6	12	18	24
5	10	20	30	40

(a) Complete the table to show all the possible scores. [1]

(b) Explain why all the scores are even numbers. [1]

Odd × even = even

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(c) What is the probability that a person gets a score of 10 or more when playing the game once? [2]

$\frac{7}{12}$

(d) Players are charged £2.50 to play the game once.
Each player who gets a score of 10 or more wins £3.50.
How much profit would you expect to make when 228 people each play the game once?
You must show all your working. [4]

Amt. taken = 228 × £2.50 = £570

Expected winners = $\frac{7}{12} \times 228 = 133$

Exp. prize money = 133 × £3.50
= £465.5

Exp. profit = 570 − 465.5
= £104.5 //

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15. The length of a rectangle is double its width.
The area of the rectangle is greater than 60 cm^2.
The perimeter of the rectangle is less than 40 cm.

Give a possible width and length of the rectangle.
Calculate the area and the perimeter of this rectangle.
You must show all your working.

Use the answer spaces to clearly identify which is the area and which is the perimeter. [5]

$L = 2w$: $A = L \times w > 60$

$A = 2w \times w > 60 \Rightarrow 2w^2 > 60$

$P = 2(\text{length} + \text{width}) < 40$

$= 2(2w + w) < 40 \Rightarrow 6w < 40$

$A: w^2 > 60 \Rightarrow w > \sqrt{60} \Rightarrow w > 5.48$

$P: 6w < 40 \Rightarrow w < 40/6 \Rightarrow w < 6.67$

$\Rightarrow 5.48 < w < 6.67$

$w = 6$

$L = 2w = 2 \times 6 = 12$

$A = 72 \ (6 \times 12)$

$P = 2(6 + 12) \Rightarrow 36 cm$

Width = 6 cm Length = 12 cm

Area = 72 cm^2 Perimeter = 36 cm

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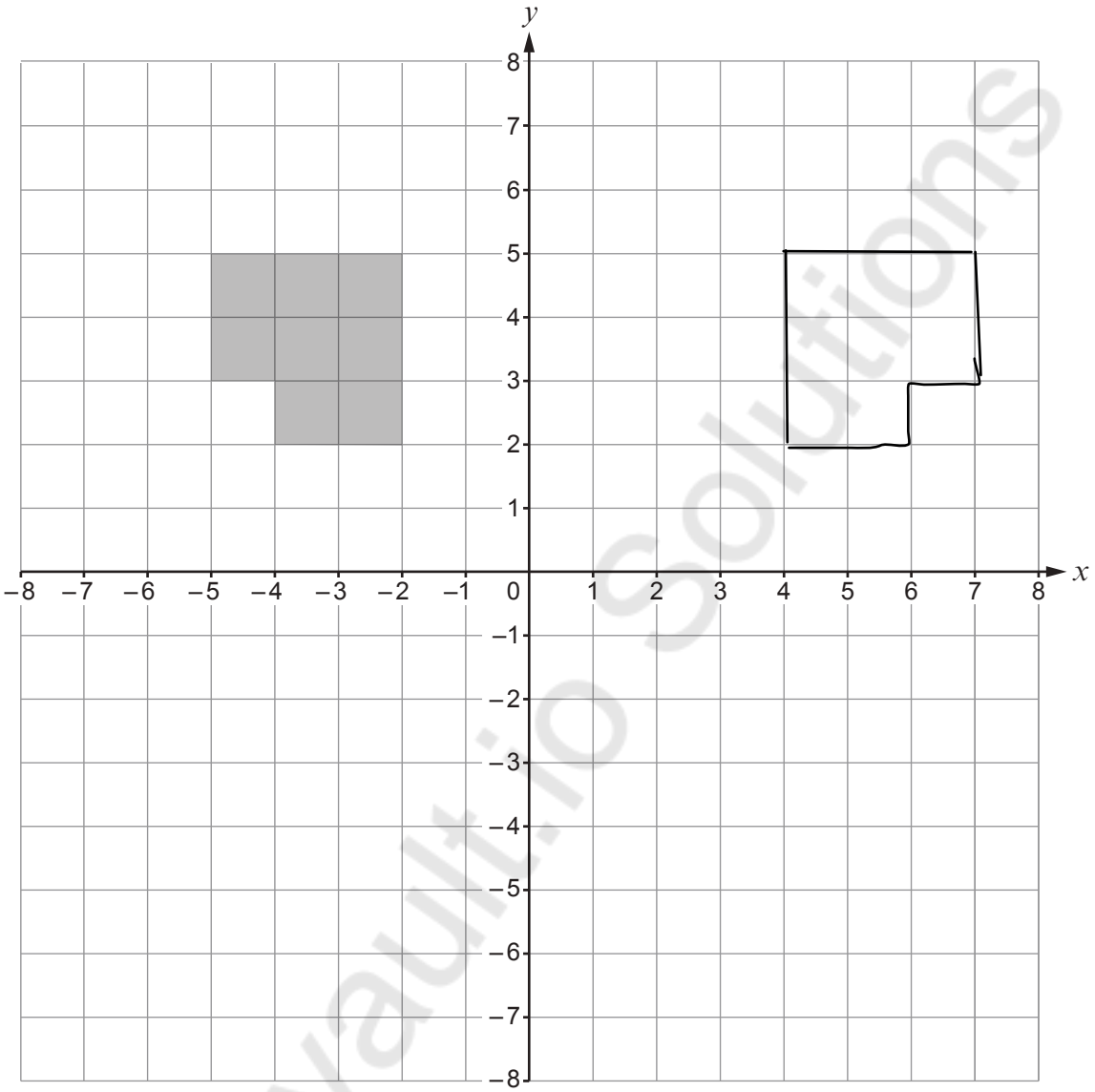
16. Reflect the shape below in the line $x = 1$. [2]



17. A car travels 129·5 miles in 3 hours 30 minutes.
Calculate the average speed of the car.
Give your answer in miles per hour. [3]

129·5 miles ÷ 3·5 hrs
⇒ 37 miles per hour //

END OF PAPER

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

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