



**GCSE**

**3300U40-1**

**WEDNESDAY, 14 JUNE 2023 – MORNING**

**MATHEMATICS**

**UNIT 2: CALCULATOR – ALLOWED**

**INTERMEDIATE TIER**

**1 hour 45 minutes plus your additional time allowance**

**A CALCULATOR WILL BE REQUIRED FOR THIS EXAMINATION**

**Surname:** \_\_\_\_\_

**First name(s):** \_\_\_\_\_

**Centre Number:** \_\_\_\_\_

**Candidate Number:** **0** \_\_\_\_\_

**For Examiner's use only**

<b>Question</b>	<b>Maximum Mark</b>	<b>Mark Awarded</b>
1.	4	
2.	4	
3.	3	
4.	4	
5.	5	
6.	3	
7.	2	
8.	7	
9.	3	
10.	5	
11.	6	
12.	4	
13.	4	
14.	6	
15.	7	
16.	4	
17.	4	
18.	5	
<b>Total</b>	<b>80</b>	

**(Turn over)**

**ADDITIONAL MATERIALS**

A ruler, a protractor and a pair of compasses may be required.

**ITEMS INCLUDED WITH QUESTION PAPER**

A separate Formula List.

A separate Diagram Booklet.

Model for Question 8.

**The Diagram Booklet MUST be handed in to the invigilators and sent for marking.**

**INSTRUCTIONS TO CANDIDATES**

Use black ink, black ball – point pen, black felt tip or your usual method.

Write your name, centre number and candidate number in the spaces on the front cover.

Answer ALL questions.

Write your answers in the spaces provided.

If you run out of space, use the additional page(s) at the back of the booklet.

Question numbers must be given for the work written on the additional page(s).

Take  $\pi$  as 3.14 or use the  $\pi$  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 8, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.**

1. (a) Look at the diagram for Question 1 (a) in the separate Diagram Booklet.  
The diagram is NOT drawn to scale.  
The diagram shows shape ***ABCD***.

In the diagram,

$$\text{Angle } \mathbf{BAD} = 97^\circ$$

$$\text{Angle } \mathbf{ADC} = 115^\circ$$

$$\text{Angle } \mathbf{ABC} = 42^\circ$$

$$\text{Angle } \mathbf{BCD} = x^\circ$$

Calculate the value of ***X***.

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[2 marks]

continued on the next page . . .

(Turn over)

**Question 1 continued**

1. (b) Look at the diagram for Question 1 (b) in the separate Diagram Booklet.  
The diagram is NOT drawn to scale.

The diagram shows an isosceles triangle, labelled ***PQR***.

In the diagram,

$$PR = PQ$$

$$\text{Angle } RPQ = 78^\circ$$

$$\text{Angle } PQR = y^\circ$$

Calculate the value of ***y***.

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**7**

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**[2 marks]**

**(Turn over)**

2. (a) Which ONE of the following fractions can be written as a recurring decimal?  
Circle your answer.

$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{8}$	$\frac{1}{10}$
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[1 mark]

- (b) Which THREE numbers from the list below are prime numbers?

27    31    35    39    43    47    51    55

The three prime numbers are:

\_\_\_\_\_ , \_\_\_\_\_ and \_\_\_\_\_

[2 marks]

continued on the next page . . .

(Turn over)

## Question 2 continued

2. (c)  $81 = 3^n$

Write down the value of  $n$ .

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$n =$  \_\_\_\_\_

[1 mark]

(Turn over)



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Isaac is \_\_\_\_\_ years old.

Nadia is \_\_\_\_\_ years old.

Dewi is \_\_\_\_\_ years old.

**[3 marks]**

4. (a) Write down the next two numbers in the following sequence.

**-26   -20   -14   -8   \_\_\_\_\_   \_\_\_\_\_**

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**[2 marks]**

**continued on the next page . . .**

**(Turn over)**

## Question 4 continued

4. (b)  $f = 3g + 2h$

Calculate the value of  $f$  when

$$g = 9.3 \text{ and } h = -13.6$$

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[2 marks]

(Turn over)

5. (a) A box contains different – coloured balls. Some are red, some are blue and the others are green.

Look at Diagram 1 for Question 5 (a) in the separate Diagram Booklet.

Diagram 1 is a bar chart.

The bar chart shows how many balls of each colour are in the box.

Look at Diagram 2 for Question 5 (a) in the separate Diagram Booklet.

Diagram 2 is a pie chart.

Draw an accurate pie chart to compare the number of coloured balls in the box. Part of the pie chart has been completed for you.

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**[3 marks]**

**continued on the next page . . .**

**(Turn over)**

**Question 5 continued**

5. (b) Look at the table for Question 5 (b) in the separate Diagram Booklet.

The letters **A, B, C** and **D** describe four different events, as shown in the table.

Using the letters **A, B, C** and **D**, list the events in the order of how likely they are to happen in the boxes on the next page.

Start with the least likely and end with the most likely.

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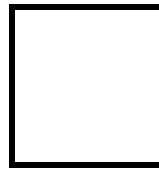
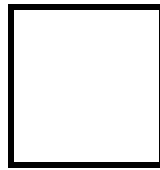
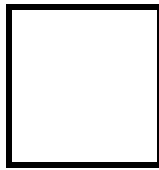
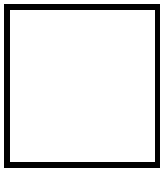
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**Least likely**



**Most likely**

**[2 marks]**

**(Turn over)**

6. A journey of **45** miles is travelled in **1 hour 15** minutes.

Calculate the average speed of this journey.  
Give your answer in **mph**.

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**[3 marks]**

7. A regular polygon has **15** sides.

Calculate the size of an exterior angle of this regular polygon.

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**[2 marks]**

**8. IN THIS QUESTION, YOU WILL BE ASSESSED ON THE QUALITY OF YOUR ORGANISATION, COMMUNICATION AND ACCURACY IN WRITING.**

**Ask for the model for Question 8.**

**The model is NOT made to scale.**

**The model represents a solid metal cuboid.**

**The solid metal cuboid has dimensions  
4 cm, 5 cm and 20 cm.**

**The cuboid is melted down. The metal is used  
to make solid cubes, each with sides 3 cm.**

**How many complete cubes will be made?**

**You must show all your working.**

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**[5 marks + 2 marks OCW]**

9. (a) Look at the diagram for Question 9 (a) in the separate Diagram Booklet.  
The diagram is NOT drawn to scale.

(i) What is the bearing of point **B** from point **A**?

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[1 mark]

(ii) What is the bearing of point **A** from point **B**?

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[1 mark]

continued on the next page . . .

(Turn over)

## Question 9 continued

9. (b) Points **P**, **Q**, **R** and **S** are all 5 km from point **X**.

**P** is on a bearing of  $005^\circ$  from **X**.

**Q** is on a bearing of  $100^\circ$  from **X**.

**R** is on a bearing of  $240^\circ$  from **X**.

**S** is on a bearing of  $355^\circ$  from **X**.

Which **TWO** of the four points **P**, **Q**, **R** and **S** are closest to each other?

You can use the **SPACE FOR SKETCH** provided for Question 9 (b) in the separate Diagram Booklet to help you.

Point **X** has been drawn for you.

The two points closest to each other are

\_\_\_\_\_ and \_\_\_\_\_

[1 mark]

(Turn over)

**10. A bus going to a WELSH HERITAGE conference has 43 people on board.**

**There are 38 students, 4 tutors and a driver on the bus.**

**At the conference, each student will attend a session on LANGUAGE, a session on HISTORY or both sessions.**

- **All the students will attend at least one session.**
- **18 students will attend both sessions.**
- **25 students will attend the session on HISTORY.**
- **The tutors and driver will not attend either of the sessions.**

**continued on the next page . . .**

**Question 10 continued**

**10. (a) Look at the diagram for Question 10 (a) in the separate Diagram Booklet. The diagram is an incomplete Venn diagram.**

**Complete the Venn diagram to show this information.**

**The universal set,  $\mathcal{E}$ , contains all of the 43 people on the bus.**

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**[3 marks]**

**continued on the next page . . .**

**(Turn over)**

**Question 10 continued**

**10. (b) One of the people on the bus is chosen at random.**

**What is the probability that this person will attend the session on LANGUAGE?**

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**[2 marks]**

11. (a) Solve the equation

$$7 + 5(x - 2) = 3x + 8$$

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[3 marks]

continued on the next page . . .

(Turn over)

## Question 11 continued

11. (b) Make  $f$  the subject of the formula

$$h = 13 - 2f$$

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[2 marks]

(c) Factorise  $15x - 35y$

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[1 mark]

(Turn over)

**12. A large number of prize tokens are placed in a box.**

**The tokens are identical in shape and size.**

**GOLD, SILVER, BRONZE or NO PRIZE is written on each token.**

**One token is chosen at random from the box.**

**Look at the table for Question 12 in the separate Diagram Booklet.**

**The table shows the probability of choosing a GOLD prize token and the probability of choosing a SILVER prize token.**

- (a) There are three times as many NO PRIZE tokens in the box as there are BRONZE prize tokens.**

**Complete the table.**

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**[2 marks]**

**continued on the next page . . .**

**(Turn over)**

**Question 12 continued**

**12. (b) There are 15 GOLD prize tokens in the box.**

**How many SILVER prize tokens are there in the box?**

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**[2 marks]**

**(Turn over)**





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**[4 marks]**

14. (a) Evaluate  $\frac{\sqrt[3]{154}}{7.9 - 3.26}$

Give your answer correct to 2 significant figures.

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[2 marks]

continued on the next page . . .

(Turn over)

**Question 14 continued**

**14. (b) Calculate the reciprocal of 23**

**Give your answer correct to 3 decimal places.**

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**[2 marks]**

**continued on the next page . . .**

**(Turn over)**

## Question 14 continued

14. (c) Circle the correct answer for each of the following.

(i) The Lowest Common Multiple (LCM) of 4 and 6 is:

2	4	6	12	24
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[1 mark]

(ii) The Highest Common Factor (HCF) of 10 and 15 is:

5	10	15	30	150
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[1 mark]

(Turn over)

15. Look at the diagram for Question 15 in the separate Diagram Booklet. The diagram is NOT drawn to scale.

In the diagram,

$AD$  is a straight line.

$$\text{Angle } BAC = 90^\circ$$

$$\text{Angle } BDE = 90^\circ$$

$$\text{Angle } CBE = 90^\circ$$

$$\text{Angle } CBA = x^\circ$$

$$AC = 7.7 \text{ cm}$$

$$BC = 11.3 \text{ cm}$$

$$BD = 13.1 \text{ cm.}$$

- (a) Calculate the value of  $x$ .

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16. (a) A number is decreased by 5% of its value.

This is done 4 times in total.

Each time, the value decreases by 5%

Circle the multiplier that you would use

to find the value after the 4 decreases.

$\times 0.05^4$	$\times 0.95^4$	$\times 0.20$	$\times 1.05^4$	$\times 0.04^5$
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[1 mark]

continued on the next page . . .

(Turn over)







18. Look at the diagram for Question 18 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

The diagram shows a semicircle, with radius  $r$ , drawn inside a trapezium.

The area of the semicircle is  $77 \text{ cm}^2$

The semicircle touches the line  $AB$ .

$AB = 22 \text{ cm}$ .

Calculate the area of the trapezium  $ABCD$ .

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**GCSE**

**3300U40-1**

**WEDNESDAY, 14 JUNE 2023 – MORNING**

**MATHEMATICS**

**UNIT 2: CALCULATOR – ALLOWED**

**INTERMEDIATE TIER**

**The Diagram Booklet MUST be handed in  
to the invigilators and sent for marking.**

# **Diagram Booklet**

**Surname:** \_\_\_\_\_

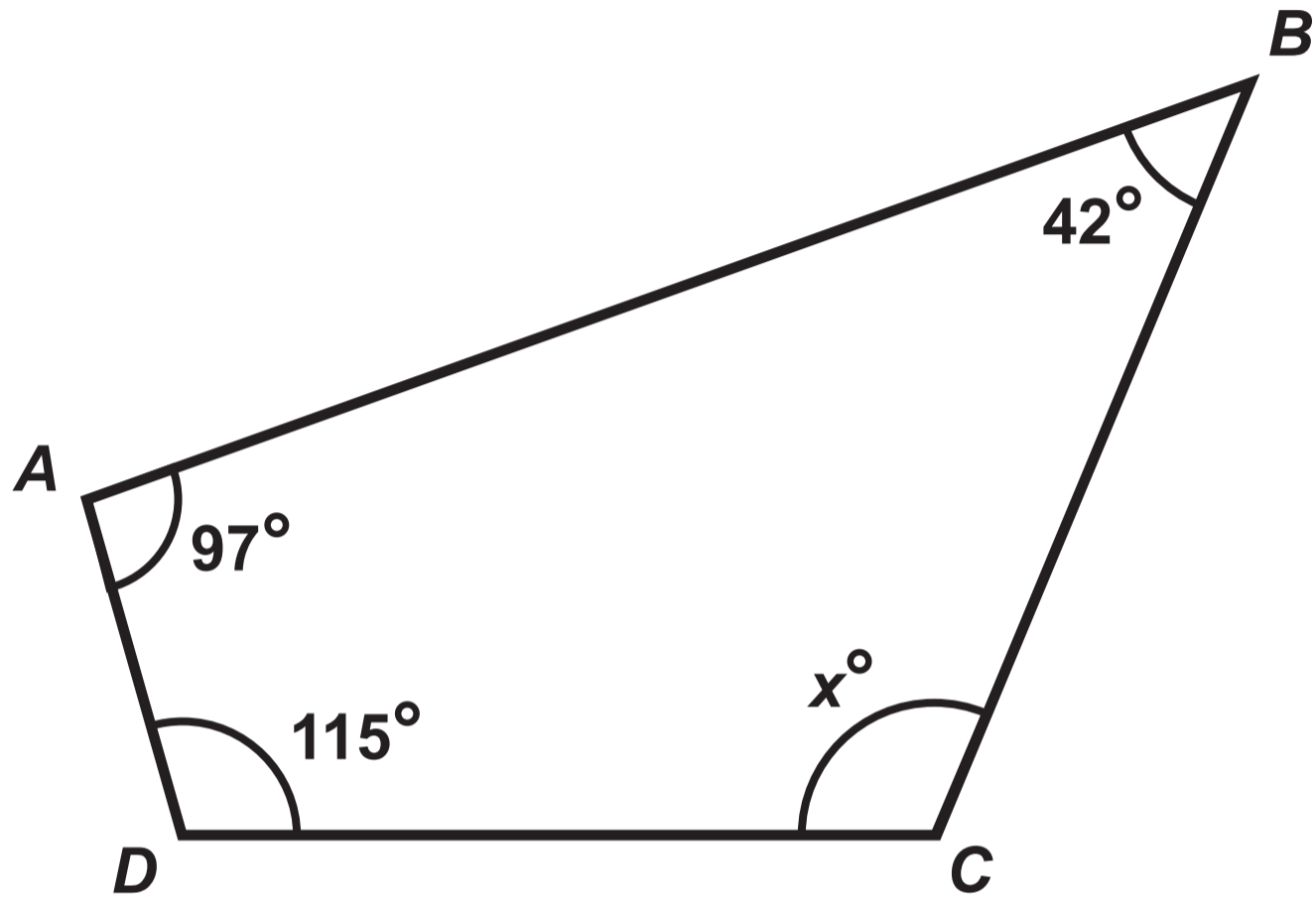
**First name(s):** \_\_\_\_\_

**Centre Number:** \_\_\_\_\_

**Candidate Number:** 0 \_\_\_\_\_

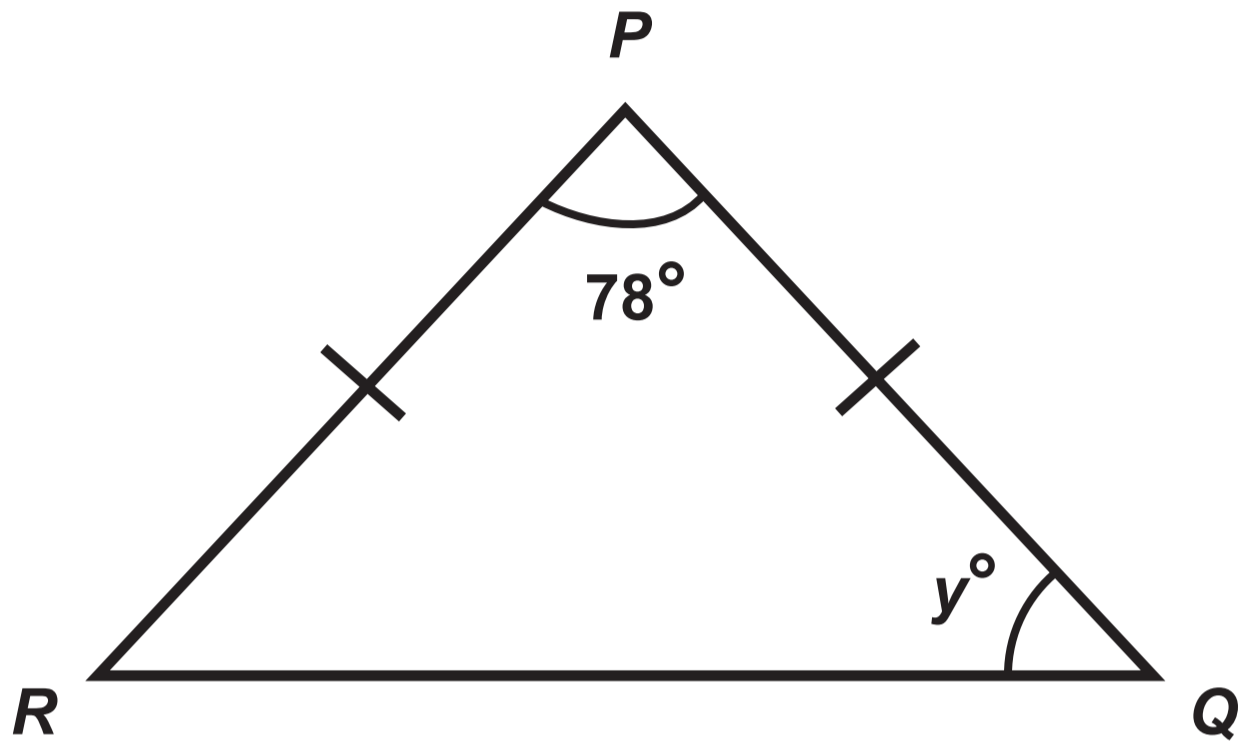
Question 1 (a)

Diagram NOT drawn to scale



Question 1 (b)

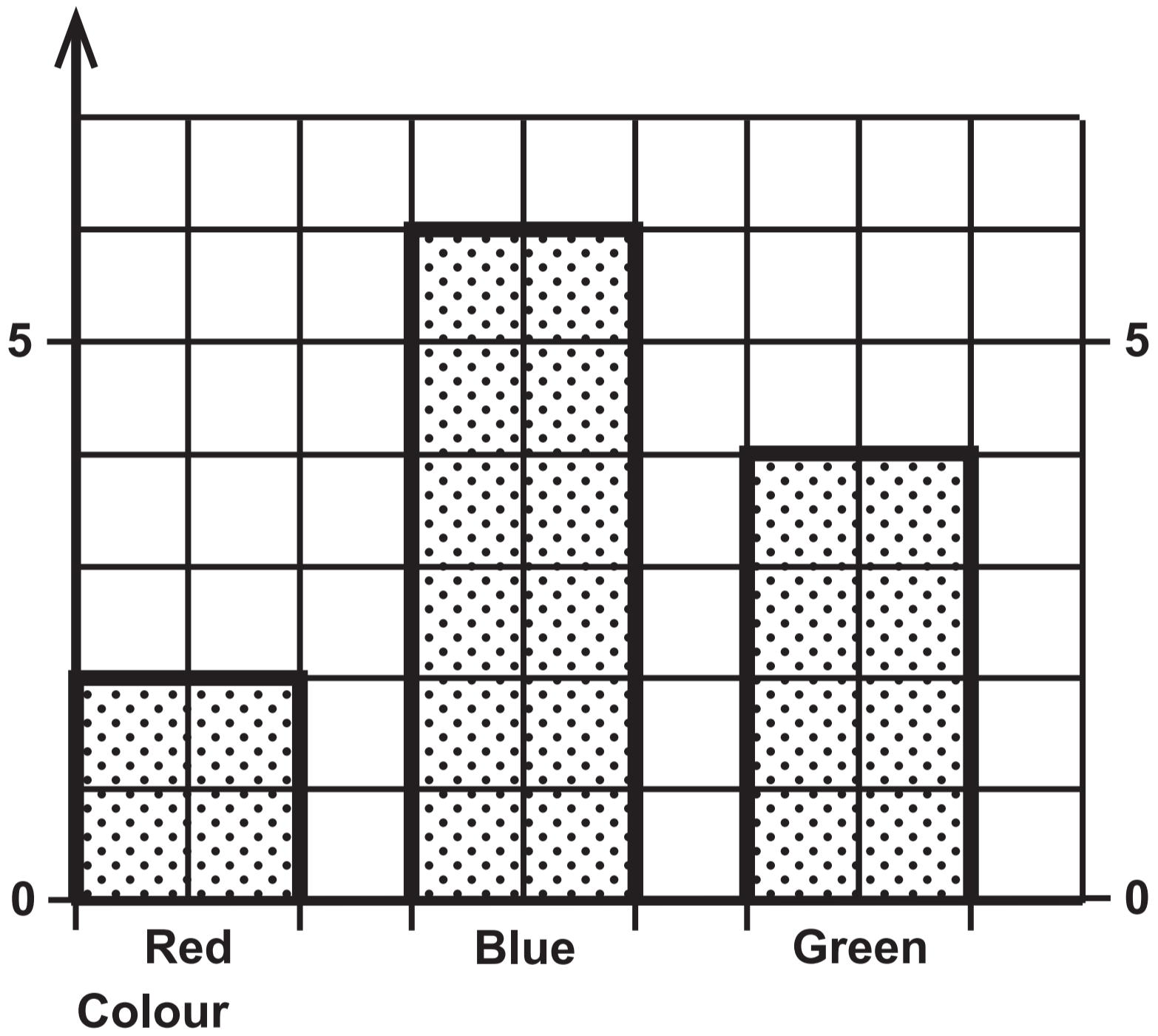
Diagram NOT drawn to scale



# Question 5 (a)

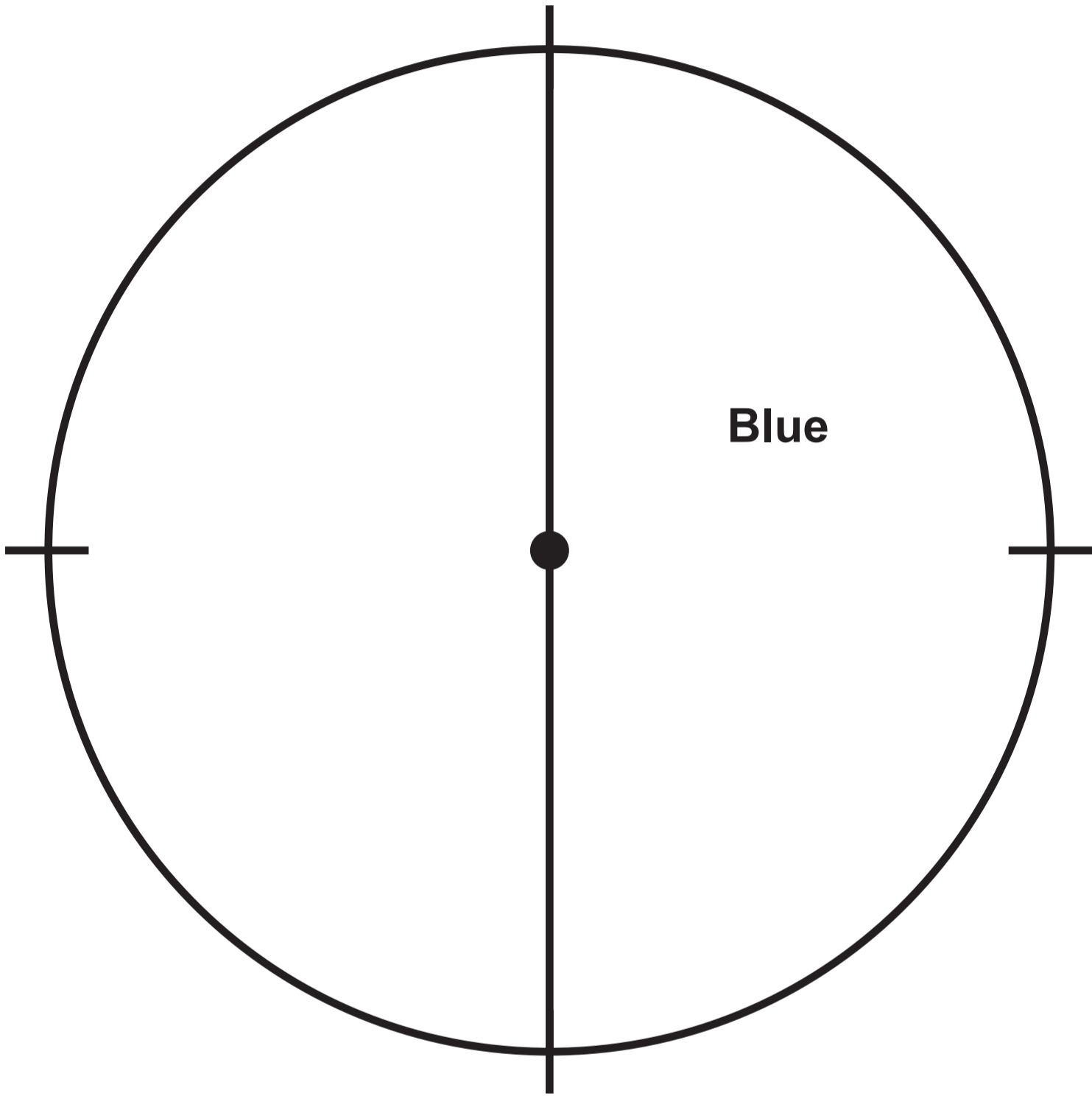
## Diagram 1

Number of balls



**Question 5 (a)**

**Diagram 2**



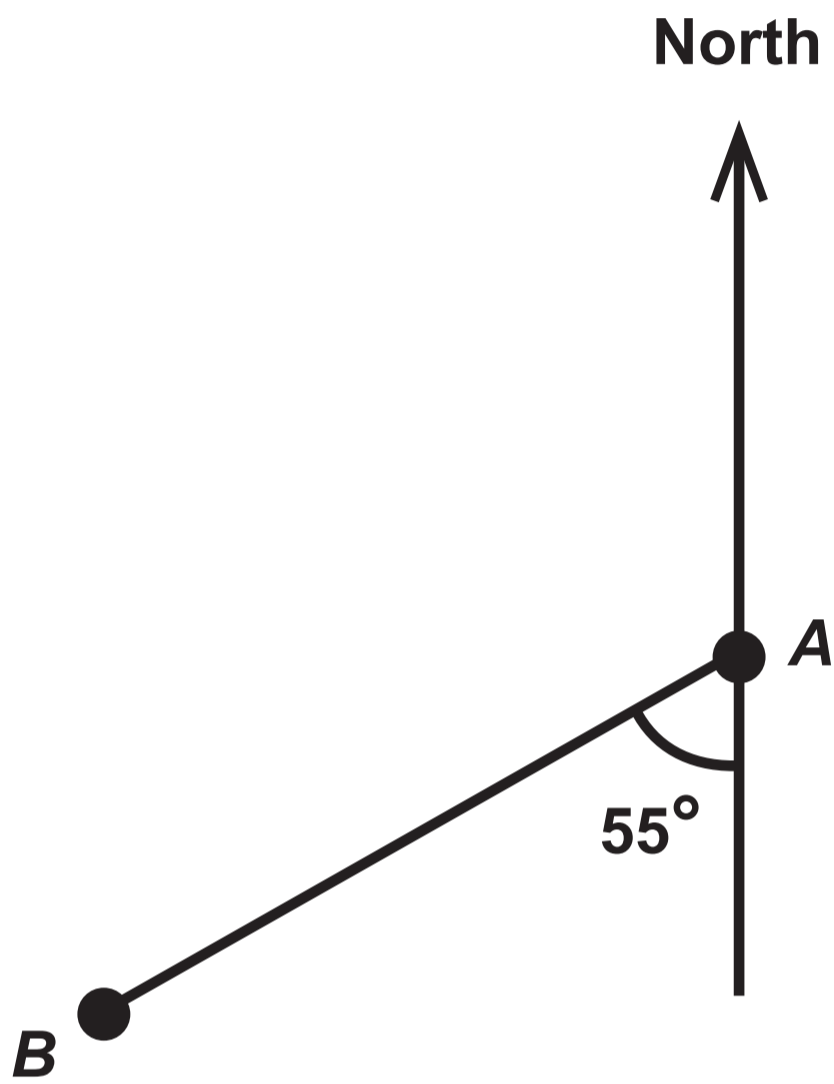
### Question 5 (b)

Table

EXPERIMENT	EVENT	
A fair 6 – sided dice is thrown.	A	4 is thrown.
A fair coin is thrown.	B	A tail is thrown.
Four cards labelled North, East, South and West are placed in a box. One card is chosen at random.	C	North is chosen.
Seven cards, each labelled with a different day of the week, are placed in a box. One card is chosen at random.	D	Sunday is chosen.

Question 9 (a)

Diagram NOT drawn to scale



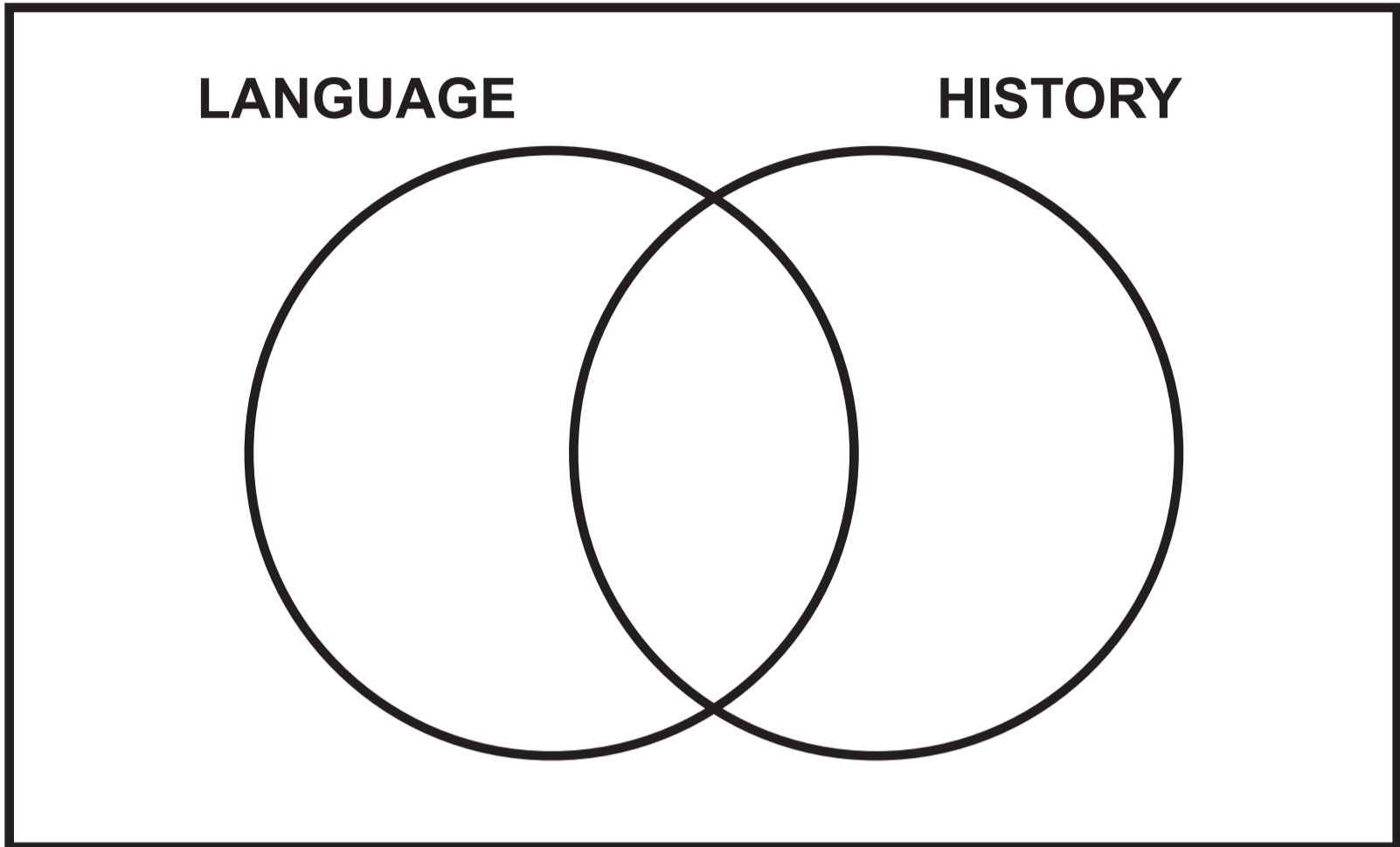
**Question 9 (b)**

**SPACE FOR SKETCH**



Question 10 (a)

$\varepsilon$



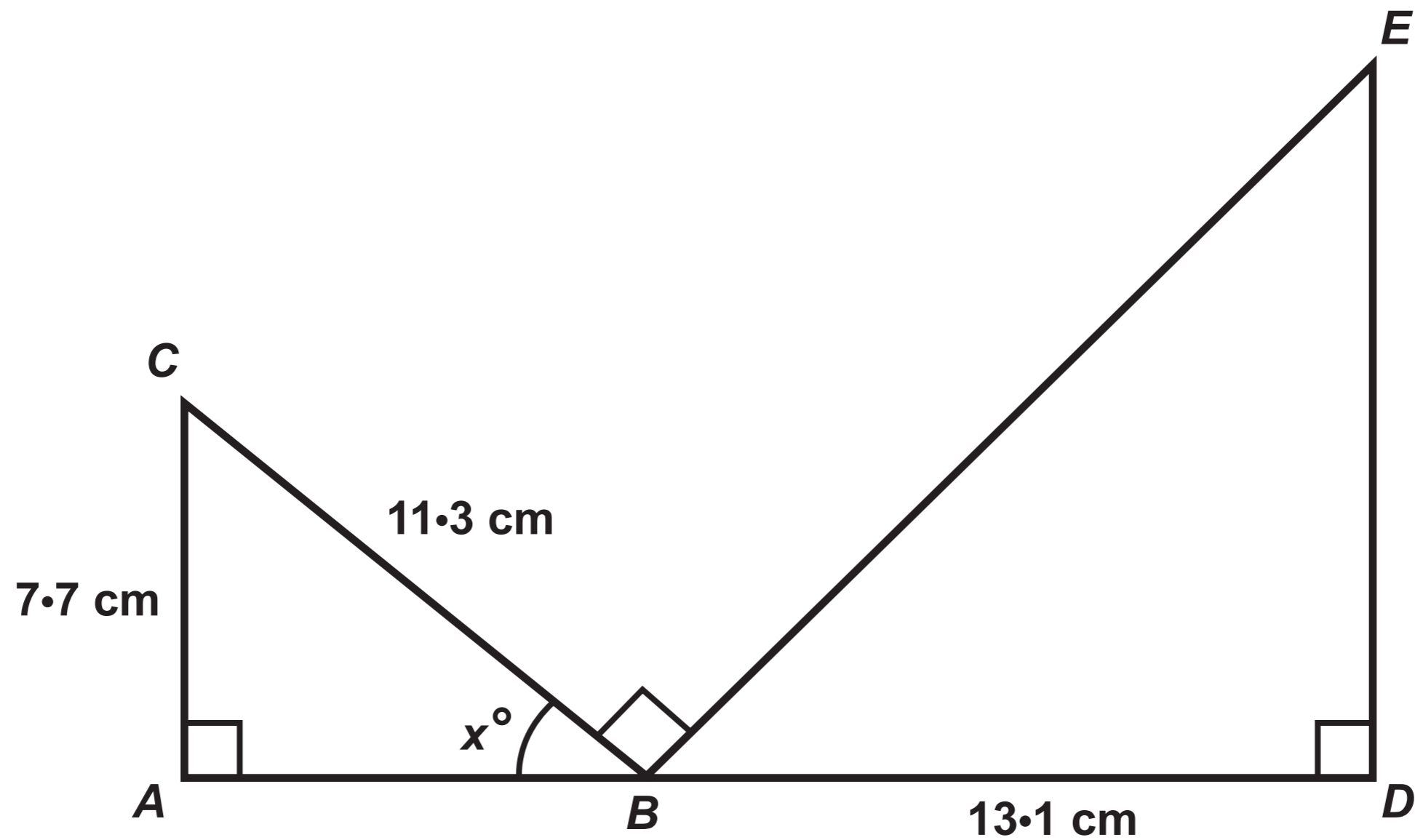
## Question 12

Table

TOKEN	Gold	Silver	Bronze	No Prize
PROBABILITY	0.02	0.18		

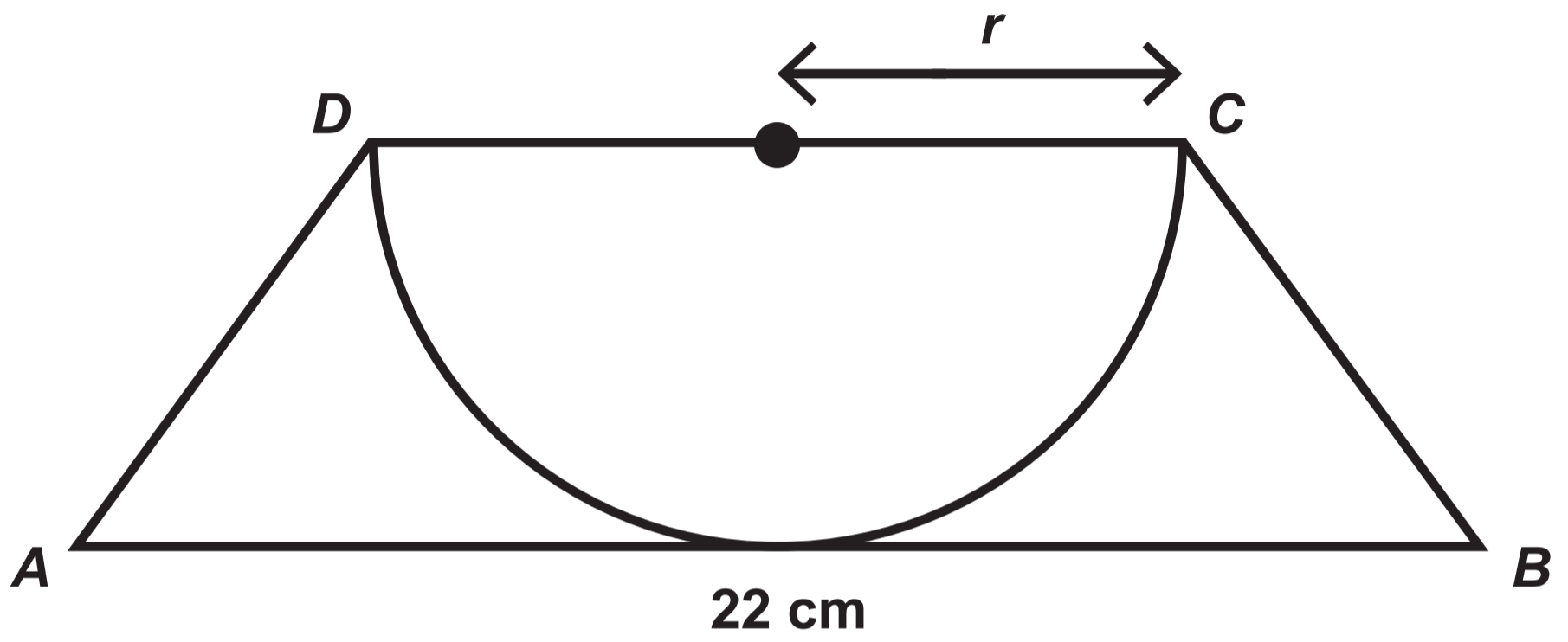
### Question 15

Diagram NOT drawn to scale



Question 18

Diagram NOT drawn to scale



**GCSE  
MATHEMATICS  
and  
NUMERACY**



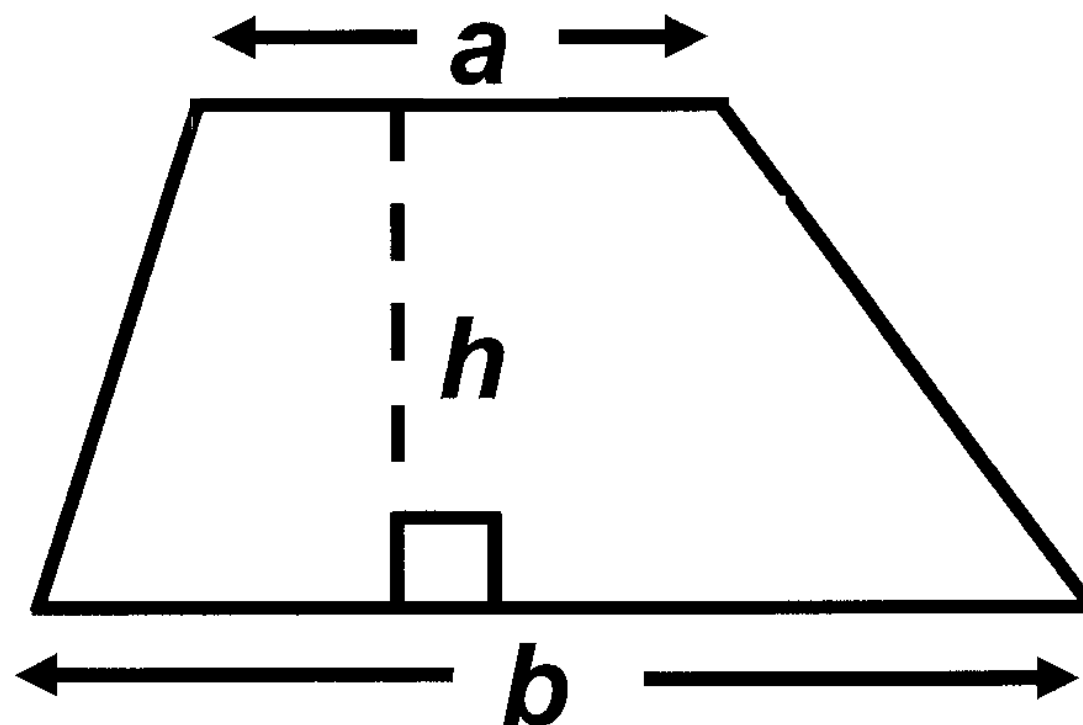
**FORMULA LIST  
INTERMEDIATE TIER  
GCSE**

**You must not write on these formula pages.**

**Anything you write on these formula pages will gain NO credit.**

## Formula List – Intermediate Tier

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



Volume of prism =  
area of cross – section  $\times$  length

