GCSE

3300U40-1

WEDNESDAY, 16 NOVEMBER 2022 – 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		
Question	**Maximum Mark**	**Mark Awarded**
1.	3	
2.	2	
3.	6	
4.	9	
5.	3	
6.	2	
7.	2	
8.	4	
9.	4	
10.	5	
11.	4	
12.	4	
13.	7	
14.	8	
15.	3	
16.	3	
17.	2	
18.	5	
19.	4	
Total	80	

(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 11.

Cut out shape for Question 1 (b).

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 π as 3•14 or use the π button on your calculator.

(Turn over)

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

1. (a) Look at the diagram for Question 1 (a) in the separate Diagram Booklet. The diagram shows a shape on a grid of squares.

Enlarge the shape by a scale factor of 3

[2 marks]

continued on the next page . . .

Question 1 continued

1. (b) Look at the diagram for Question 1 (b) in the separate Diagram Booklet.

The diagram shows a shape on a coordinate grid.

Translate the shape 2 squares to the left and 4 squares down.

A cut out shape is available for this question.

[1 mark]

2. Calculate the value of $7e + 6f$

when $e = -9{\cdot}2$ and $f = 4{\cdot}7$

[2 marks]

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

Look at the diagram for Question 3 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

In the diagram, *AF* is a straight line.

Angle *CDE* = 110°

Angle *DCB* = 123°

Angle *CBA* = 112°

Angle *DEF* = *x*.

continued on the next page . . .

Question 3 continued

Calculate the size of angle *x*.

You must show all your working.

(Turn over)

12

[4 marks + 2 marks OCW]

4. Laura puts 90 counters in a bag.
Each counter is red or blue or yellow.

Laura wants to draw a pie chart to show the number of counters of each colour.

Look at the table for Question 4 in the separate Diagram Booklet.
The table shows some of the information that she needs.

continued on the next page . . .

Question 4 continued

4. (a) Complete the table.

You must show all your working.

[5 marks]

continued on the next page . . .

Question 4 continued

4. (b) Look at the diagram for Question 4 (b) in the separate Diagram Booklet.

The diagram shows an incomplete pie chart.

Complete the pie chart to show the results from the table.

[2 marks]

continued on the next page . . .

Question 4 continued

4. (c) Laura chooses a counter at random from the bag. Calculate the probability that this counter is either red or blue.

[2 marks]

5. (a) Write 0·03435 correct to two significant figures.

Circle your answer.

0·03	0·033	0·0344
0·034	0·03400	

[1 mark]

continued on the next page . . .

Question 5 continued

5. (b) Convert 6·7 m^2 into cm^2

Circle your answer.

670	6700	67 000
670 000	6 700 000	

[1 mark]

continued on the next page . . .

Question 5 continued

5. (c) Factorise $12e + 15$

Circle your answer.

$27e$	$3(4e + 5)$	$12(e + 15)$
$5(12e + 3)$	$15(0{\cdot}8e + 3)$	

[1 mark]

6. Find the whole number that satisfies all of the following conditions:

- It is a whole number between 15 and 35 inclusive.
- The number is a multiple of 2 but not a multiple of 4
- 3 is a factor of this number, but 9 is NOT a factor of this number.

(Turn over)

The whole number is _____

[2 marks]

7. Calculate $\frac{23}{14 \cdot 59 - 7 \cdot 67}$, correct $\frac{15 \cdot 4^2}{}$

to 1 decimal place.

[2 marks]

8. **125 pupils were asked which one of four primary schools they attended.**

(a) **One of the pupils is chosen at random.**

Complete the table below to find the probability that the pupil chosen went to Ysgol Bryn.

	Probability
Ysgol Aber	0·08
Ysgol Bryn	
Ysgol Castell	0·2
Ysgol Dewi	0·28

[2 marks]

continued on the next page . . .

Question 8 continued

8. (b) How many of the 125 pupils went to Ysgol Dewi?

[2 marks]

9. **Look at the diagram for Question 9 in the separate Diagram Booklet.**

The diagram IS drawn to scale.

Point *A* and point *B* are shown in the scale drawing.

The scale is 1 cm represents 5 km.

(a) Point *C* is 30 km from point *B* on a bearing of 310°

Complete the scale drawing to show the position of point *C*.

[2 marks]

Question 9 continued

9. (b) Use your scale drawing to calculate

- **the ACTUAL length of *AC*, in kilometres,**
- **the bearing of point *C* from point *A*.**

continued on the next page . . .

Question 9 (b) continued

Actual length of AC = _____ km

Bearing of point C from point A

= _____ °

[2 marks]

10. (a) Express $21 \cdot 76$ as a percentage of 32

(Turn over)

[2 marks]

continued on the next page . . .

Question 10 continued

10. (b) Solve $5t + 3 = 3t + 14$

[3 marks]

11. Ask for the model for Question 11.

The model is NOT made to scale.

The model represents a metal cylinder.

The solid metal cylinder has a radius of 2•3 cm and a height of 5 cm.

The mass of the cylinder is 423•1 g.

Find the density of the metal.

Give your answer in g/cm^3

(Turn over)

(Turn over)

[4 marks]

12. A solution to the equation

$$x^3 + 5x - 8 = 0$$

lies between 1 and 2

Use the method of trial and improvement to find this solution correct to 1 decimal place.

You must show all your working.

(Turn over)

(Turn over)

(Turn over)

[4 marks]

13. Look at the diagram for Question 13 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

***A*, *B* and *C* are points on the circumference of a circle with centre *O*.**

The length of *BC* is 10 cm.

The diameter of the circle is 18 cm.

Angle *ABC* is a right angle.

Calculate the shaded area.

You must show all your working.

(Turn over)

(Turn over)

[7 marks]

14. (a) Look at the diagram for Question 14 (a) in the separate Diagram Booklet. The diagram is NOT drawn to scale.

The diagram shows a rectangle.

The rectangle has:

- **a length of $3y$**
- **a width of $y + p$**
- **an area of $3y^2 + 12y$**

Find the value of p.

You must show all your working.

[3 marks]

continued on the next page . . .

Question 14 continued

14. (b) Another rectangle has a width of $4x - 10$

(i) Given that x is a whole number, explain why the value of x cannot be less than 3

[1 mark]

continued on the next page . . .

Question 14 (b) continued

14. (b) (ii) Look at the diagram for Question 14 (b) (ii) in the separate Diagram Booklet. The diagram is NOT drawn to scale. The diagram shows a different rectangle.

The perimeter of this rectangle is $14x - 4$

The width of the rectangle is $4x - 10$

Find the length of the rectangle in TERMS OF x.

_____

_____

(Turn over)

[4 marks]

15. Look at the diagram for Question 15 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

In the diagram,

$XZ = 7$ cm

Angle $XZY = 41°$

Angle YXZ is a right angle.

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

[3 marks]

16. 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 marks]

17. A number has been increased by 60% to give an answer of 64

What was the original number?

(Turn over)

60

[2 marks]

18. Look at the diagram for Question 18 in the separate Diagram Booklet.
The diagram is an incomplete tree diagram.

Bag A and Bag B contain only red and blue balls.

The probability of choosing a red ball from Bag A is $\frac{3}{5}$

The probability of choosing a red ball from Bag B is 0·25

A ball is chosen at random from each bag.

continued on the next page . . .

Question 18 continued

18. (a) Complete the tree diagram.

[2 marks]

(b) Find the probability that the two balls chosen are the same colour.

[3 marks]

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

Do not use a trial and improvement method. You must show all your working.

$$3x + 5y = -2$$
$$5x + 4y = -12$$

(Turn over)

(Turn over)

(Turn over)

[4 marks]

END OF PAPER

TOTAL 80 MARKS

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

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

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

GCSE

3300U40-1

WEDNESDAY, 16 NOVEMBER 2022 – MORNING

MATHEMATICS

UNIT 2: CALCULATOR – ALLOWED
INTERMEDIATE TIER

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

Diagram Booklet

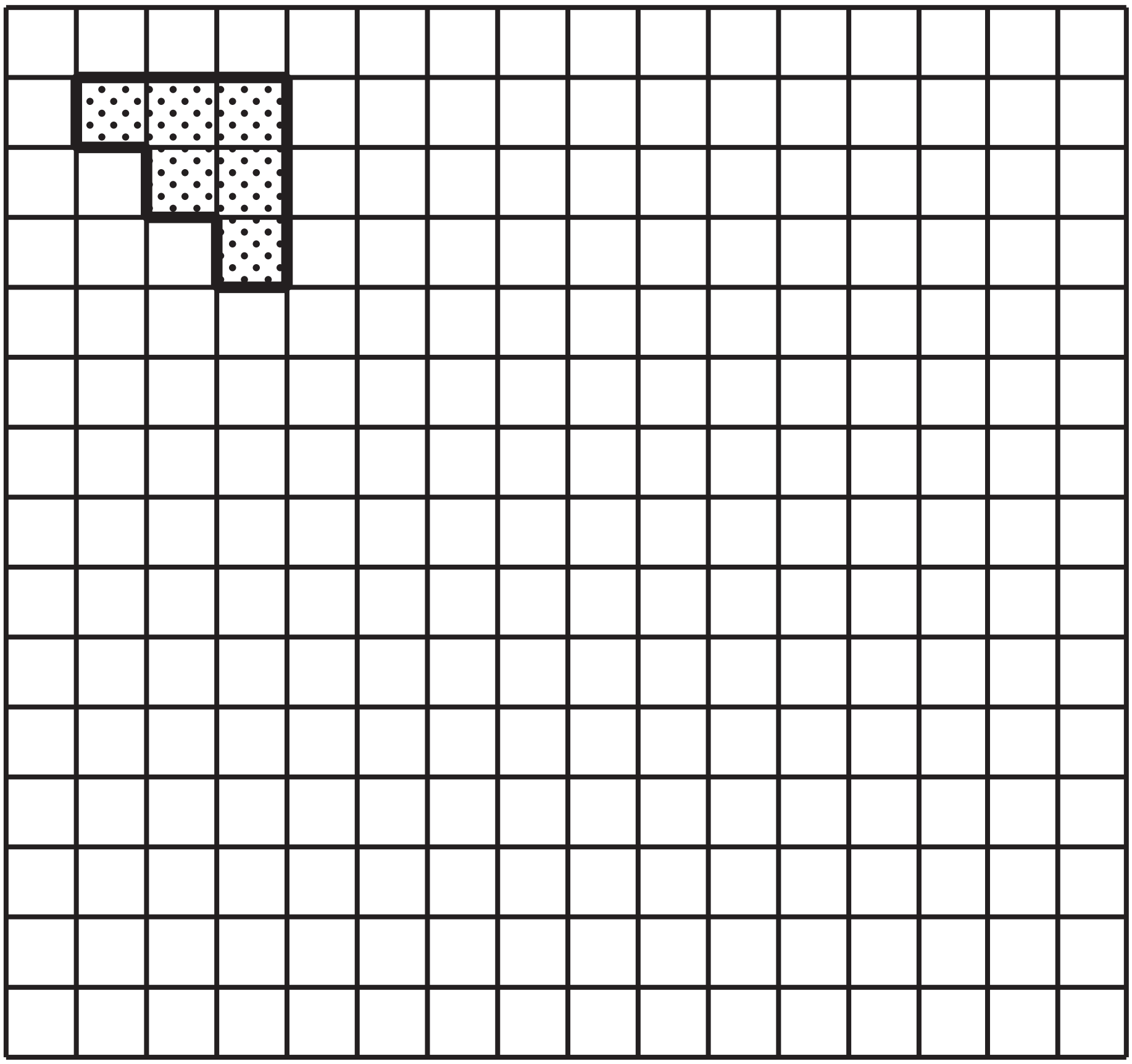
Surname: _____

First name(s): _____

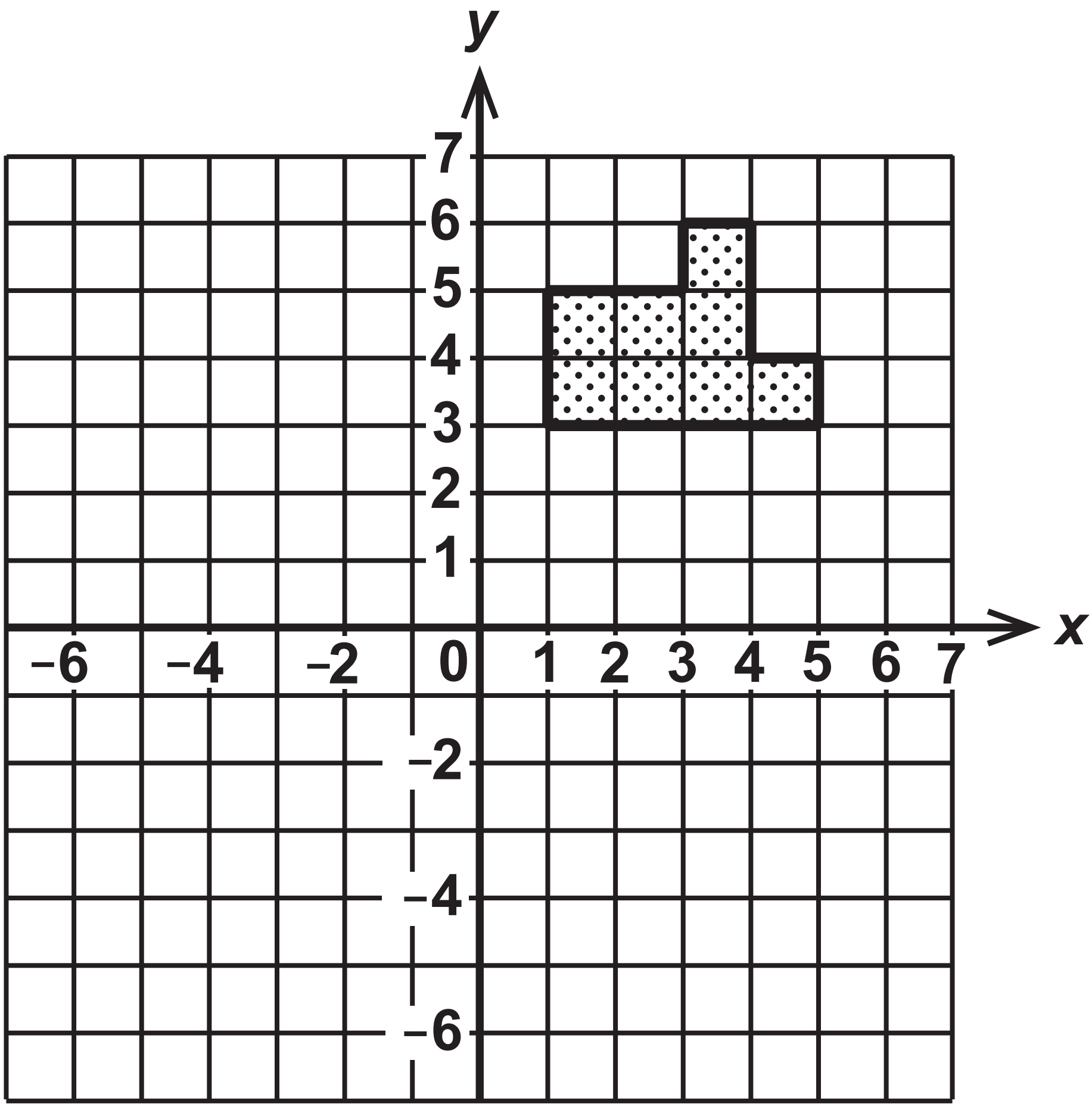
Centre Number: _____

Candidate Number: 0 _____

Question 1 (a)

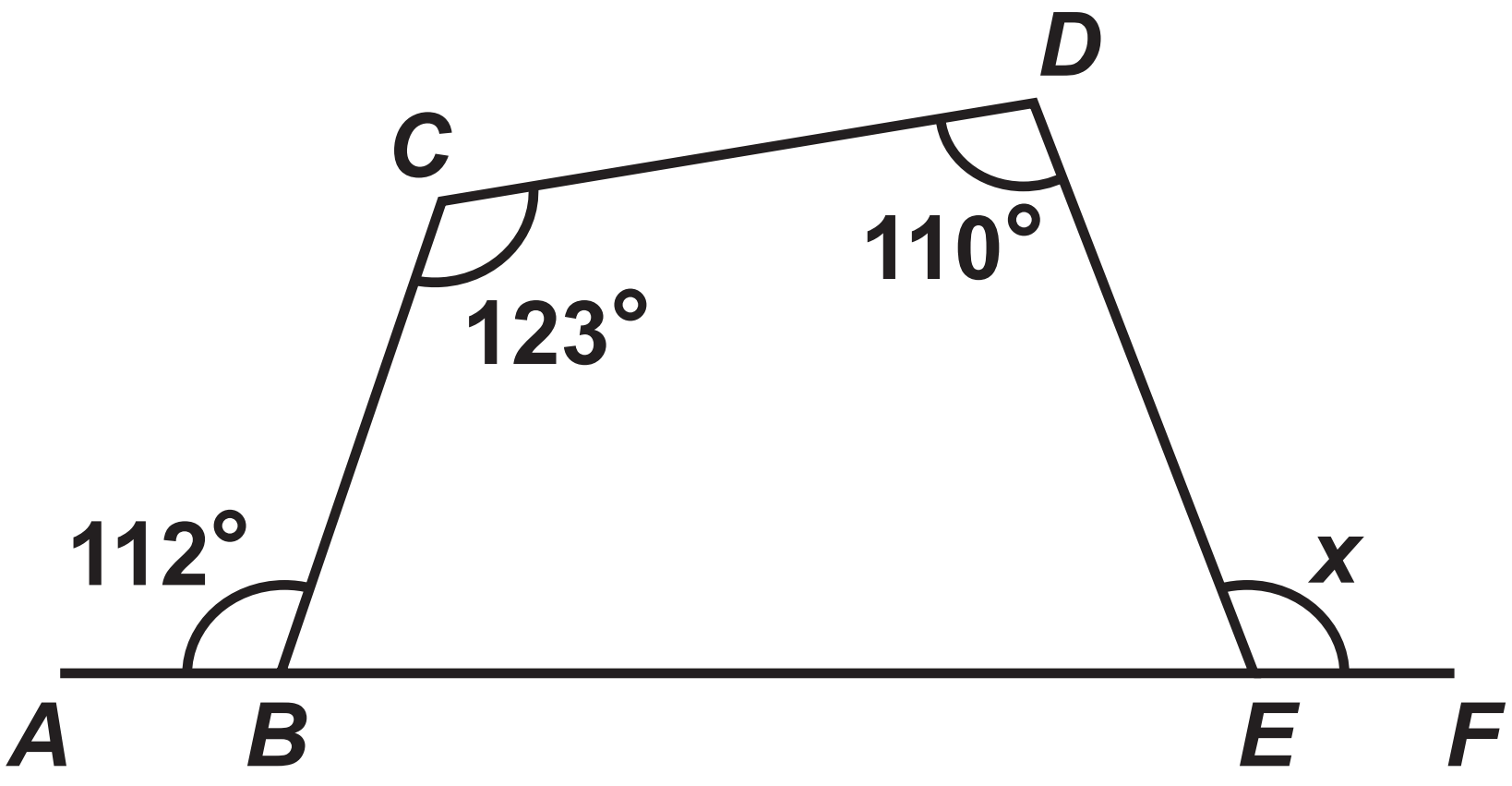


Question 1 (b)



Question 3

Diagram NOT drawn to scale

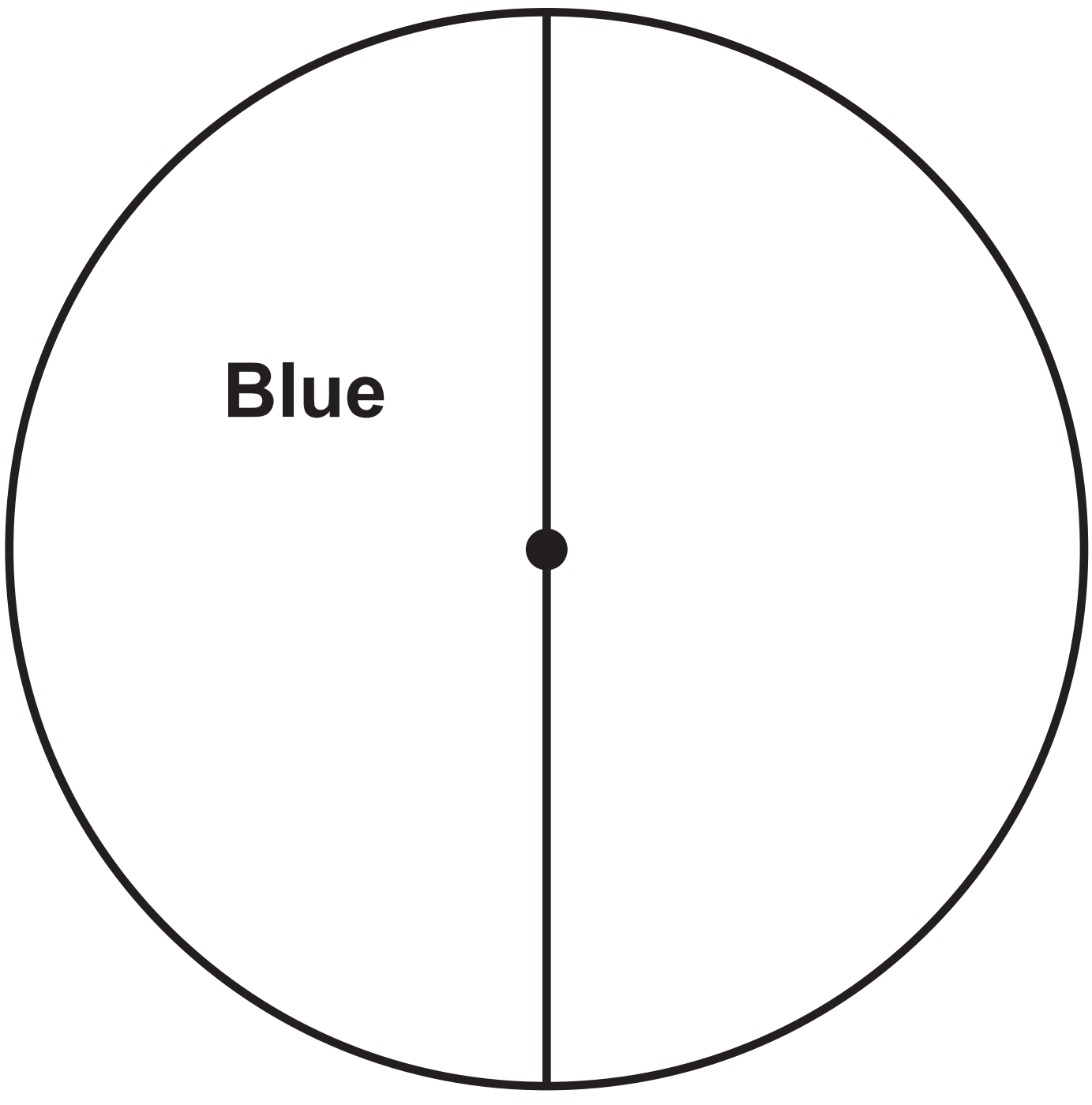


Question 4

Table

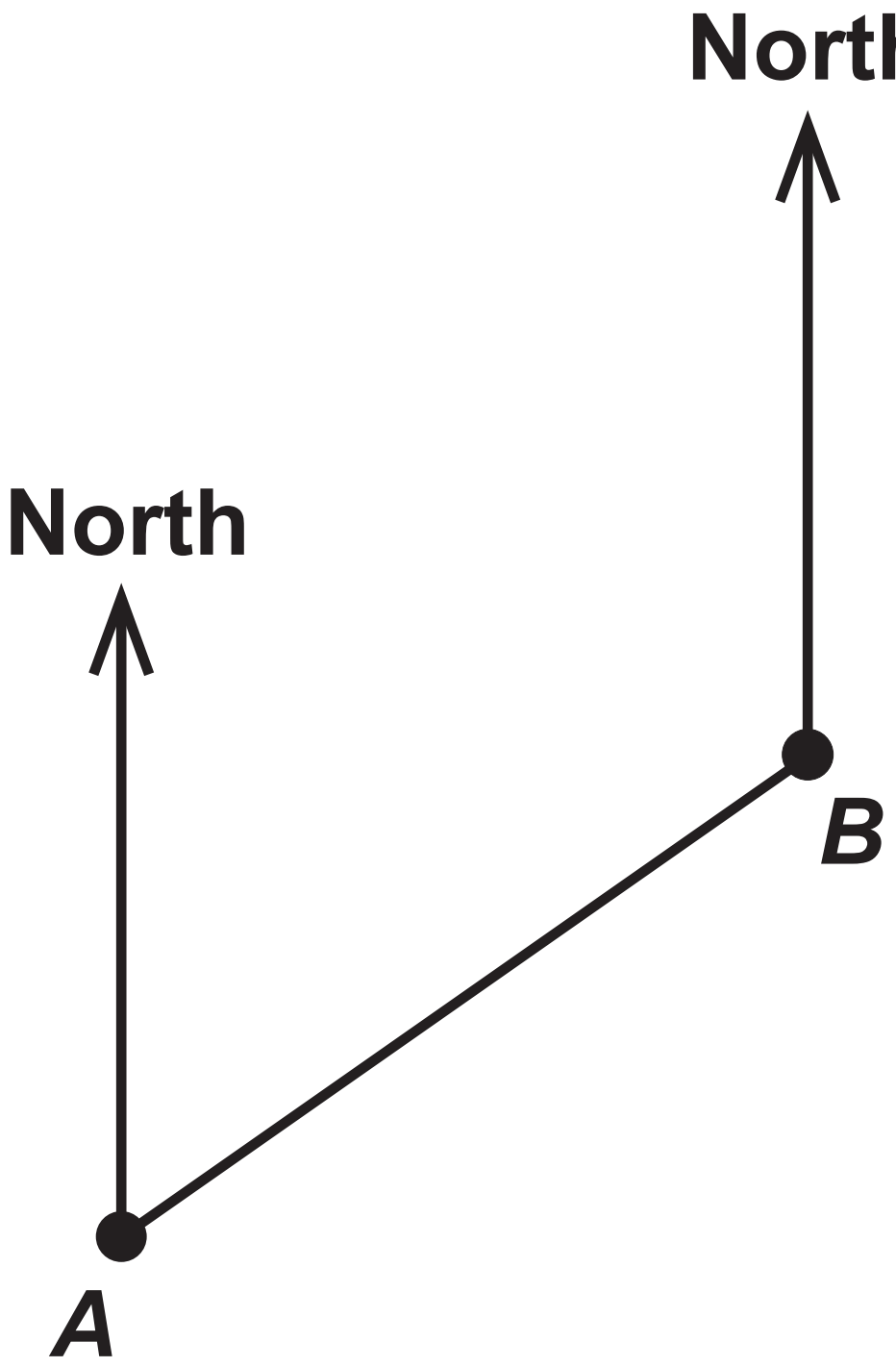
	NUMBER OF COUNTERS	PIE CHART ANGLE
Red	25	
Blue		180°
Yellow		
	Total = 90	

Question 4 (b)



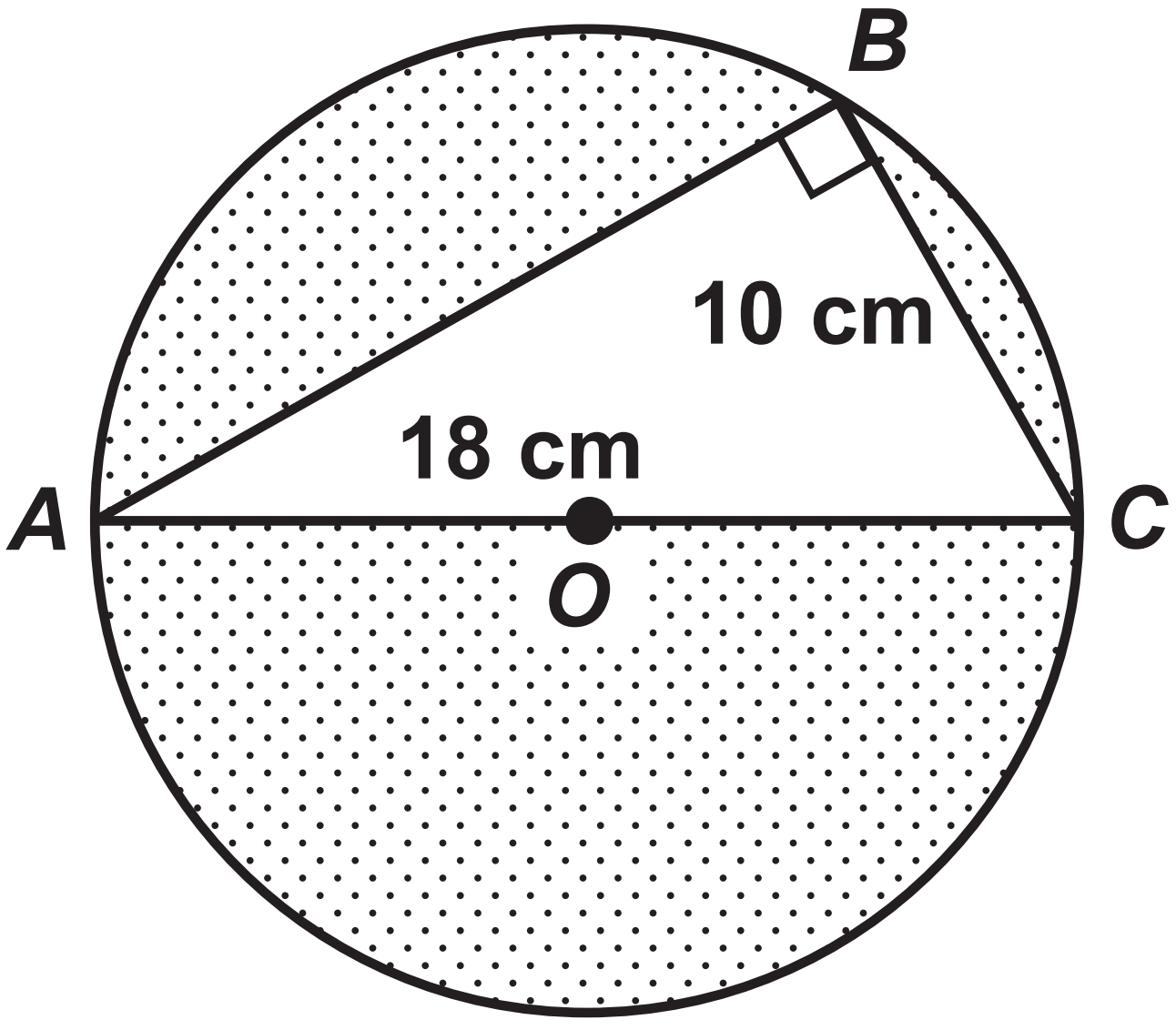
Question 9

Scale: 1 cm represents 5 km



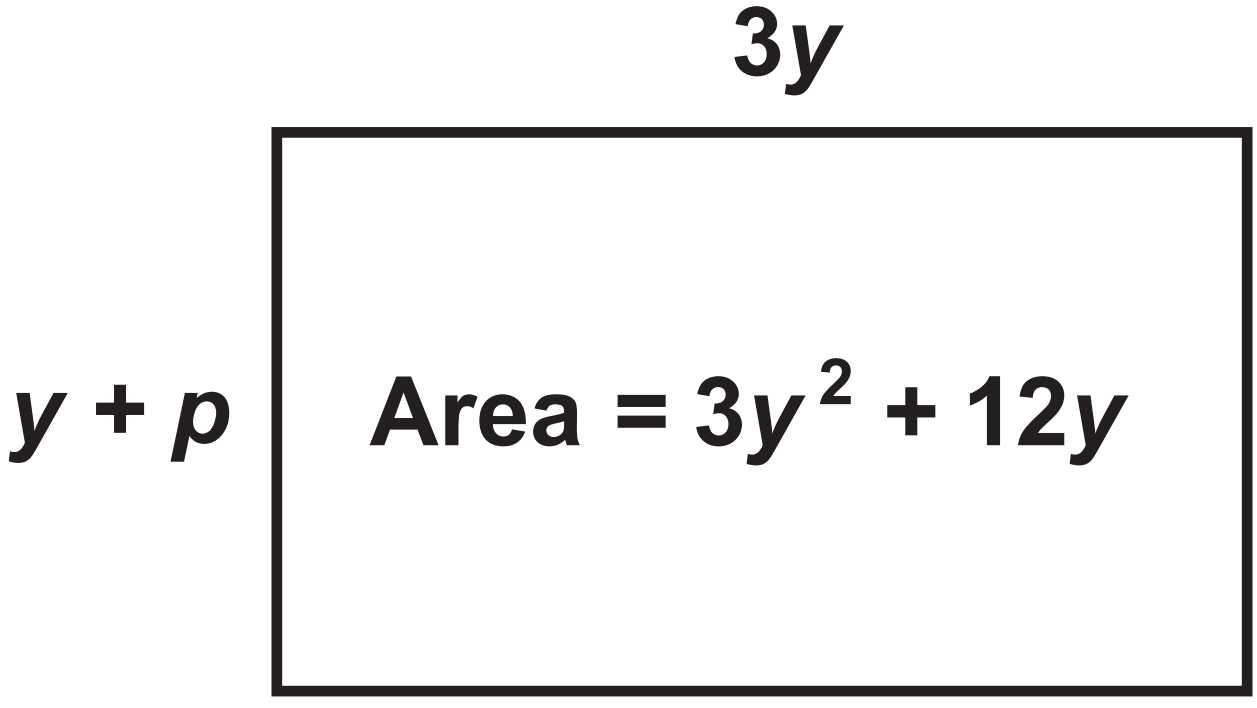
Question 13

Diagram NOT drawn to scale



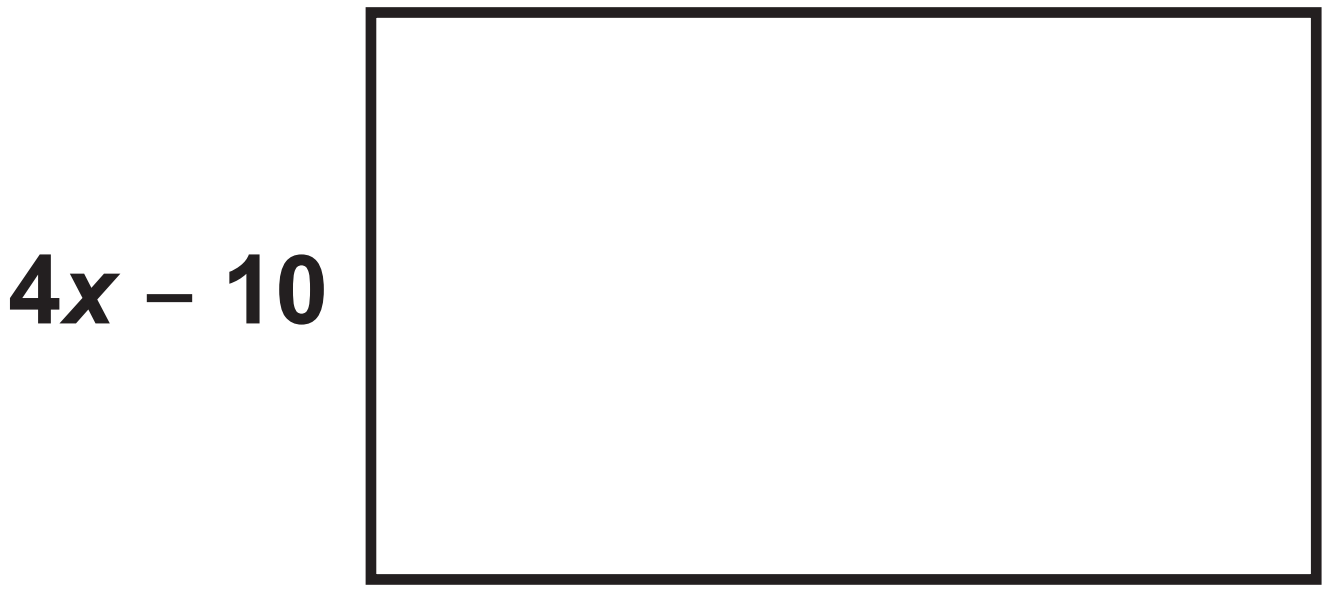
Question 14 (a)

Diagram NOT drawn to scale



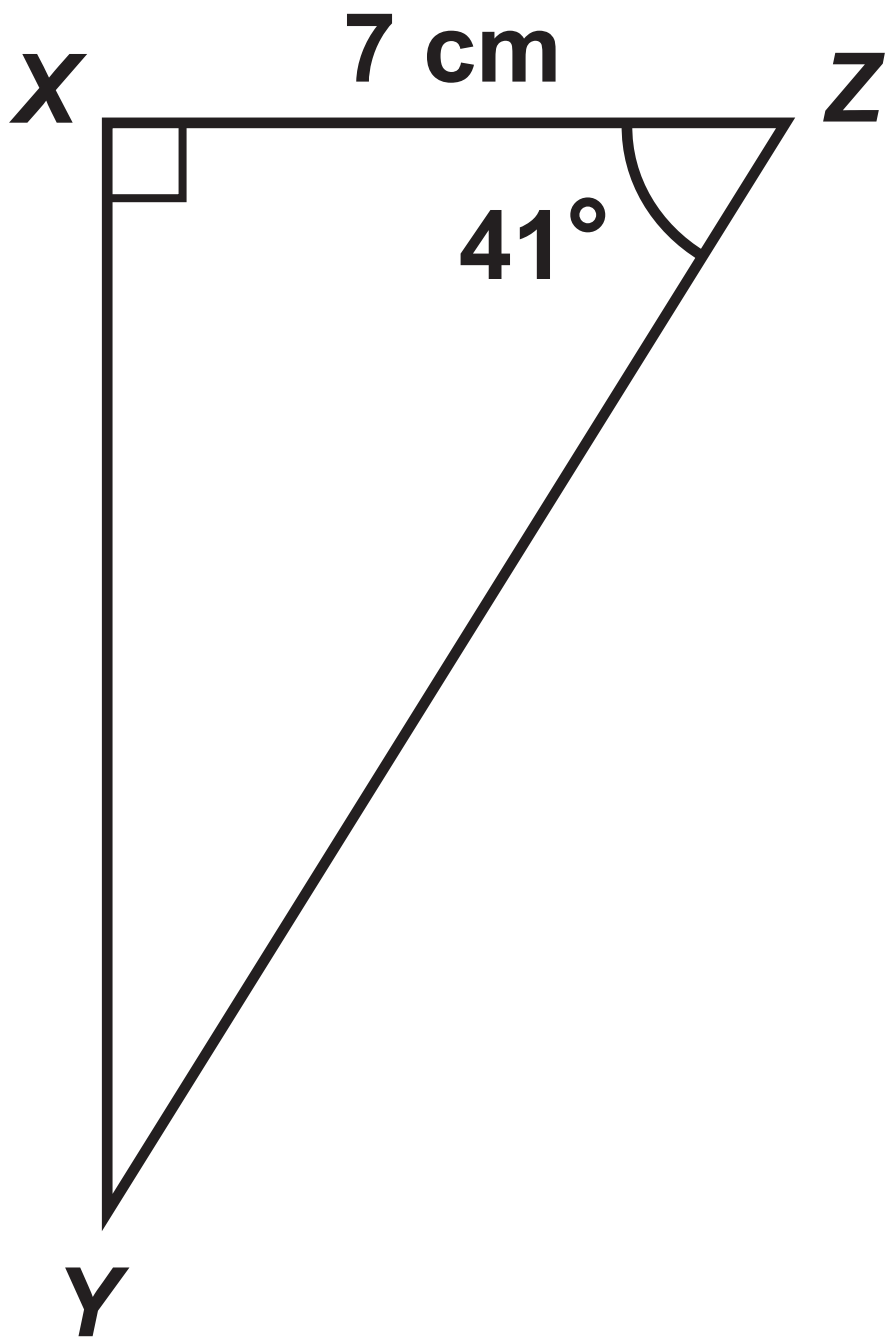
Question 14 (b) (ii)

Diagram NOT drawn to scale

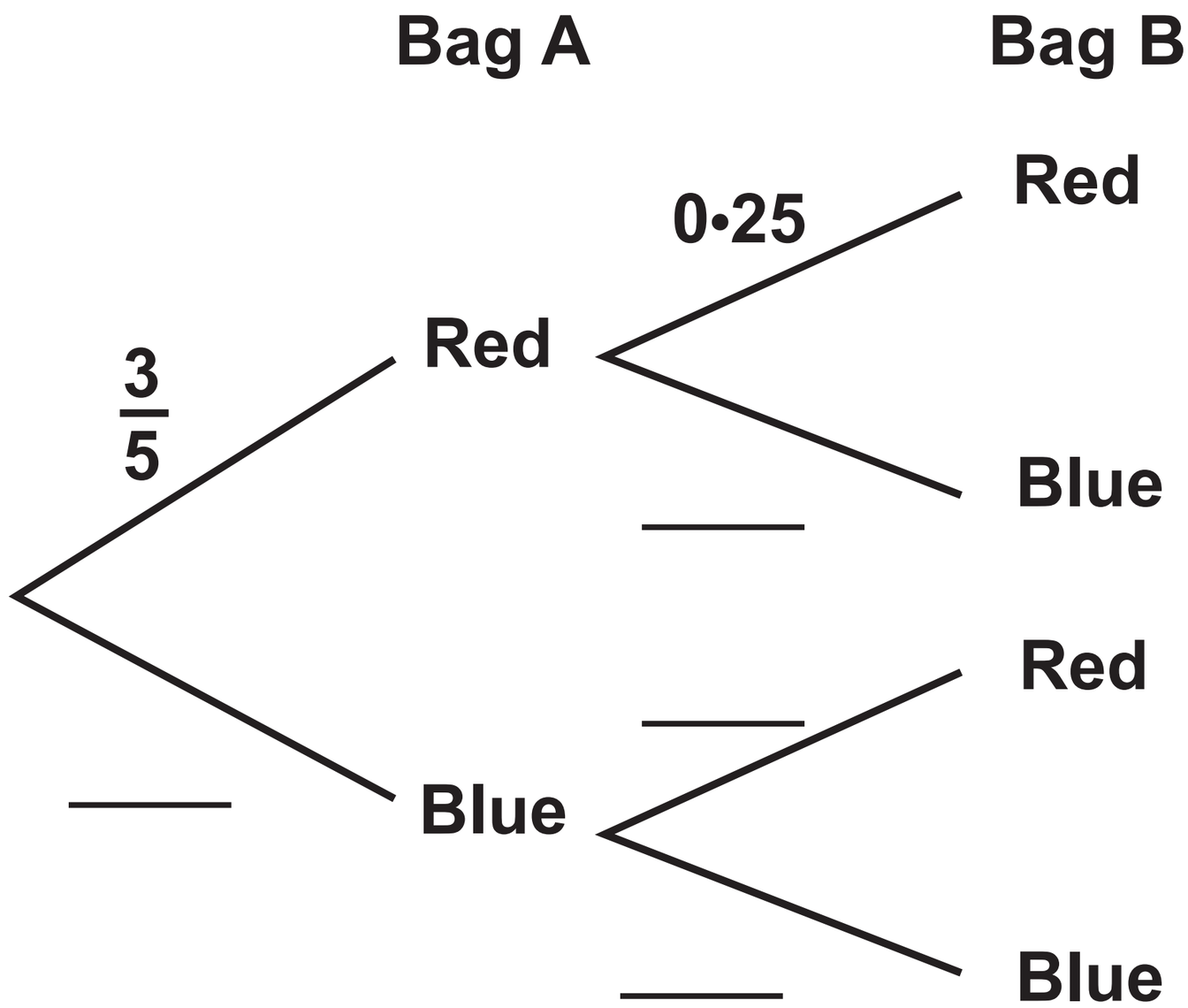


Question 15

Diagram NOT drawn to scale



Question 18



GCSE
MATHEMATICS
and
NUMERACY

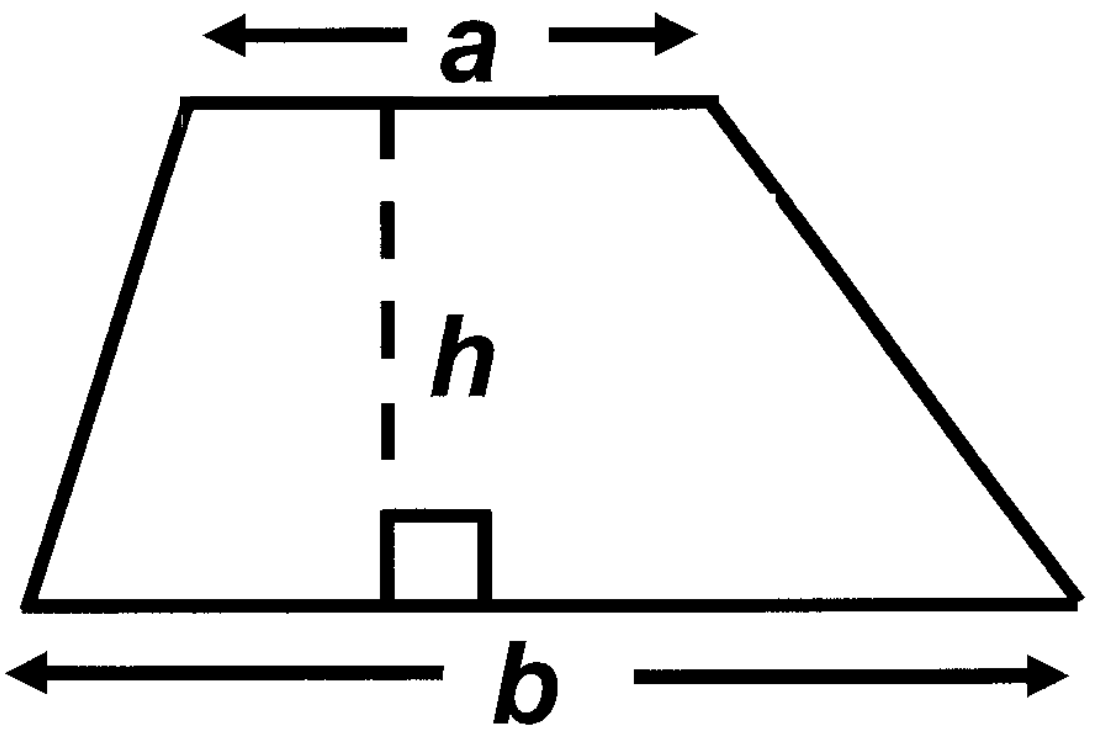
FORMULA LIST
INTERMEDIATE TIER
GCSE

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 × length