



**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  $\pi$  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 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]**

- (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  
 $e = -9.2$  and  $f = 4.7$

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[2 marks]

(Turn over)

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.

$$\text{Angle } CDE = 110^\circ$$

$$\text{Angle } DCB = 123^\circ$$

$$\text{Angle } CBA = 112^\circ$$

$$\text{Angle } DEF = x.$$

Calculate the size of angle  $x$ .

You must show all your working.

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**(Turn over)**

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.

The table below shows some of the information that she needs.

|        | NUMBER OF COUNTERS | PIE CHART ANGLE |
|--------|--------------------|-----------------|
| Red    | 25                 |                 |
| Blue   |                    | $180^\circ$     |
| Yellow |                    |                 |
|        | Total = 90         |                 |

- (a) Complete the table above.

You must show all your working.

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[5 marks]

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 on the previous page.

[2 marks]

continued on the next page . . .

(Turn over)

**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.

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**[2 marks]**

**(Turn over)**

5. (a) Write **0.03435** correct to two significant figures.

Circle your answer.

|             |              |                |
|-------------|--------------|----------------|
| <b>0.03</b> | <b>0.033</b> | <b>0.0344</b>  |
|             | <b>0.034</b> | <b>0.03400</b> |

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[1 mark]

continued on the next page . . .

(Turn over)

## Question 5 continued

5. (b) Convert  $6.7 \text{ m}^2$  into  $\text{cm}^2$

Circle your answer.

|         |      |           |
|---------|------|-----------|
| 670     | 6700 | 67 000    |
| 670 000 |      | 6 700 000 |

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[1 mark]

continued on the next page . . .

(Turn over)

## Question 5 continued

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

Circle your answer.

|       |              |                |
|-------|--------------|----------------|
| $27e$ | $3(4e + 5)$  | $12(e + 15)$   |
|       | $5(12e + 3)$ | $15(0.8e + 3)$ |

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[1 mark]

(Turn over)

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.

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The whole number is \_\_\_\_\_

[2 marks]

7. Calculate  $\frac{15.4^2}{14.59 - 7.67}$ , correct to  
1 decimal place.

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[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        |

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[2 marks]

(Turn over)

**Question 8 continued**

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

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**[2 marks]**

**(Turn over)**

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  **$310^\circ$**

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

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[2 marks]

continued on the next page . . .

(Turn over)

## 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**.

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Actual length of **AC** = \_\_\_\_\_ km

Bearing of point **C** from point **A**

= \_\_\_\_\_ °

[2 marks]

(Turn over)

**10. (a) Express 21.76 as a percentage of 32**

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**[2 marks]**

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

**(Turn over)**

### Question 10 continued

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

[illegible]

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**[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  $\text{g/cm}^3$**

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**(Turn over)**

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.

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**[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.

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**(Turn over)**

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.

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**[3 marks]**

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

**(Turn over)**

## 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

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[1 mark]

continued on the next page . . .

(Turn over)

**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  $x$ .**

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**[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,

$$XZ = 7 \text{ cm}$$

$$\text{Angle } XZY = 41^\circ$$

Angle  $YXZ$  is a right angle.

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

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**[3 marks]**

16. Two times are recorded correct to the NEAREST 0.1 SECOND.

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|--------------|
| 12.4 seconds |
| 25.5 seconds |

Calculate the greatest possible difference between these times.

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[3 marks]

(Turn over)

[illegible]

**(Turn over)**

- 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.**

- (a) Complete the tree diagram.**

**[2 marks]**

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

**Question 18 continued**

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

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**[3 marks]**

**(Turn over)**

- 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.**

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

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

[illegible]



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[4 marks]

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**END OF PAPER**

**TOTAL 80 MARKS**

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**(Turn over)**

| <b>Question<br/>number</b> | <b>Additional pages, if required. Write the<br/>question number(s) in the left - hand margin.</b> |
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| Question<br>number | Additional pages, if required. Write the<br>question number(s) in the left - hand margin. |
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**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**

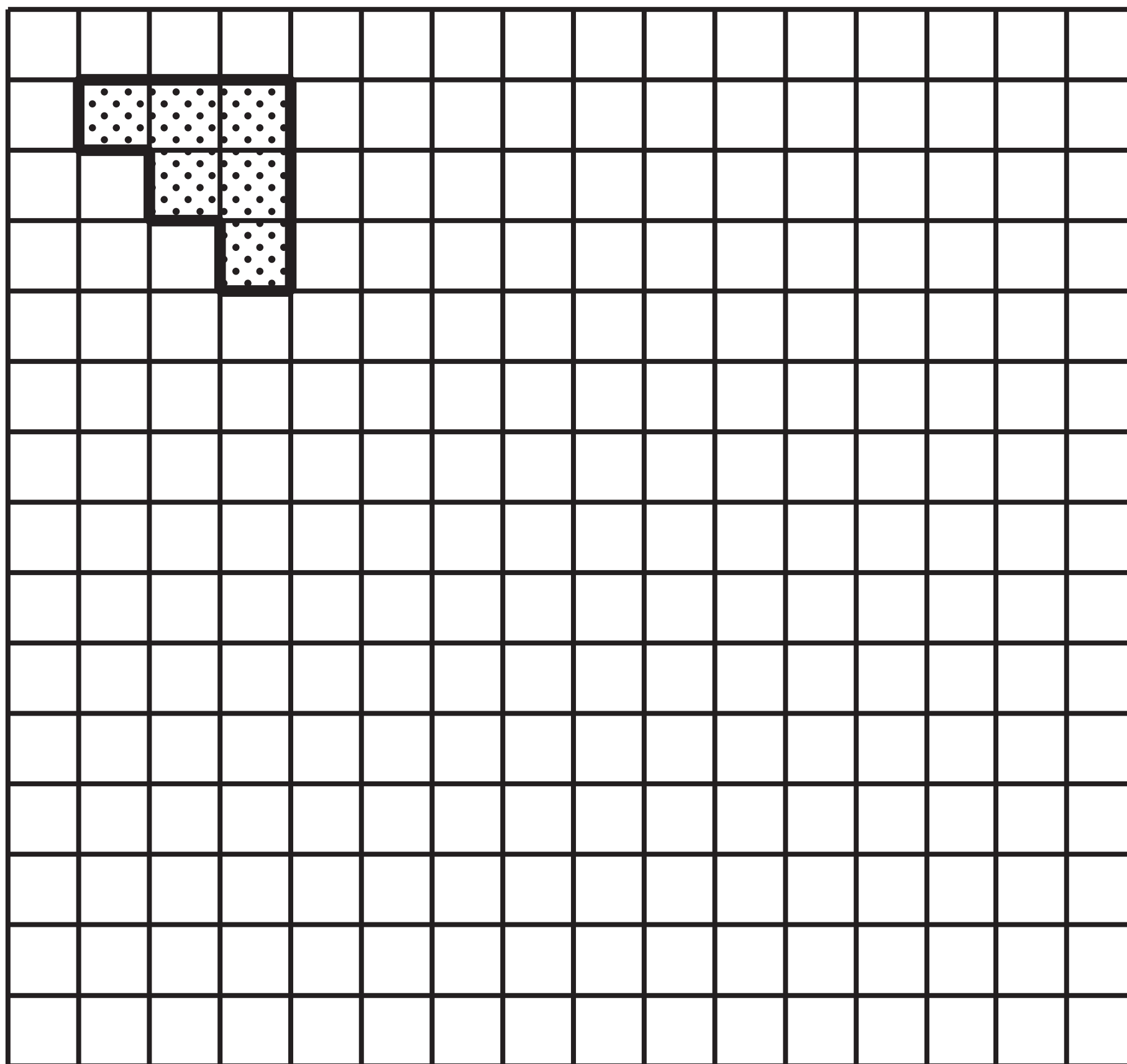
**Surname:** \_\_\_\_\_

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

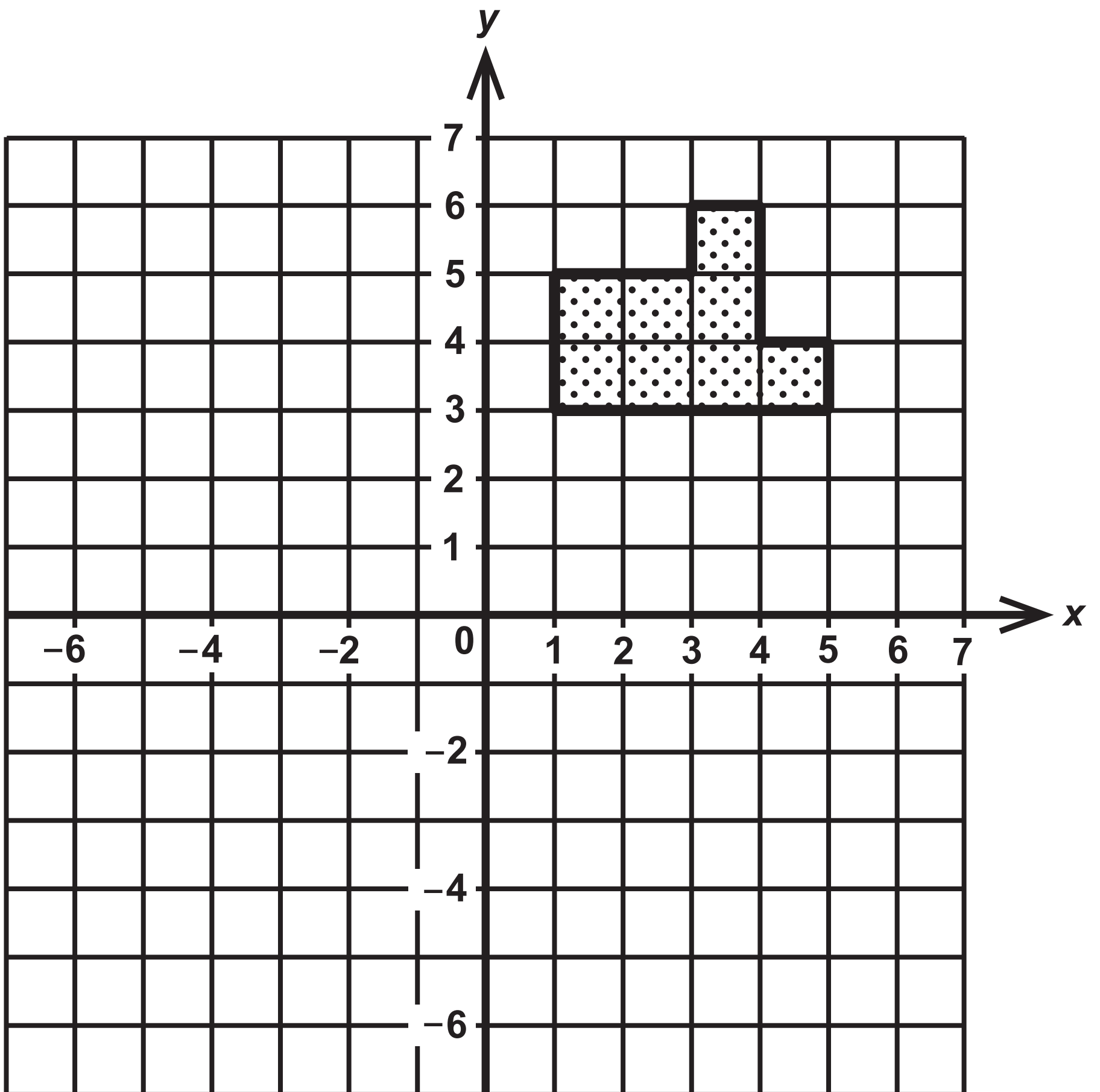
**Centre Number:** \_\_\_\_\_

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

## Question 1 (a)

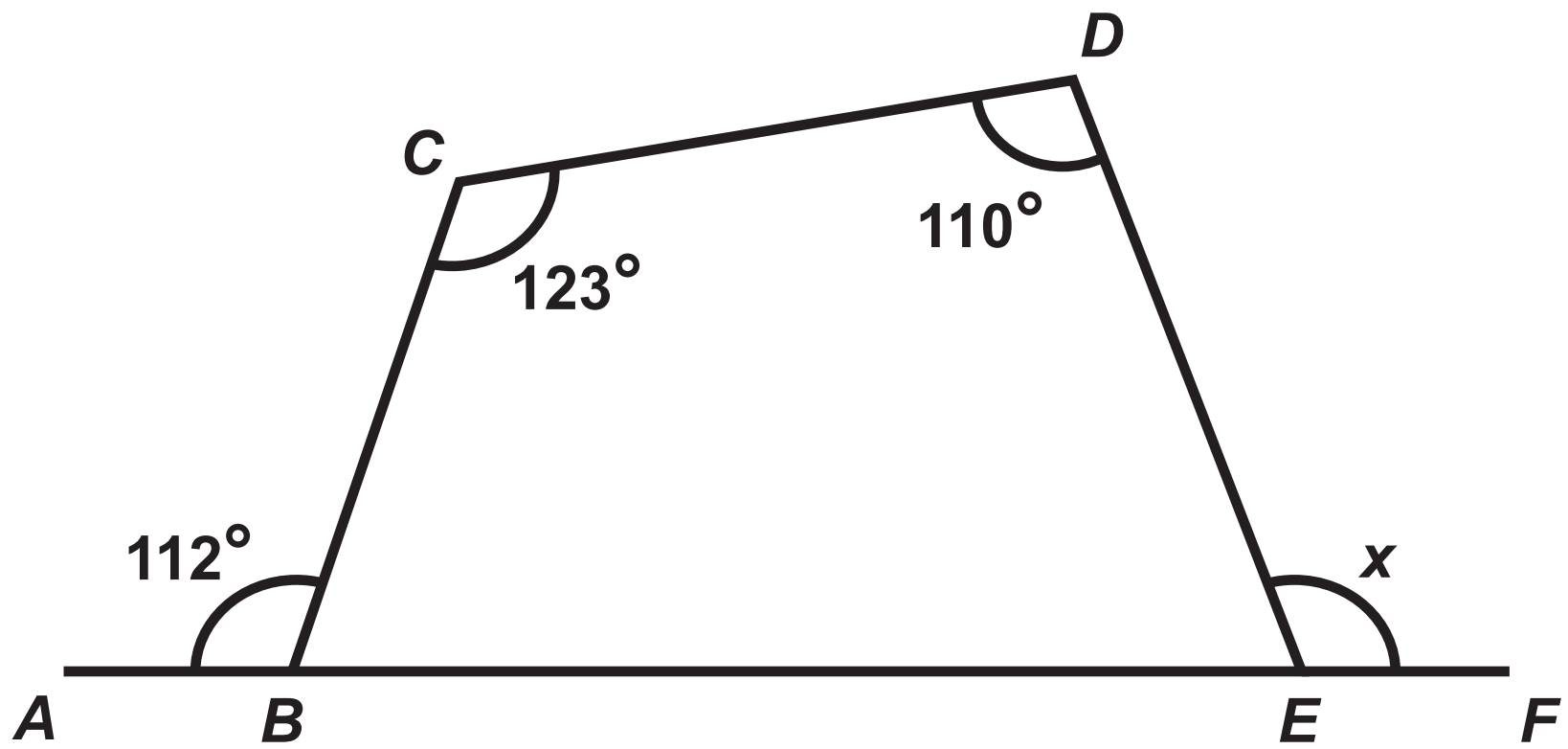


# Question 1 (b)

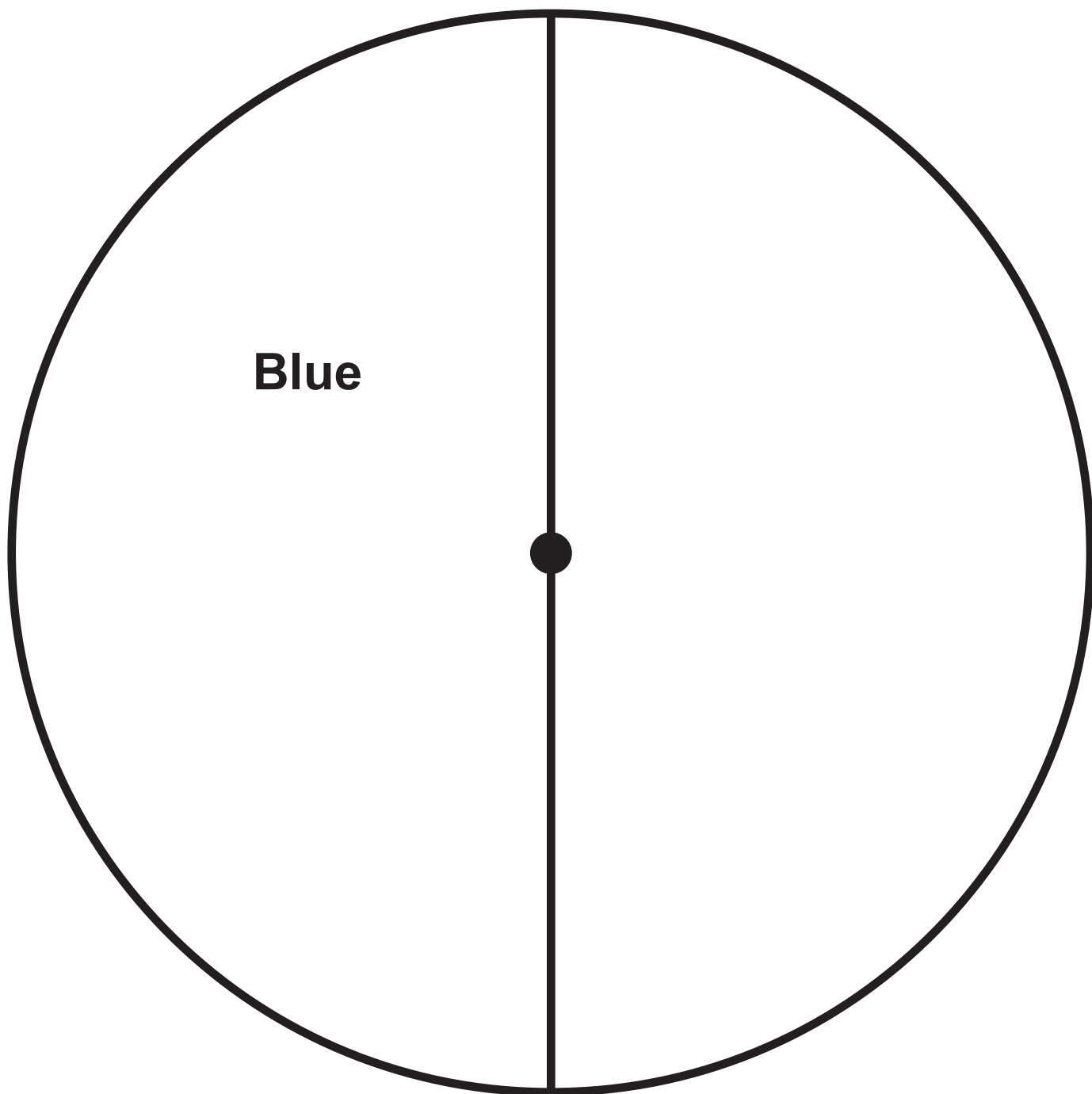


### Question 3

Diagram NOT drawn to scale

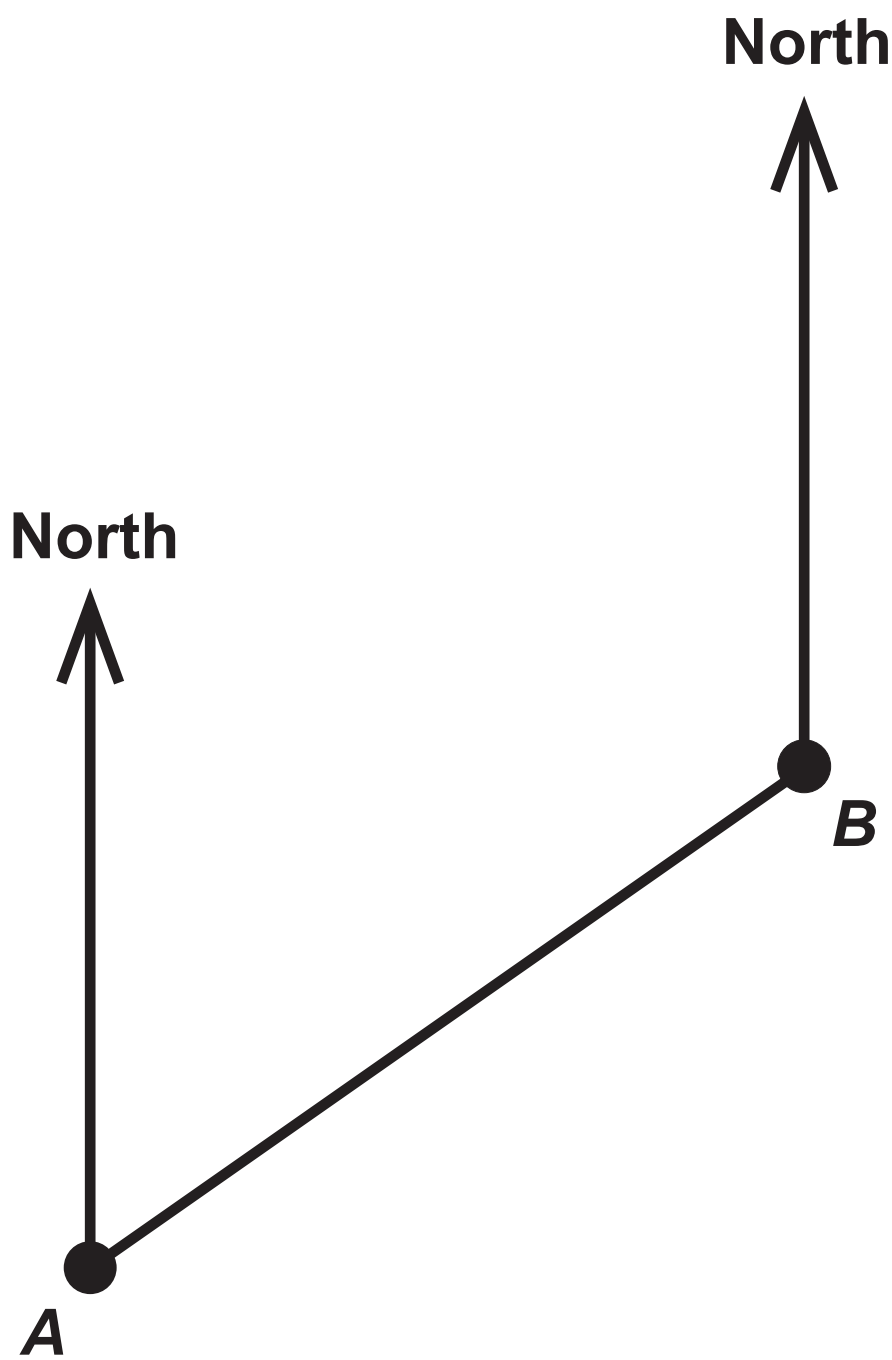


### Question 4 (b)



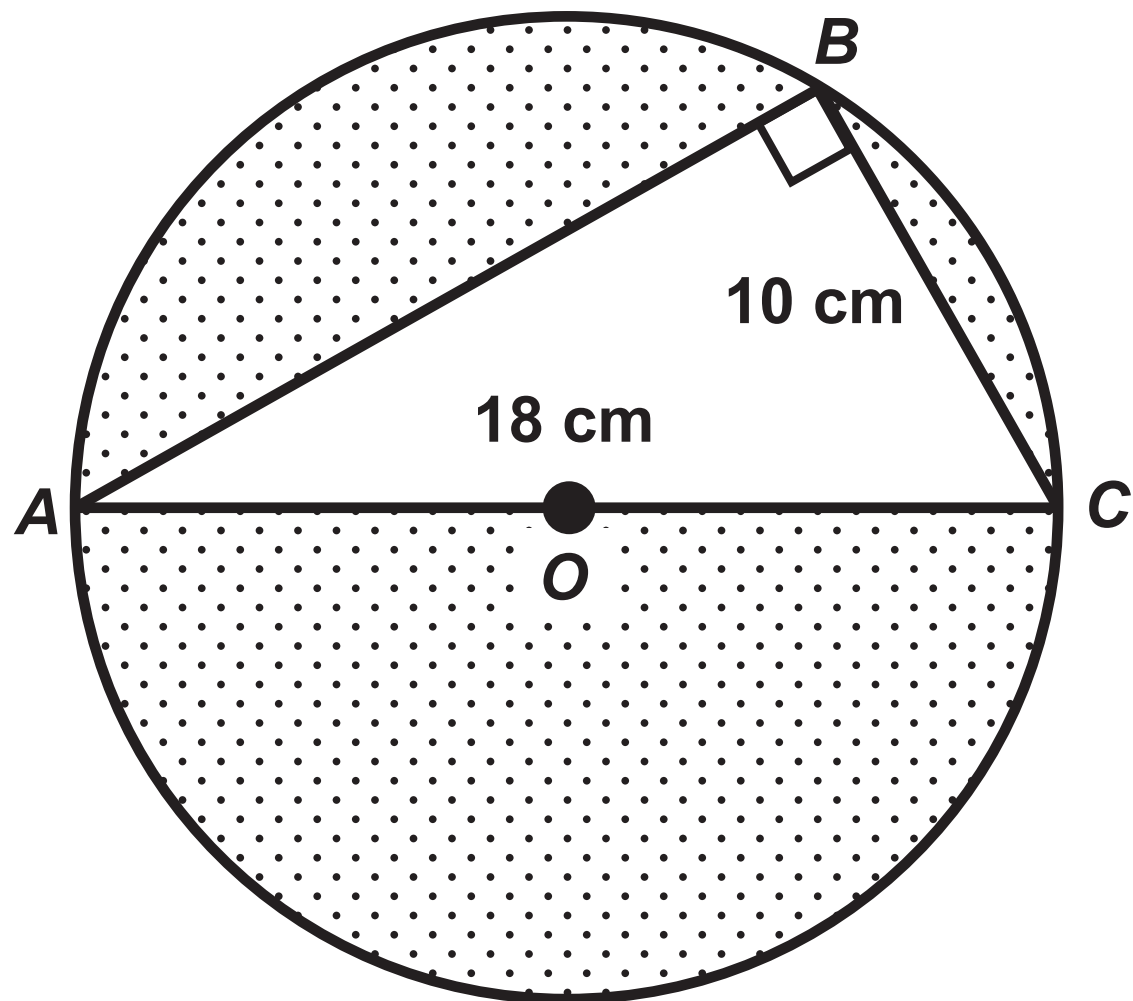
Question 9

Scale: 1 cm represents 5 km



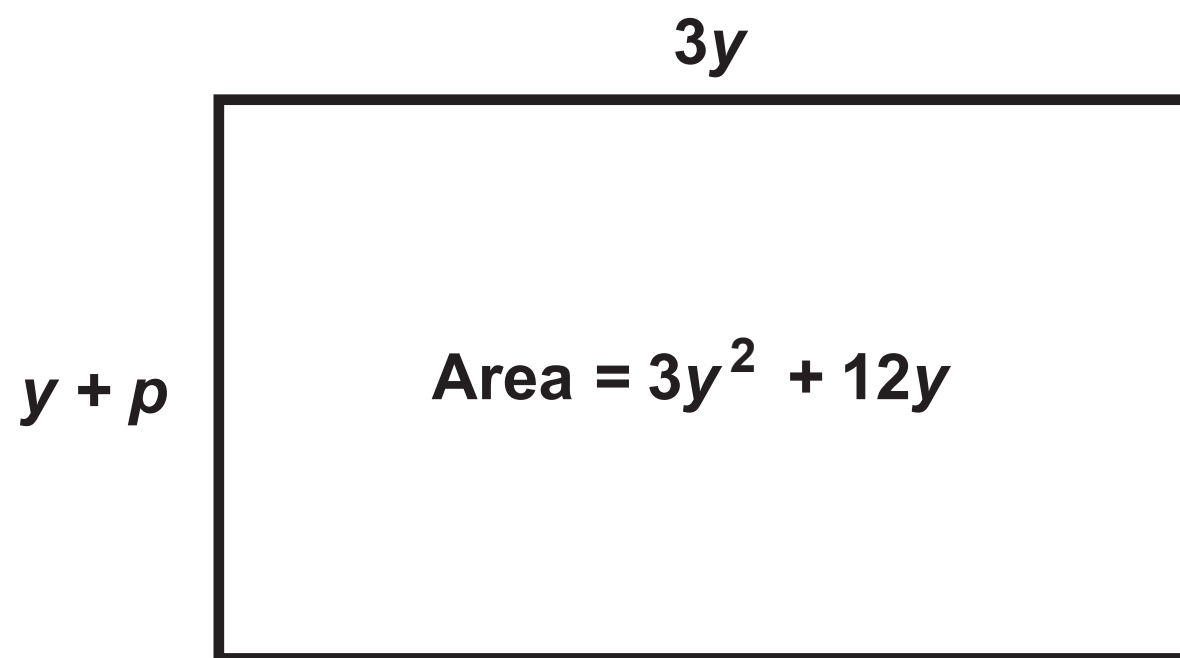
### Question 13

Diagram NOT drawn to scale



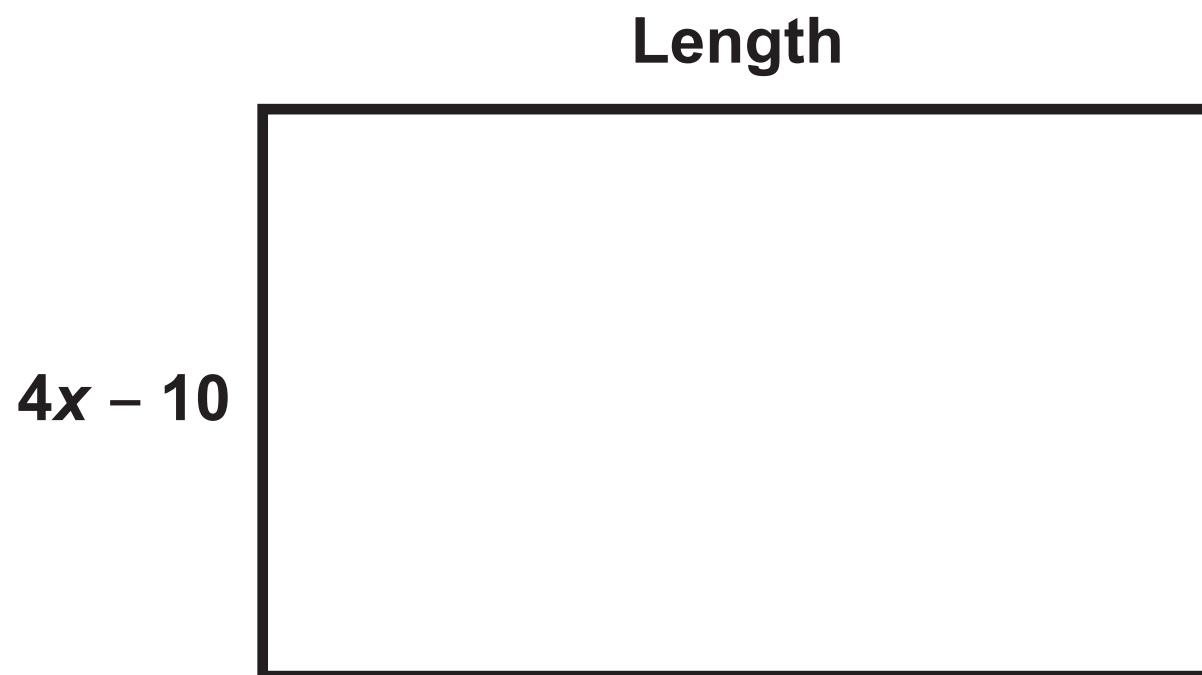
### Question 14 (a)

Diagram NOT drawn to scale



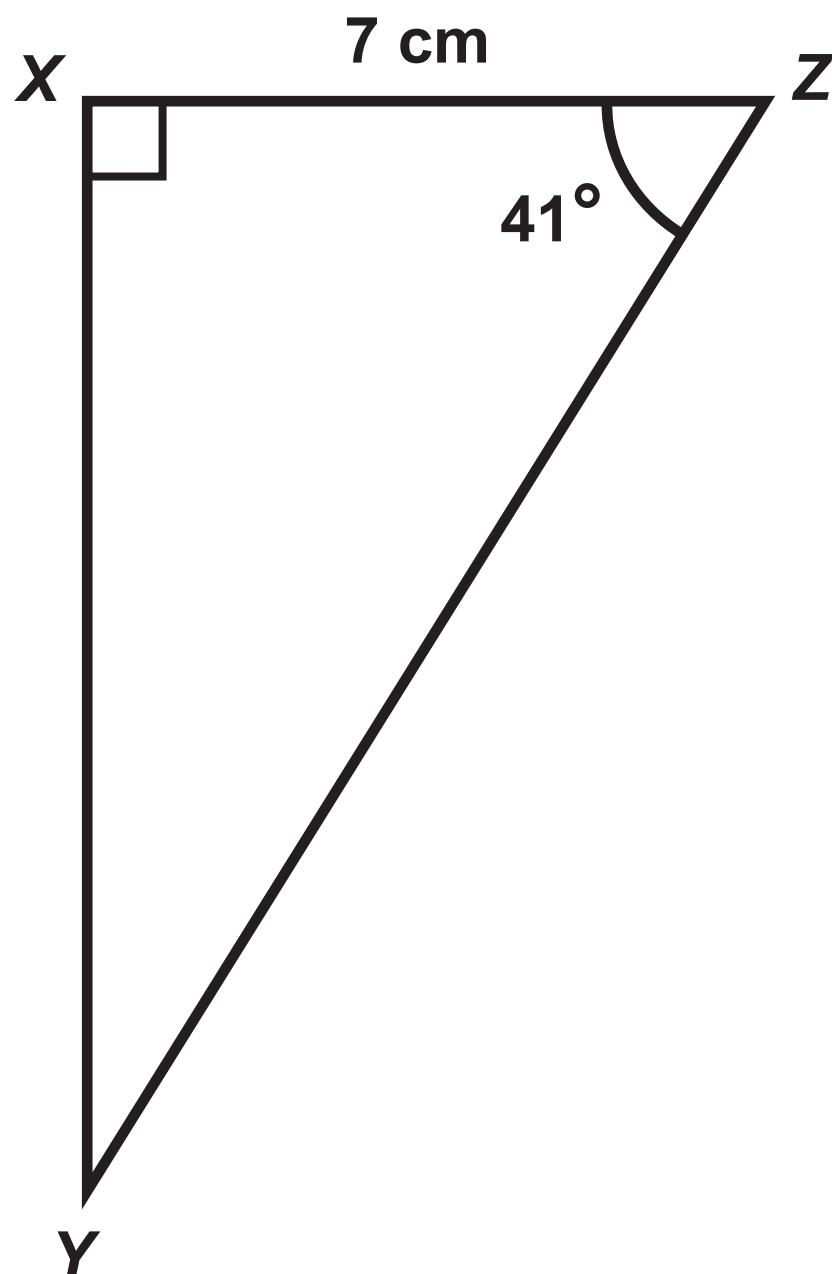
**Question 14 (b) (ii)**

**Diagram NOT drawn to scale**

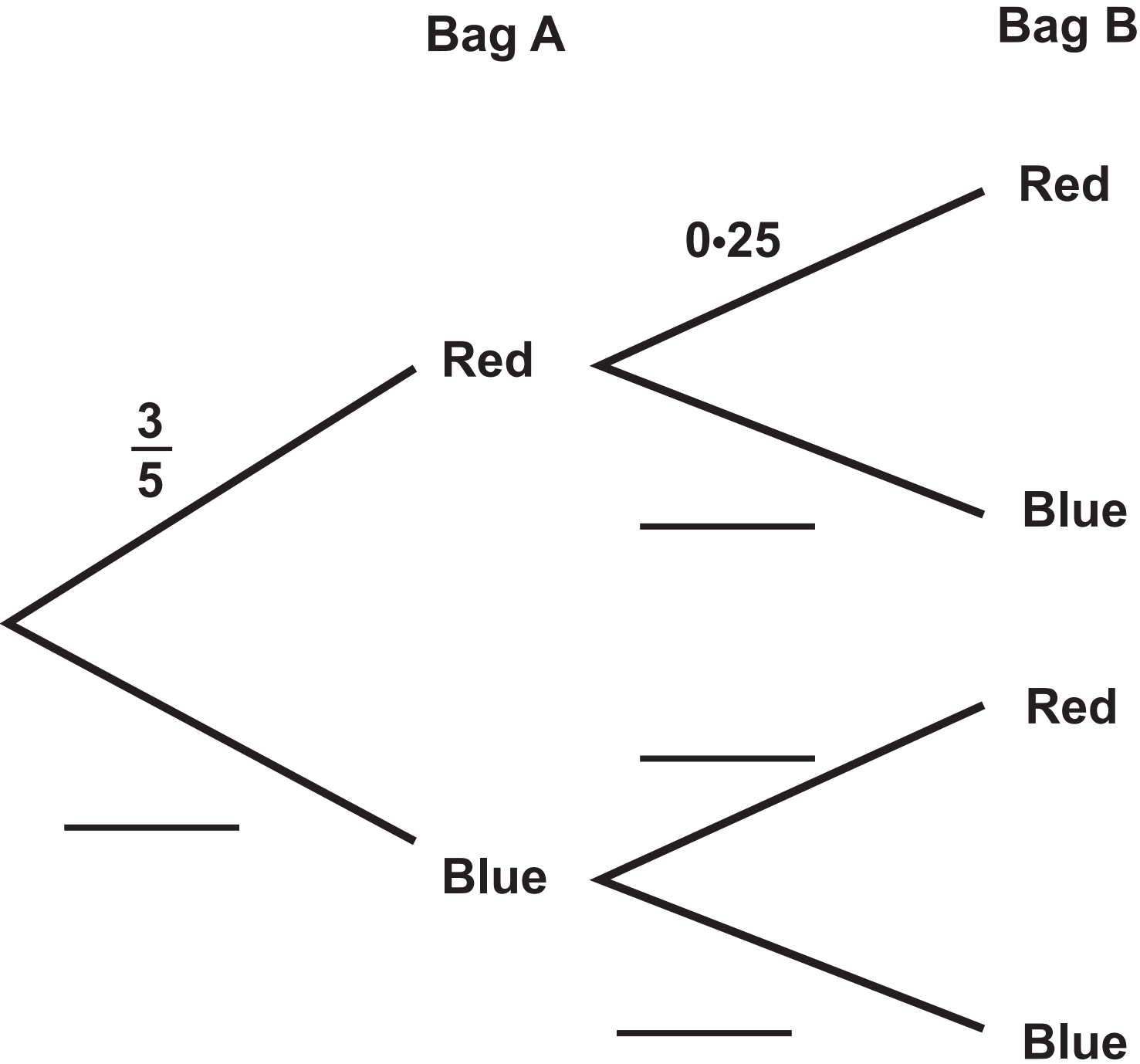


### Question 15

Diagram NOT drawn to scale



Question 18



**GCSE  
MATHEMATICS  
and  
NUMERACY**



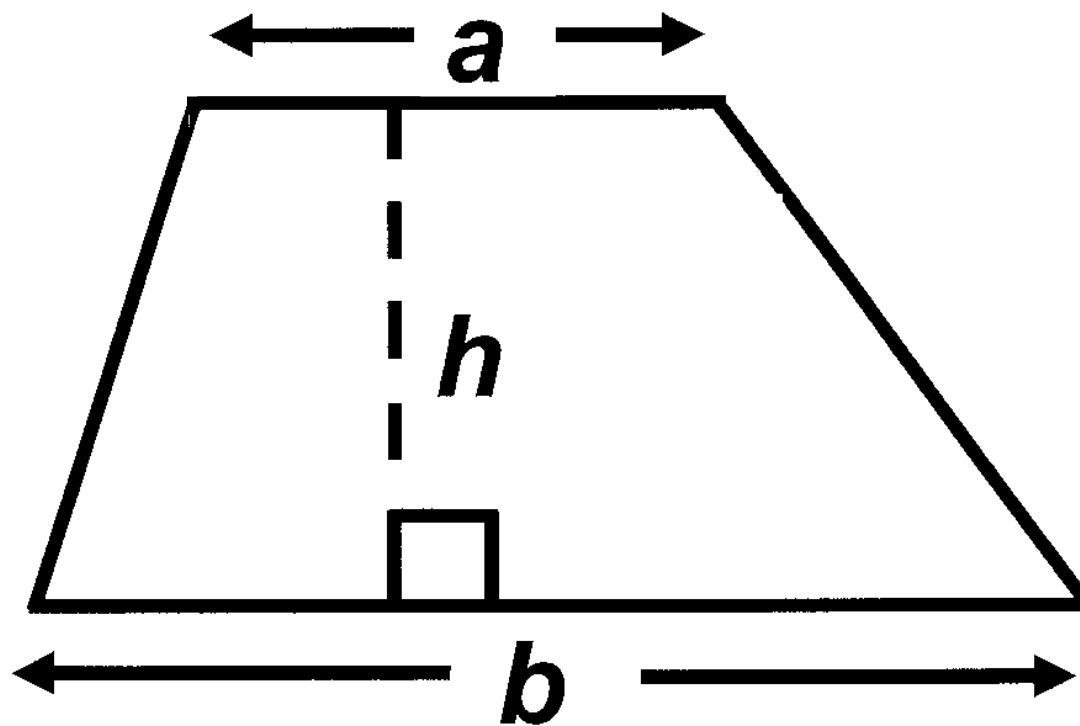
**FORMULA LIST  
INTERMEDIATE TIER  
GCSE**

**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  $\times$  length

