

Surname <i>StemUp Model Solution</i>	Centre Number	Candidate Number
First name(s)		0



GCSE

3300U20-1



A20-3300U20-1

WEDNESDAY, 11 NOVEMBER 2020 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
FOUNDATION TIER

1 hour 30 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.	4	
2.	4	
3.	3	
4.	3	
5.	2	
6.	3	
7.	4	
8.	4	
9.	5	
10.	7	
11.	4	
12.	4	
13.	4	
14.	5	
15.	2	
16.	2	
17.	5	
Total	65	

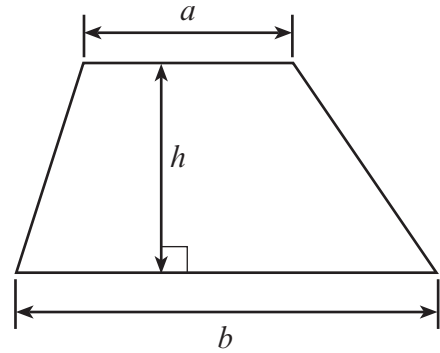
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Formula List – Foundation Tier

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



1. Fill in the boxes below to make each calculation correct.

[4]

$$\boxed{\text{£}1.63} + \boxed{35\text{p}} = \boxed{\text{£ } 1.98}$$

$$\boxed{\text{£}1.73} + \boxed{53 \text{ p}} = \boxed{\text{£}2.26}$$

$$\boxed{7} \times \boxed{84\text{p}} = \boxed{\text{£ } 5.88}$$

$$\boxed{17} \times \boxed{\text{£ } 0.41} = \boxed{\text{£}6.97}$$

Space for working:

$$\text{£}1.63 + \text{£}0.35 = \text{£}1.98$$

$$\text{£}2.26 - \text{£}1.73 = \text{£}0.53 = 53\text{p}$$

$$7 \times 84\text{p} = 588\text{p} = \text{£}5.88$$

$$\text{£}6.97 \div 17 = \text{£}0.41$$



2. (a) Write the number three million, seven hundred thousand in figures. [1]

3 700 000

- (b) In the boxes below, write the largest possible four-digit **even** number.
You may use digits more than once. [1]

9	9	9	8
---	---	---	---

9998 (largest digit 9, last digit must be even so 8)

- (c) Write down all the factors of 15. [2]

15 = 1 × 15

15 = 3 × 5

The factors of 15 are *1, 3, 5 and 15*



3. (a) Circle the best expression from those below to describe the chance of it snowing in Swansea on 1st May next year. [1]

impossible

unlikely

an even chance

likely

certain

- (b) Dyfrig has a bag containing identically-sized coloured balls. There are ten black balls and ten green balls in the bag.

Dyfrig adds red balls to the bag.

Now, when Dyfrig selects a ball at random, there is an even chance of selecting a red ball.

How many red balls did Dyfrig add to the bag? [1]

For an even chance, red balls = black + green = 10 + 10

= 20 red balls

- (c) A fair six-sided dice is rolled and a fair coin is thrown. Which of the following events is least likely to occur? Circle the correct answer. [1]

Rolling a 1 on the dice

Getting a head on the coin

Rolling an odd number on the dice

Getting a tail on the coin

Rolling a prime number on the dice

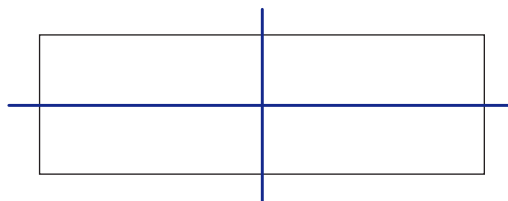
Space for working:

$$P(1) = 1/6 \quad P(\text{head}) = 1/2 \quad P(\text{odd}) = 3/6$$

$$P(\text{tail}) = 1/2 \quad P(\text{prime: 2, 3, 5}) = 3/6$$

1/6 is the smallest, so rolling a 1 is least likely.

4. (a) Draw all the lines of symmetry on the rectangle below. [2]



- (b) What is the special name given to a triangle that has three lines of symmetry? [1]

Equilateral triangle



5. In this question, you must complete the boxes using **only** the digits 0, 1 and 2. In each part, you must use **all three** of the digits.

(a) Write the size of an angle which is an obtuse angle.

[1]

1	2	0	°
---	---	---	---

(b) Write the size of an angle which is a reflex angle.

[1]

2	1	0	°
---	---	---	---

6. Kate writes down three **different even** numbers.

The mean of Kate's numbers is 8.
She did **not** write down the number 8.

What possible even numbers could Kate have written down?

[3]

Mean = 8, so total of the three numbers = $3 \times 8 = 24$

Three different even numbers, not including 8, adding to 24:

$2 + 4 + 18 = 24$

Check: mean = $24 \div 3 = 8$

Possible numbers Kate could have written are 2, 4 and 18



7. (a) Calculate $\frac{\sqrt{0.9216}}{8}$. [1]

$$\sqrt{0.9216} = 0.96$$

$$0.96 \div 8 = 0.12$$

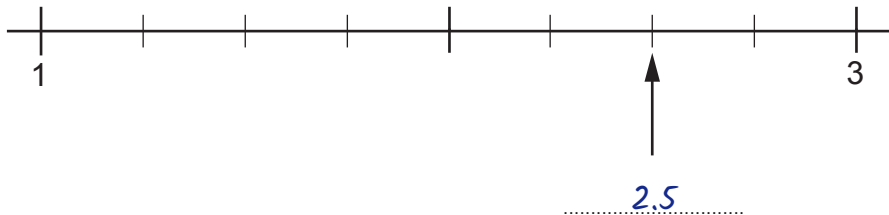
- (b) Calculate $\frac{3}{5}$ of 632.

Write your answer as a decimal. [2]

$$632 \div 5 \times 3 = 126.4 \times 3$$

$$= 379.2$$

- (c) A number line is shown below.
To which number is the arrow pointing? [1]



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%
$\frac{3}{10}$	0.3	30%
$\frac{9}{20}$	0.45	45%



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

Two friends are making cuboids out of centimetre cubes.
Gareth's cuboid is shown below.

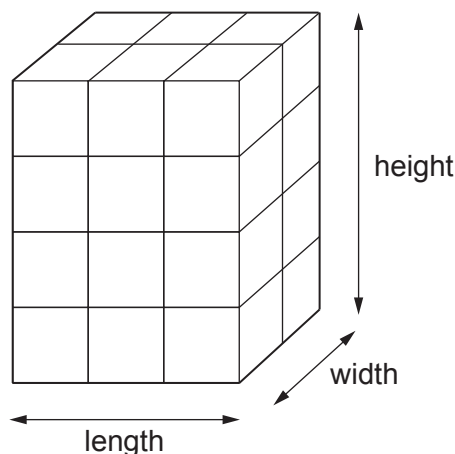


Diagram not drawn to scale

Ivy makes a different cuboid. Her cuboid has:

- the same length as Gareth's cuboid,
- a width six times the width of Gareth's cuboid,
- a height five times the height of Gareth's cuboid.

What is the volume of Ivy's cuboid?

You must show all your working.

[3 + 2 OCW]

Gareth's cuboid: length = 3 cm, width = 2 cm, height = 4 cm

Ivy's cuboid:

Length = 3 cm (same as Gareth's)

Width = $6 \times 2 = 12$ cm

Height = $5 \times 4 = 20$ cm

Volume = length $\times$ width $\times$ height

Volume of Ivy's cuboid = $3 \times 12 \times 20$

= 720 cm^3

Therefore the volume of Ivy's cuboid is 720 cm^3 .



10. (a) (i) Evaluate $\frac{1}{0.25^2}$. [1]

$$0.25^2 = 0.0625$$

$$1 \div 0.0625 = 16$$

- (ii) Evaluate $5.4^3 \times 3.7^2$.
Give your answer correct to the nearest 10. [2]

$$5.4^3 = 157.464 \quad 3.7^2 = 13.69$$

$$157.464 \times 13.69 = 2155.68216$$

$$= 2160 \text{ (to the nearest 10)}$$

- (b) Find 62% of 7.8. [2]

$$62\% = 0.62$$

$$0.62 \times 7.8 = 4.836$$

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

91

151

199

219

247

$$247 \div 19 = 13$$

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

1197

2197

3197

4197

5197

$$13^3 = 13 \times 13 \times 13 = 2197$$



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

50 39 28 17 6 -5

Subtract 11 each time: $17 - 11 = 6$, $6 - 11 = -5$

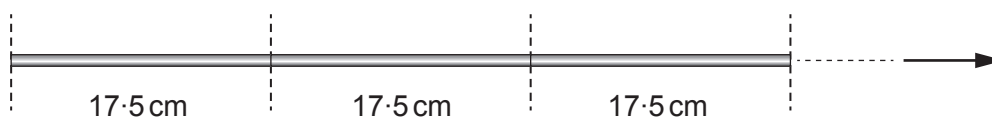
- (b) Use the formula $x = 4a + 3b$ to find the value of x when $a = 7.2$ and $b = -4.6$. [2]

$$x = 4 \times 7.2 + 3 \times (-4.6)$$

$$x = 28.8 - 13.8$$

$$x = 15$$

12. 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]

$$4 \text{ metres} = 400 \text{ cm}$$

$$400 \div 17.5 = 22.857142...$$

Only whole rods can be placed, so round down to 22.

$$\text{Check: } 22 \times 17.5 = 385 \text{ cm (fits in 400 cm)}$$

$$23 \times 17.5 = 402.5 \text{ cm (too long)}$$

Number of rods = 22

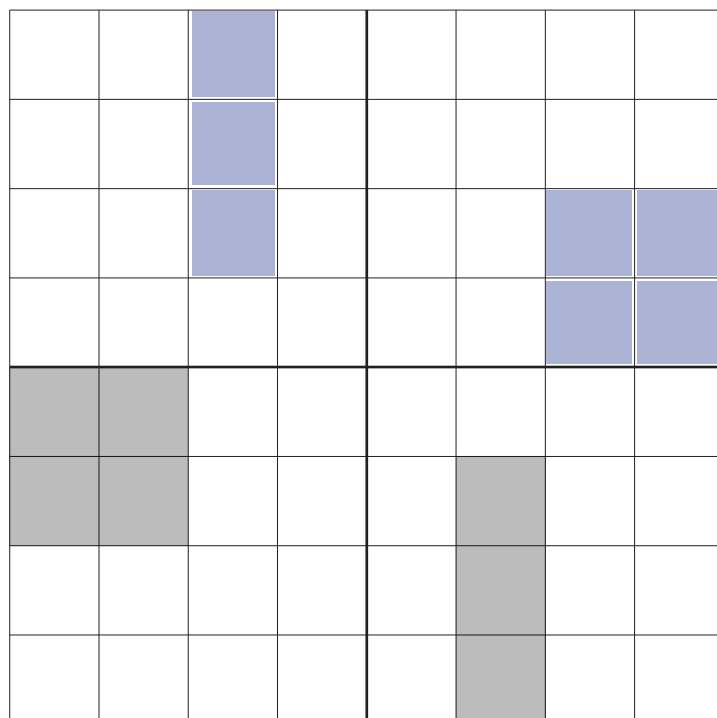


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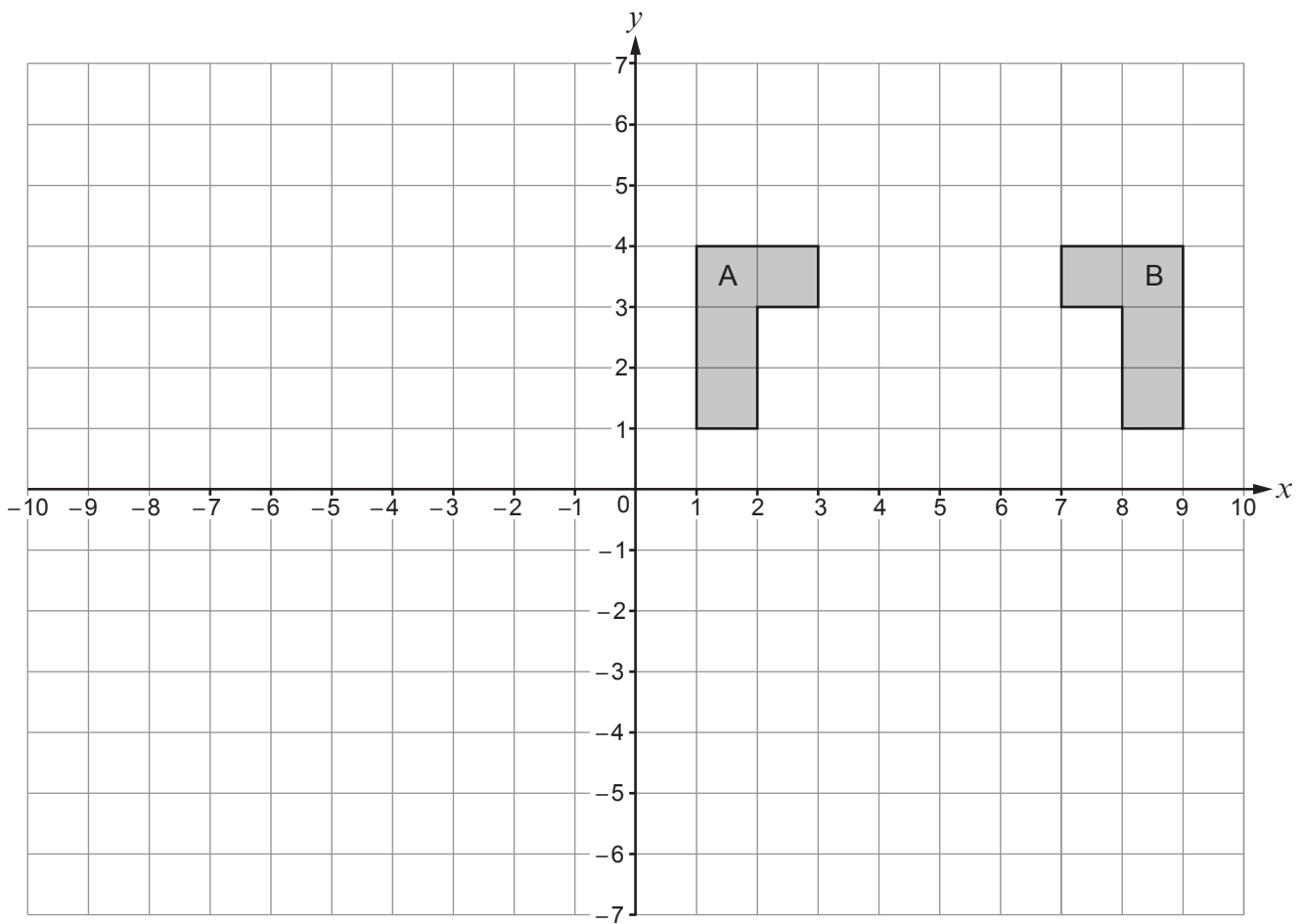
13. (a) Shade the least number of squares so that the grid has rotational symmetry of order 2. The squares you shade must be in the upper two quadrants. [2]



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

[2]

Examiner
only



Reflection in the line $x = 5$

.....

.....

.....

.....



14. (a) Solve $5(2x + 3) = 20$.

[3]

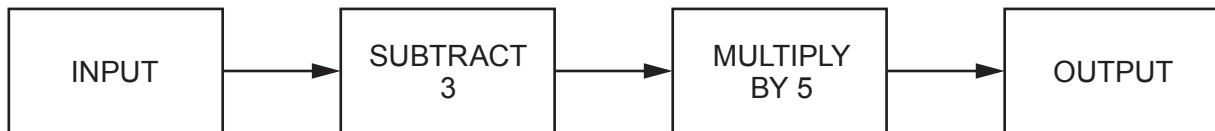
$$5(2x + 3) = 20$$

$$10x + 15 = 20$$

$$10x = 5$$

$$x = 5/10 = 0.5$$

- (b) A number machine is shown below.



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

[2]

$$n \rightarrow n - 3 \rightarrow 5(n - 3)$$

$$\text{OUTPUT} = 5(n - 3)$$



15. (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

YES. If 140° is the angle between the two equal sides, the other two angles are equal: $(180^\circ - 140^\circ) \div 2 = 20^\circ$ each.

So the triangle has angles 140° , 20° and 20° , which add to 180° .

(b)

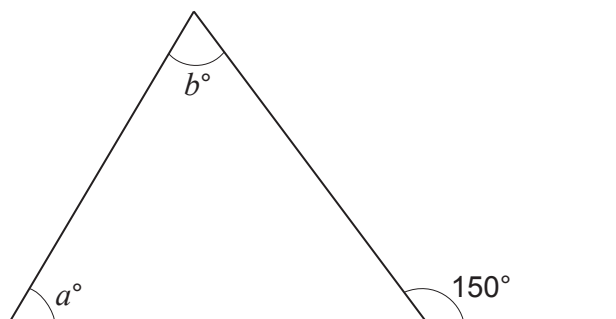


Diagram not drawn to scale

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

$$a + b = 30$$

$$a + b = 210$$

$$b - a = 150$$

$$a - b = 150$$

$$a + b = 150$$



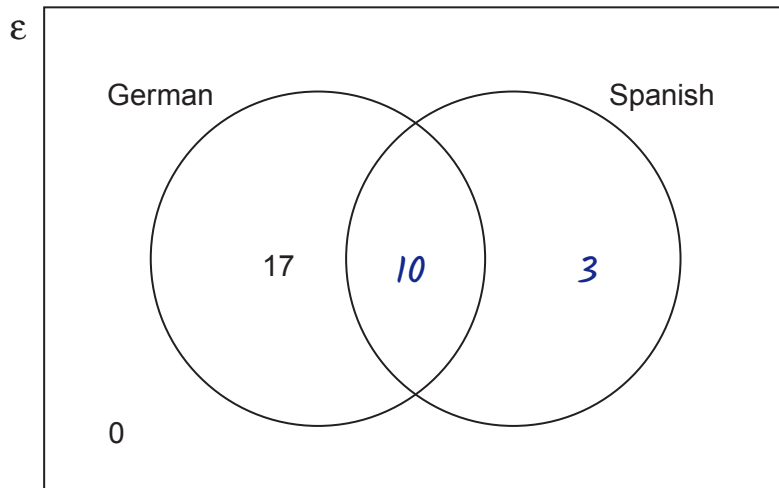
16. Each of 30 students studies German, Spanish or both languages.

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:

$$\text{Both} = \frac{1}{3} \text{ of } 30 = 30 \div 3 = 10$$

$$\text{Spanish only} = 30 - 17 - 10 - 0 = 3$$



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

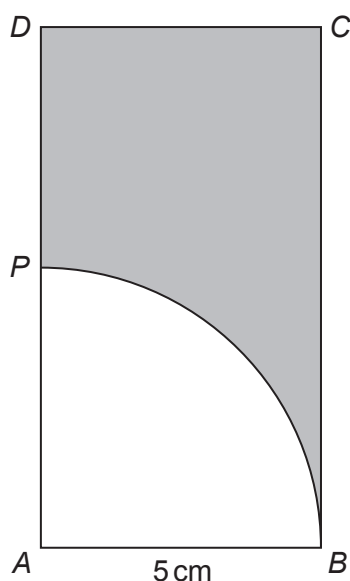


Diagram not drawn to scale

Calculate the area of the shaded section shown above.
 You must show all your working.

[5]

$$AP = AB = 5 \text{ cm (radius), and } PD = AP = 5 \text{ cm}$$

$$AD = 5 + 5 = 10 \text{ cm}$$

$$\text{Area of rectangle } ABCD = 5 \times 10 = 50 \text{ cm}^2$$

$$\text{Area of quarter circle } APB = \pi \times 5^2 \div 4$$

$$= 78.539816... \div 4 = 19.634954... \text{ cm}^2$$

$$\text{Shaded area} = 50 - 19.634954...$$

$$= 30.365045...$$

$$= 30.4 \text{ cm}^2 \text{ (1 d.p.)}$$

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