



GCSE



C300U10 – 1

WEDNESDAY, 6 NOVEMBER 2024 – MORNING

**MATHEMATICS – COMPONENT 1
NON – CALCULATOR MATHEMATICS
FOUNDATION TIER**

**2 hours 15 minutes plus your additional
time allowance**

**THE USE OF A CALCULATOR IS NOT
PERMITTED IN THIS EXAMINATION**

Surname: _____

First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	5	
2.	3	
3.	3	
4.	2	
5.	4	
6.	4	
7.	5	
8.	4	
9.	7	
10.	6	
11.	6	
12.	5	
13.	2	
14.	6	
15.	3	
16.	5	
17.	5	
18.	4	
19.	6	
20.	7	
21.	3	
22.	6	
23.	6	
24.	7	
25.	6	
Total	120	

ADDITIONAL MATERIALS

An additional formulae booklet.

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

ITEMS INCLUDED WITH QUESTION PAPER

A separate Formula List.

A separate Diagram Booklet.

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 this booklet, taking care to number the question(s) correctly.

(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.

You are reminded of the need for good English and orderly, clear presentation in your answers.

(Turn over)

1. (a) What number must be added
to **268** to make **415**?

[1 mark]

- (b) Work out 16×6

[1 mark]

continued on the next page . . .

(Turn over)

Question 1 continued

1. (c) Work out $\frac{0.5 \times 30}{6}$

[2 marks]

(d) Work out $5 \times 3 + 4 \div 2$

[1 mark]

(Turn over)

2. Look at the diagram for Question 2 in the separate Diagram Booklet. The diagram is a pictogram.

One day Phoebe recorded the number of hours of sunshine in some cities in England.

The pictogram shows some of her results.

- (a) There were **10 hours** of sunshine in London.
Complete the key for the pictogram.

[1 mark]

- (b) How many more hours of sunshine did Liverpool have than Newcastle?

[1 mark]

- (c) There were **7 hours** of sunshine in Southampton.

Complete the pictogram.

[1 mark]

3. Complete the table below so that each row shows a decimal and its equivalent simplified fraction.

The first row has been completed for you.

Decimal	Fraction
0.5	$\frac{1}{2}$
	$\frac{7}{10}$
0.25	
0.03	
	$\frac{11}{50}$

[3 marks]

(Turn over)

4. The recommended time taken to cook a turkey is given by the following formula.

Time =

20 minutes per kilogram + 90 minutes

Calculate the time taken to cook an 8 kg turkey.

Time taken = _____ minutes
[2 marks]

(Turn over)

5. (a) Write $\frac{8}{32}$ as a fraction in its simplest form.

[1 mark]

- (b) Write $\frac{7}{25}$ as a percentage.

[1 mark]

- (c) Find $\frac{2}{9}$ of 45

[2 marks]

(Turn over)

6. (a) Look at the diagram for Question 6 (a) in the separate Diagram Booklet.

(i) Draw a line parallel to AB , through the point C .

[1 mark]

(ii) Draw a line perpendicular to AB , through the point D .

[1 mark]

(b) Look at the diagram for Question 6 (b) in the separate Diagram Booklet. The plan and front elevation of a 3D shape are shown.

Circle the correct name for the 3D shape.

cuboid
square-based pyramid
cone
triangle-based pyramid
triangular prism

[1 mark]

continued on the next page . . .

(Turn over)

Question 6 continued

6. (c) Nicola thinks that an angle of 190° is an obtuse angle.

Explain why Nicola is incorrect.

[1 mark]

7. Look at the information for Question 7 in the separate Diagram Booklet. It shows part of a train timetable.

(a) How many minutes should the train journey from Brilfax to Drago take?

[2 marks]

continued on the next page . . .

Question 7 continued

7. (b) Carley lives in Ashby.

She works Monday to Friday in an office in Elderville.

Every morning she catches the 08:19 train from Ashby.

Last week the train left Ashby on time each morning.

The train was late arriving at Elderville on Monday but arrived on time on the other four days.

For the week, the total train journey time to work was 5 hours and 6 minutes.

How many minutes late was the train when it arrived at Elderville on Monday?

(Turn over)

**The train was _____ minutes
late on Monday**

[3 marks]

(Turn over)

8. Lewis buys the following items:

- 3 bottles of milk costing £1.50 each
- 1 loaf of bread costing £1.40
- 2 blocks of butter.

Lewis pays with a £10 note and is given 60p change.

How much does each block of butter cost?

You must show all your working.

Each block of butter costs _____

[4 marks]

(Turn over)

- 9. Adrian works in a factory.**

His normal rate of pay is £14 per hour.

Adrian usually works 22 hours per week and overtime if needed.

Any overtime hours are paid at a rate of $1\frac{1}{2}$ times his normal rate of pay.

- (a) One week Adrian worked for 28 hours.**

Calculate Adrian's pay for this week.

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(Turn over)

[4 marks]

9. (b) The following week, Adrian's normal rate of pay increased.

He worked for **22 hours** and was paid **£330**

Show that Adrian's rate of pay increased by less than **10%**

[3 marks]

(Turn over)

10. (a) Solve $6x - 3 = 27$

[2 marks]

(b) Simplify $2w \times 2w \times 3w$

[2 marks]

continued on the next page . . .

(Turn over)

Question 10 continued

10. (c) (i) One day Nick spent k minutes on his mobile phone.

Ellie spent 10 minutes less than Nick on her mobile phone.

Write an expression, in terms of k , for the number of minutes that Ellie spent on her mobile phone.

[1 mark]

- (ii) A dress costs t pounds.

Write an expression, in terms of t , for the cost of the dress in pence.

[1 mark]

(Turn over)

11. Look at the diagram for Question 11 in the separate Diagram Booklet.

The diagram is a distance–time graph.

Oliver went for a ride on his bike.

Some of his journey is represented on the distance–time graph shown.

(a) What was Oliver’s average speed between 13:00 and 15:00?

Oliver’s average speed = _____ mph
[2 marks]

(b) Give an explanation for the shape of the graph between 17:00 and 18:00

[1 mark]

continued on the next page . . .

(Turn over)

Question 11 continued

- 11. (c) Between which two times was Oliver cycling at the greatest speed?**

_____ and _____

[1 mark]

- (d) Oliver started the final part of his cycle ride at 18:00**

He cycled 20 miles at an average speed of 8 mph.

Draw this part of the cycle ride on the distance–time graph.

[2 marks]

(Turn over)

12. (a) Teddy has to work out $\sqrt{400}$

His answer is 200

Is Teddy's answer correct?

Yes ☐ No ☐

Explain why.

[1 mark]

(b) Calculate $5^3 + 5^2$

[2 marks]

continued on the next page . . .

(Turn over)

Question 12 continued

- 12. (c) Write down the number that is both a factor of 16 and a prime number.**

[1 mark]

- (d) Given that $78 \times 132 = 10\,296$ write down the answer to $10\,296 \div 780$**

[1 mark]

(Turn over)

- 13. Ledina goes to Brown Abbey School.
It is a secondary school with 1500 pupils.**

Ledina wants to carry out a survey to find out pupils' views of the school uniform.

She plans to ask 10 pupils in Year 7

Give TWO criticisms of Ledina's plan.

Criticism 1 _____

Criticism 2 _____

[2 marks]

14. Harry is a football player.

(a) Each training session, he spends:

- **18% of the time practising shooting**
- **$\frac{3}{20}$ of the time practising tackling**
- **the rest of the time practising passing.**

What percentage of each training session does Harry spend practising passing?

[3 marks]

continued on the next page . . .

(Turn over)

Question 14 continued

- 14. (b) Harry borrows £80 to pay for a new pair of football boots.**

Simple interest is charged at 5% per month on the money he borrowed.

Harry does not make any repayments.

After how many months will he owe £120?

[3 marks]

(Turn over)

15. Look at the diagram for Question 15 in the separate Diagram Booklet. The diagram is a scale drawing. The points **Y** and **Z** are shown on the scale drawing. The scale is **1 cm represents 25 metres**.

Point **X** is **400 m** from point **Y** on a bearing of **150°**

Plot point **X** on the scale drawing.

Give the bearing of point **X** from point **Z**.

Bearing of **X** from **Z** = _____[°]

[3 marks]

16. (a) There are between 30 and 40 marbles in a bag.
Amy and Beatrice share the marbles in the
ratio 1 : 8

There are no marbles left in the bag.

How many marbles does Amy have?

Amy has _____ marbles

[2 marks]

continued on the next page . . .

Question 16 continued

16. (b) Chloe and Davina have a different bag of marbles.

They share their marbles in the ratio 3 : 5

Davina gets 30 more marbles than Chloe.

How many marbles do they each get?

Chloe gets _____ marbles

Davina gets _____ marbles

[3 marks]

(Turn over)

17. Kristoff is a baker.

He is baking bread.

The flour that he needs is sold in bags of two different sizes:

Large bag of flour contains 2.5 kg costs £1.10	Small bag of flour contains 1.5 kg costs £0.80
---	---

30 of the large bags contain EXACTLY the quantity of flour that Kristoff needs.

The local supplier only has the small bags in stock.

Kristoff buys exactly the quantity of flour he needs in small bags.

How much more will he pay than if he bought the same quantity in large bags?

You must show all your working.

(Turn over)

Kristoff will pay _____ more.

[5 marks]

18. Look at the diagram for Question 18 in the separate Diagram Booklet. The diagram is NOT drawn to scale.

In the diagram:

ABC is an isosceles triangle

Angle $BCA = 50^\circ$

DA is a straight line

Angle $DAB = 40^\circ$

Reflex angle $CAD = x^\circ$

Show that $x = 255$

You must give a reason for each step of your answer.

(Turn over)

[4 marks]

(Turn over)

19. A bag contains some coloured beads.

Some are red, some are yellow, some are orange and the rest are green.

One bead is selected at random from the bag.

The probability of selecting:

- a yellow bead is twice the probability of selecting an orange bead**
- a green bead is three times the probability of selecting a yellow bead.**

(a) Write down the ratio of the number of yellow beads to the number of orange beads to the number of green beads.

yellow beads : orange beads : green beads

= _____ : _____ : _____

[2 marks]

continued on the next page . . .

(Turn over)

Question 19 continued

19. (b) The probability of selecting a red bead is 0.46

What is the probability of selecting a green bead?

You must show all your working.

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(Turn over)

Probability of selecting a green bead

= _____

[4 marks]

(Turn over)

20. (a) Expand and simplify $3(5p - 2) - 7(p - 4)$

[2 marks]

continued on the next page . . .

(Turn over)

Question 20 continued

20. (b) Look at the diagram for Question 20 (b) in the separate Diagram Booklet. The diagram is NOT drawn to scale.

The diagram shows the triangle PQR .

In the diagram:

$$\text{Angle } RPQ = (5x + 7)^\circ$$

$$\text{Angle } PQR = (8x - 27)^\circ$$

$$\text{Angle } QRP = (6x - 9)^\circ$$

Show that the triangle is NOT isosceles.

You must use an algebraic method and not trial and improvement.

[5 marks]

21. $\mathbf{p} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$, $\mathbf{q} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$

Find the values of m and n such that

$$m(\mathbf{p} + \mathbf{q}) = \begin{pmatrix} 5 \\ n \end{pmatrix}$$

$m =$ _____ $n =$ _____

[3 marks]

(Turn over)

22. Look at the table for Question 22 in the separate Diagram Booklet. The table gives information about a pizza delivery company.

Jim works in the office for a pizza delivery company. Last night he recorded the times for the first 50 deliveries.

These times are recorded in the table.

(a) Calculate an estimate of the mean time for these 50 deliveries.

[4 marks]

continued on the next page . . .

(Turn over)

Question 22 continued

- 22. (b) Calculate an estimate of the percentage of these deliveries that took **25 minutes** or more.**

[2 marks]

(Turn over)

23. (a) Simplify the following ratio,

$$15 \text{ cm}^2 : 300 \text{ mm}^2$$

[2 marks]

continued on the next page . . .

(Turn over)

Question 23 continued

23. (b) Sura is making a cake. The main ingredients are flour, sugar and dried fruit.

She uses these ingredients with their masses in the ratio $5 : 3 : 7$

(i) What fraction of the main ingredients is the mass of the dried fruit?

[1 mark]

continued on the next page . . .

(Turn over)

Question 23 (b) continued

23. (b) (ii) The combined mass of the flour and sugar is 560 g.

What is the mass of the dried fruit?

[3 marks]

(Turn over)

24. Hannah and Imran often play badminton and tennis matches against each other.

The probability that Hannah wins a badminton match is $\frac{9}{10}$

The probability that Hannah wins both a badminton match AND a tennis match is $\frac{9}{50}$

One Saturday, Hannah and Imran play one badminton match and one tennis match.

The outcomes of the matches are independent.

- (a) Look at the diagram for Question 24 (a) in the separate Diagram Booklet. The diagram shows an incomplete tree diagram.

Complete the tree diagram.

[4 marks]

continued on the next page . . .

(Turn over)

Question 24 continued

- 24. (b) Calculate the probability that Hannah wins exactly one match.**

[3 marks]

(Turn over)

25. (a) Look at the diagram for Question 25 (a) in the separate Diagram Booklet. The diagram is NOT drawn to scale.

Four triangles are shown in the diagram,
Triangle *A*, Triangle *B*, Triangle *C*
and Triangle *D*.

For each of the following statements choose
'True', 'False' or 'Need more information'.

Tick ONE box for each statement.

Statement	True	False	Need more information
Triangle <i>A</i> is congruent to Triangle <i>B</i>			
Triangle <i>C</i> is congruent to Triangle <i>D</i>			
Triangle <i>A</i> is congruent to Triangle <i>C</i>			

continued on the next page . . .

[2 marks]
(Turn over)

Question 25 continued

25. (b) Is it possible to draw an isosceles triangle with an exterior angle of 60° ?

Tick the appropriate box and show working to explain your reason.

Yes ☐ No ☐

Reason: _____

[2 marks]

continued on the next page . . .

(Turn over)

Question 25 continued

25. (c) Look at the diagram for Question 25 (c) in the separate Diagram Booklet. The diagram is NOT drawn to scale.

Two triangles are shown in the diagram.

Show that the two triangles are mathematically similar.

[2 marks]

END OF PAPER

TOTAL 120 MARKS

(Turn over)

[illegible]

(Turn over)

[illegible]

(Turn over)

[illegible]

(Turn over)

[illegible]

C300U10-1

WEDNESDAY, 6 NOVEMBER 2024 – MORNING

MATHEMATICS – COMPONENT 1

NON – CALCULATOR MATHEMATICS

FOUNDATION TIER

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

Diagram Booklet

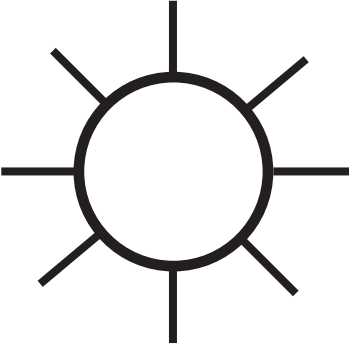
Surname: _____

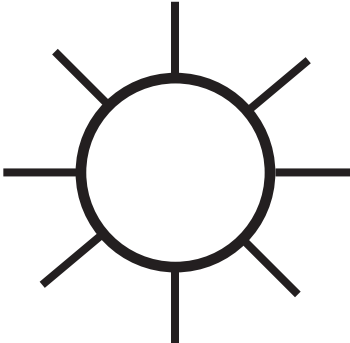
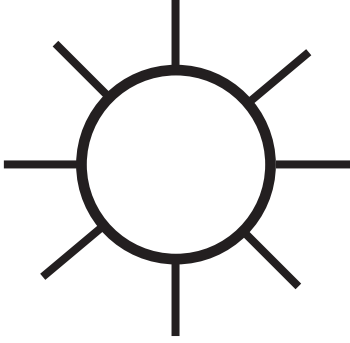
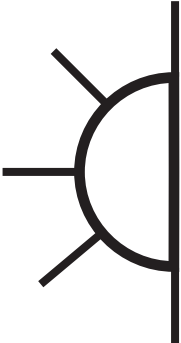
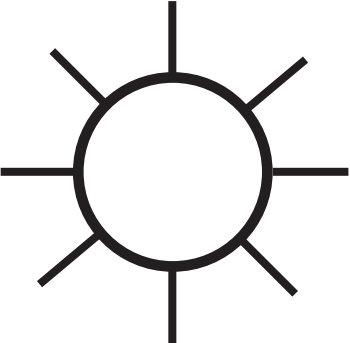
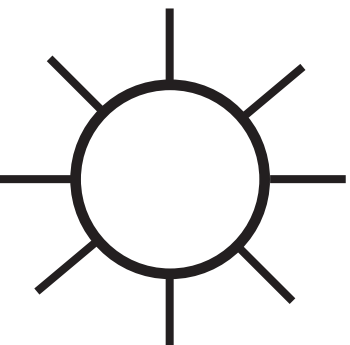
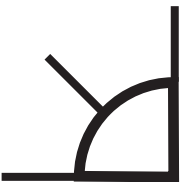
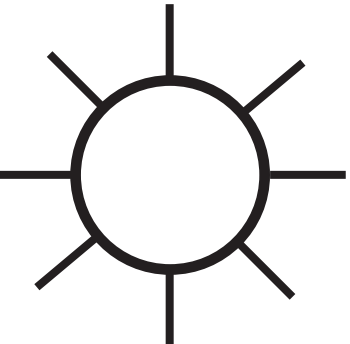
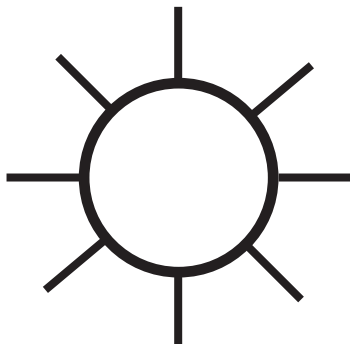
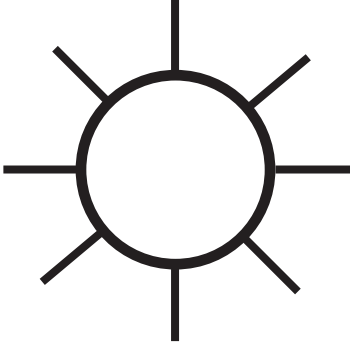
First name(s): _____

Centre Number: _____

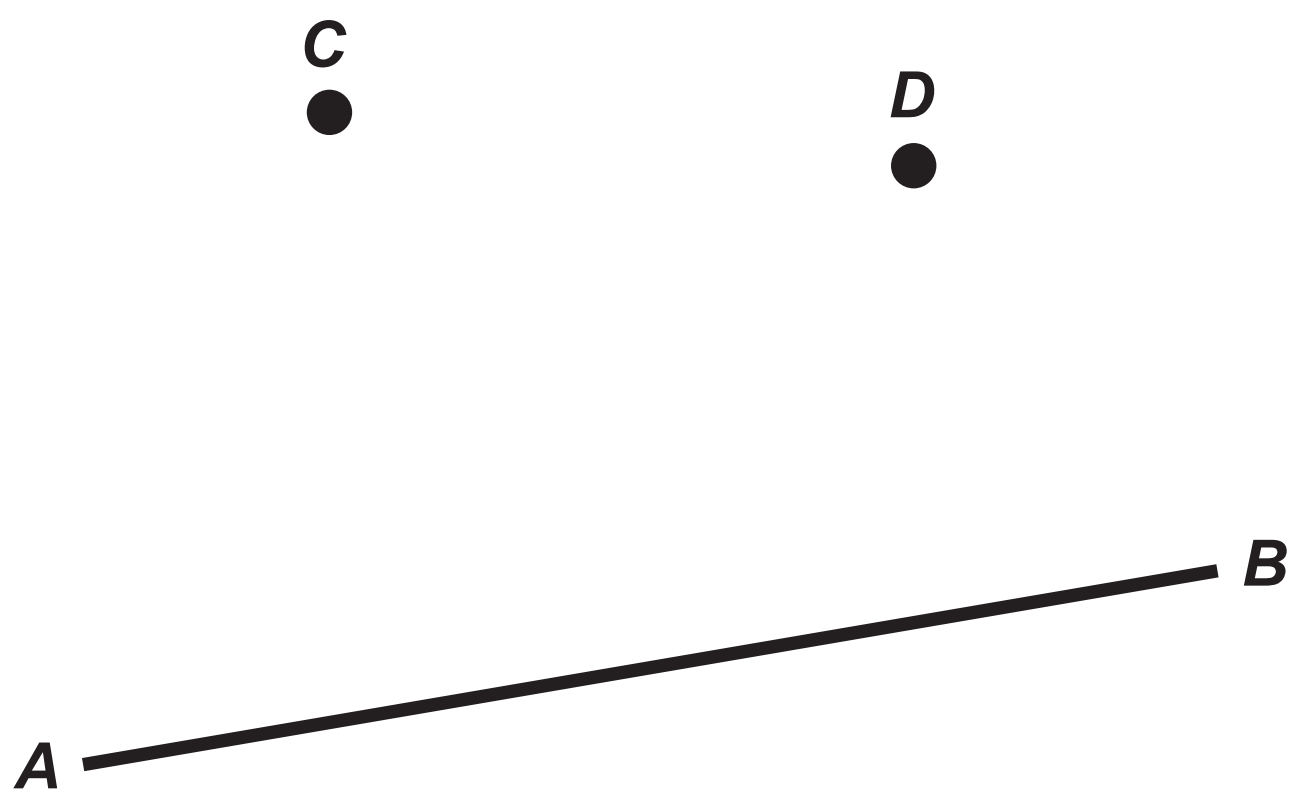
Candidate Number: 0 _____

Question 2

Key :  represents _____ hours

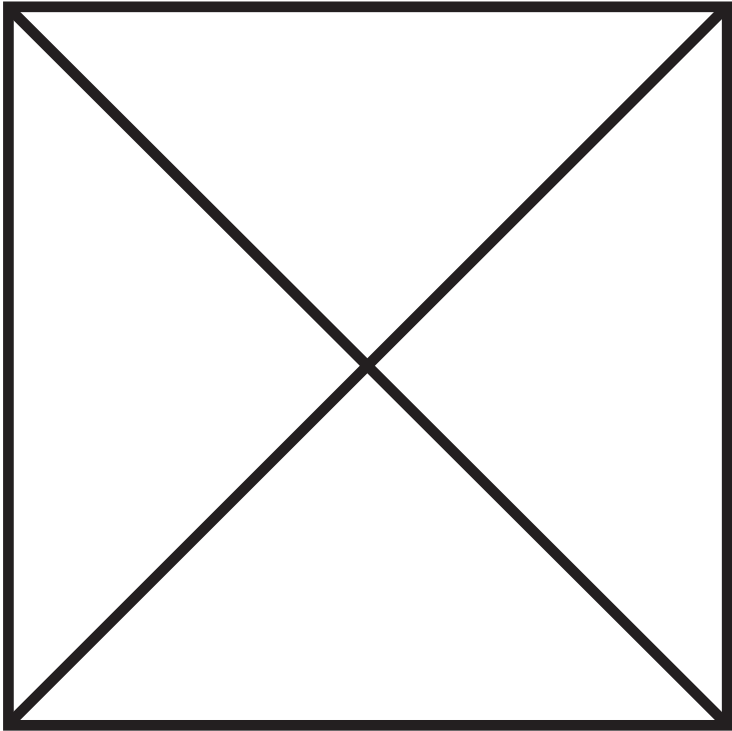
London			
Newcastle			
Birmingham			
Liverpool			
Southampton			

Question 6 (a)

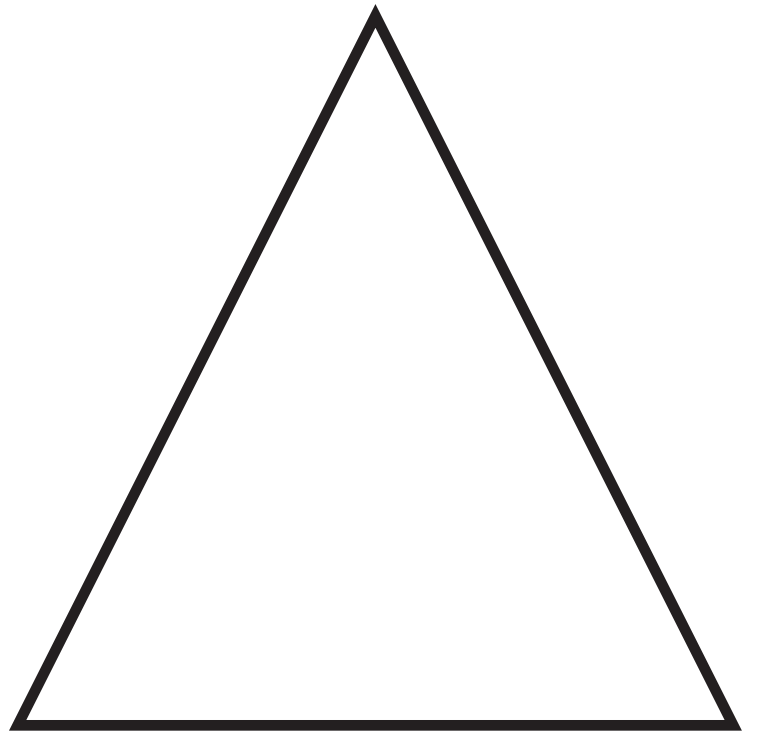


Question 6 (b)

Plan



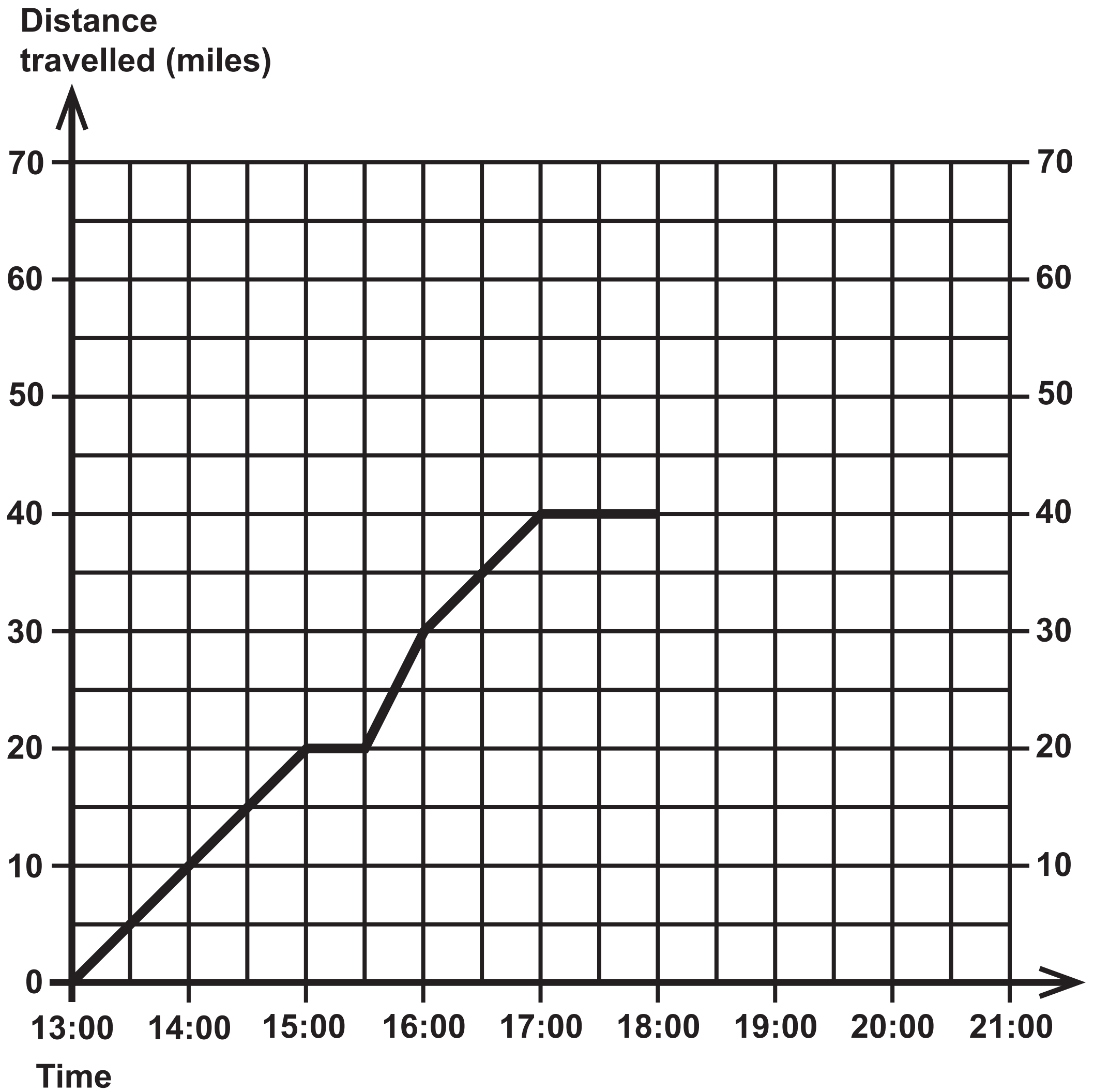
Front



Question 7

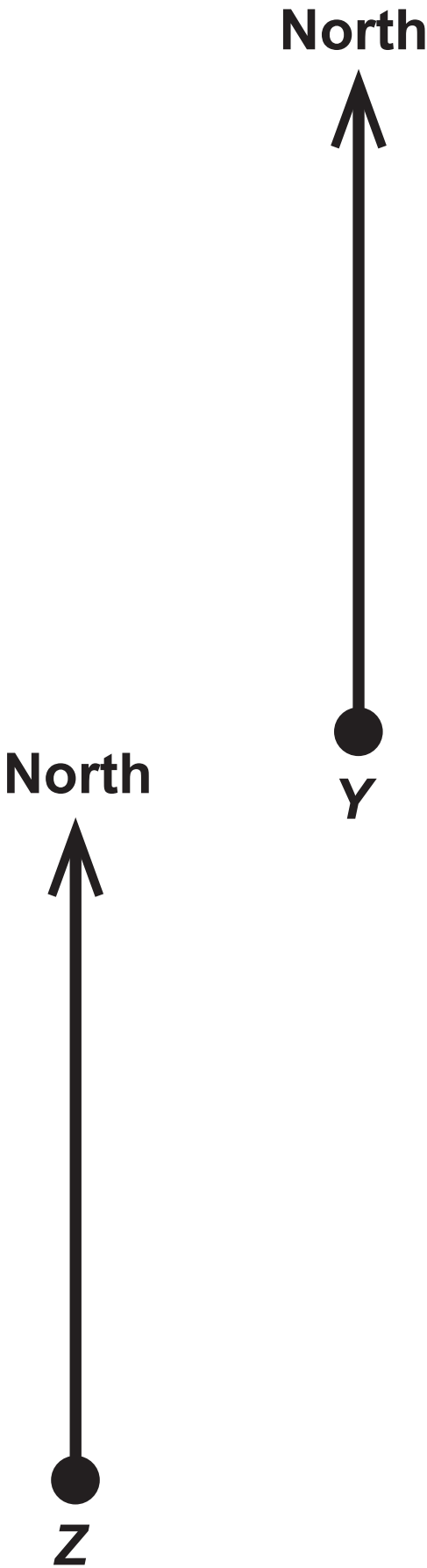
Ashby	08:19
Brilfax	08:25
Chemery	08:42
Drago	09:08
Elderville	09:17

Question 11



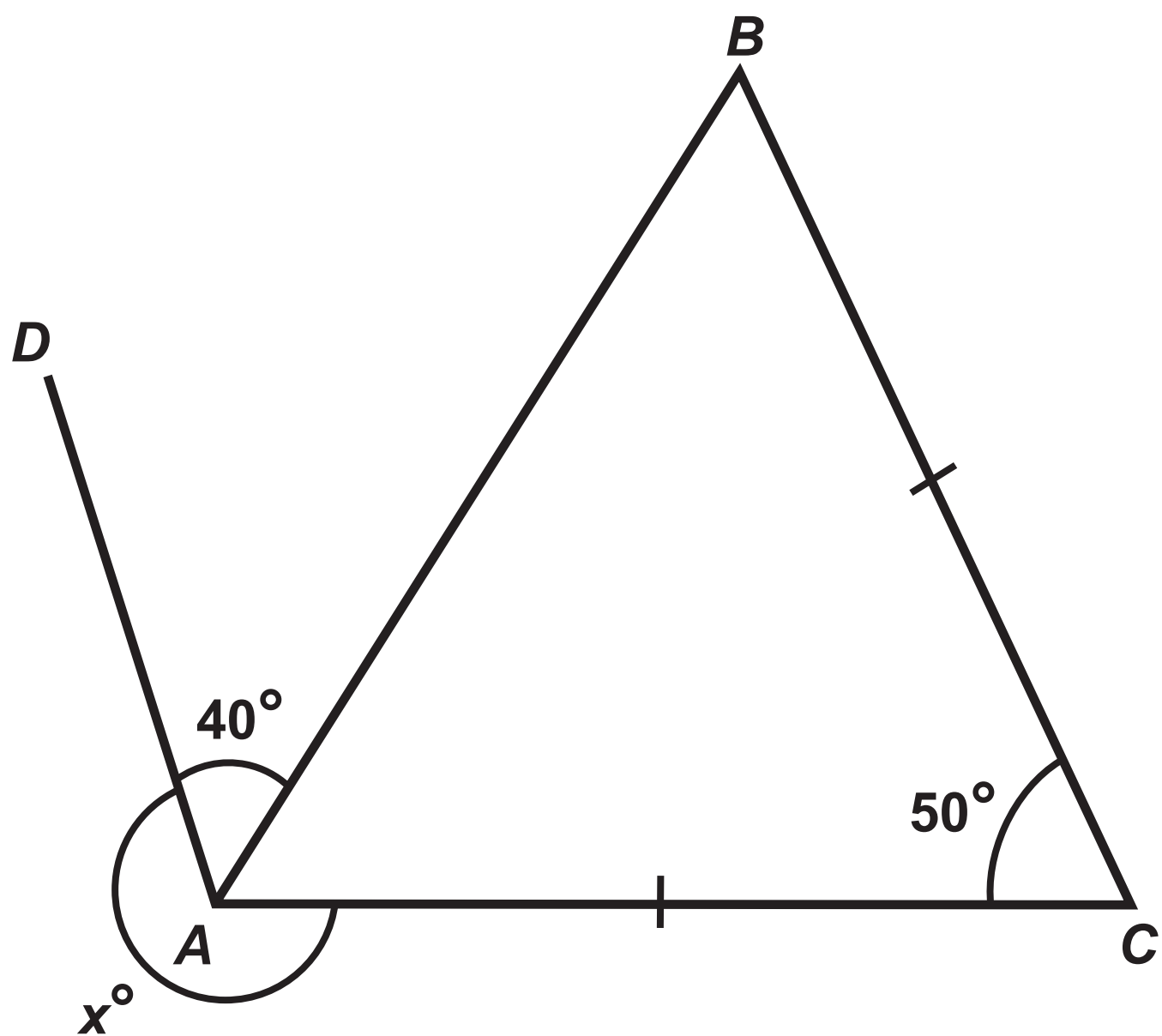
Question 15

Scale: 1 cm represents 25 metres



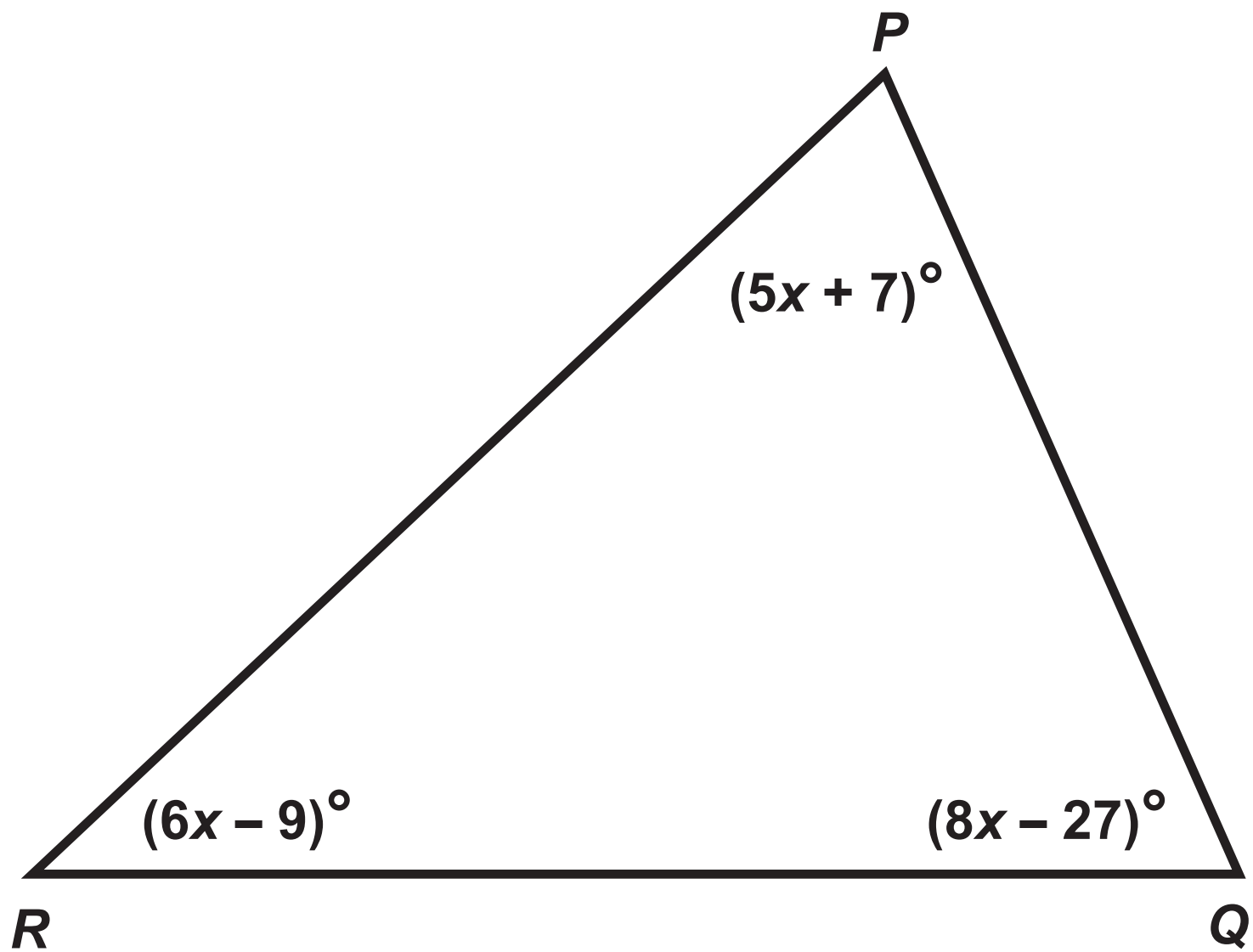
Question 18

Diagram NOT drawn to scale



Question 20 (b)

Diagram NOT drawn to scale

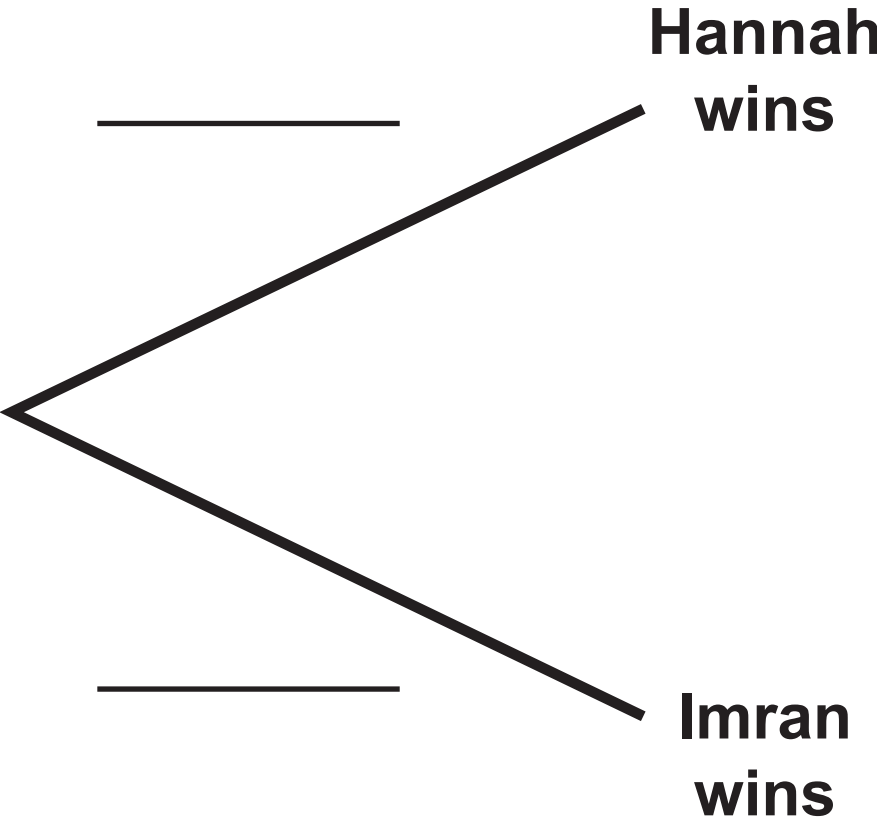


Question 22

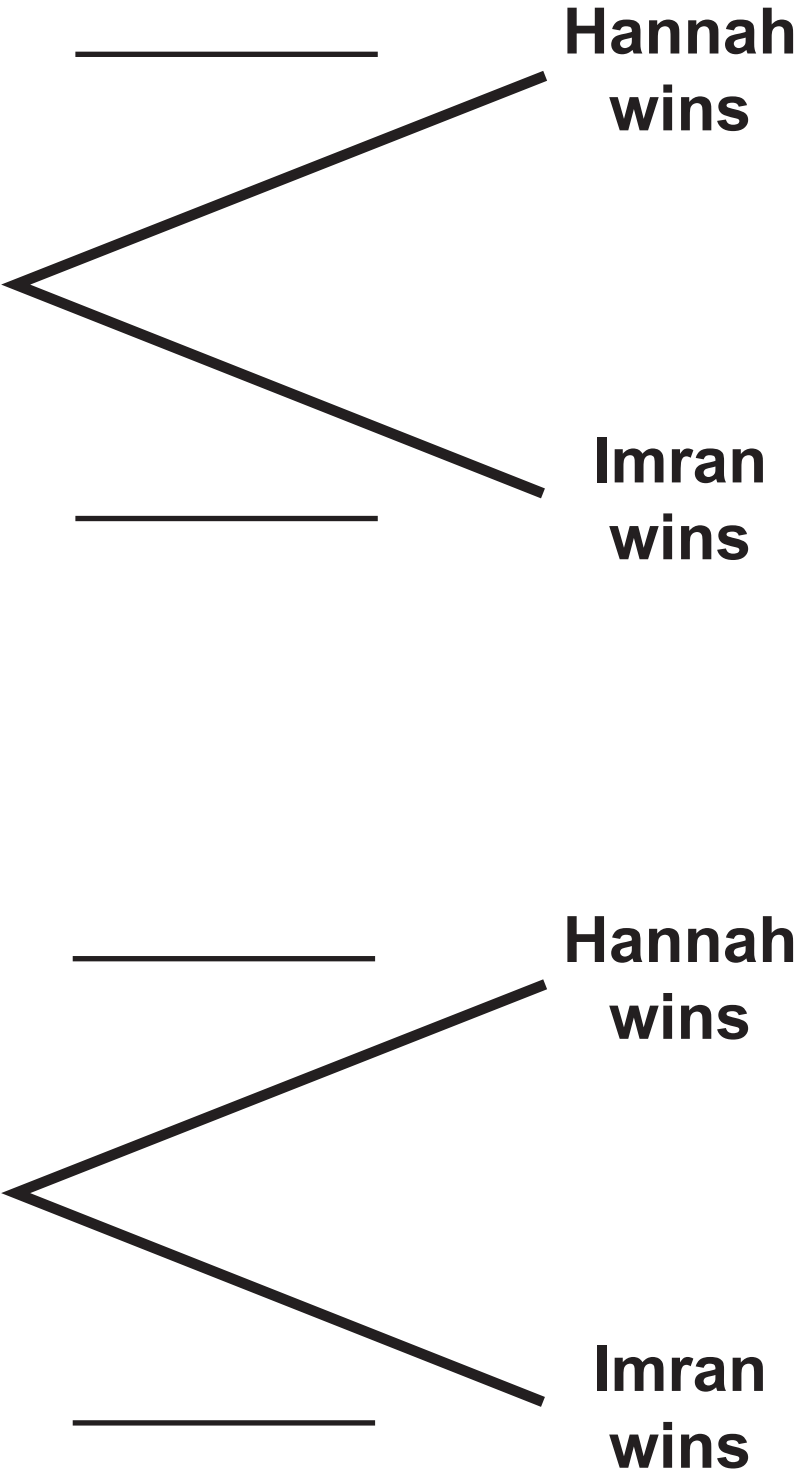
Delivery time (t mins)	Number of deliveries
$0 < t \leq 10$	10
$10 < t \leq 20$	12
$20 < t \leq 30$	16
$30 < t \leq 40$	12

Question 24 (a)

BADMINTON



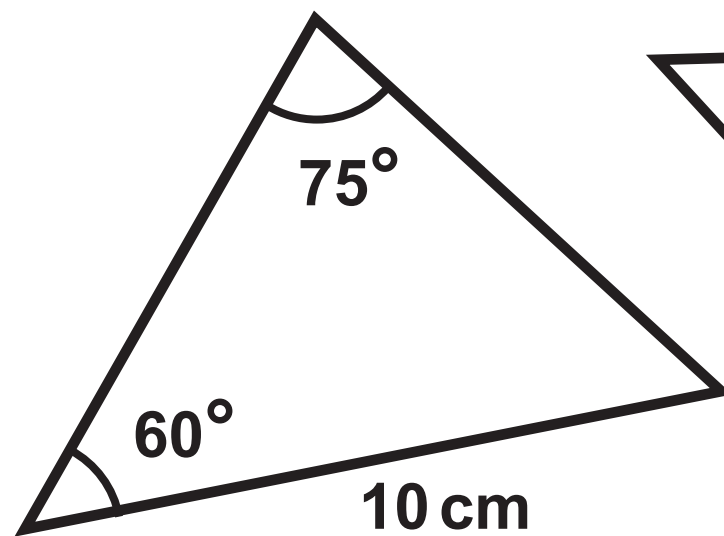
TENNIS



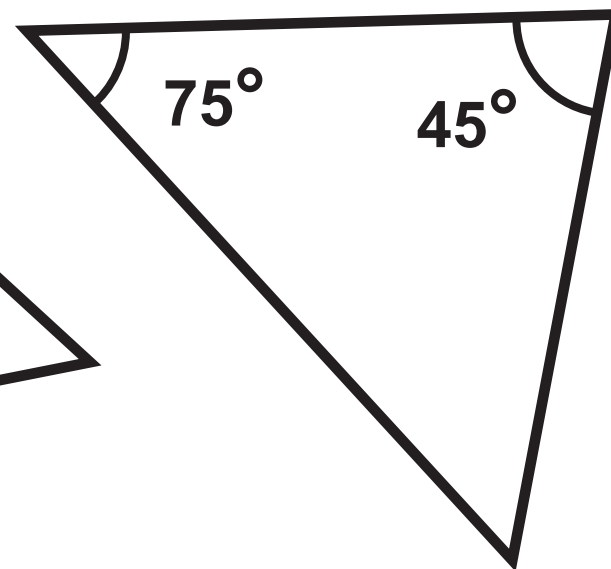
Question 25 (a)

Diagram NOT drawn to scale

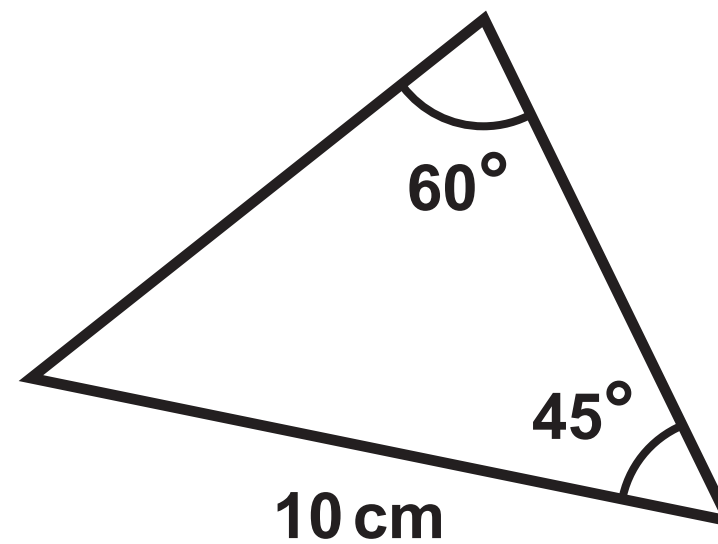
Triangle *A*



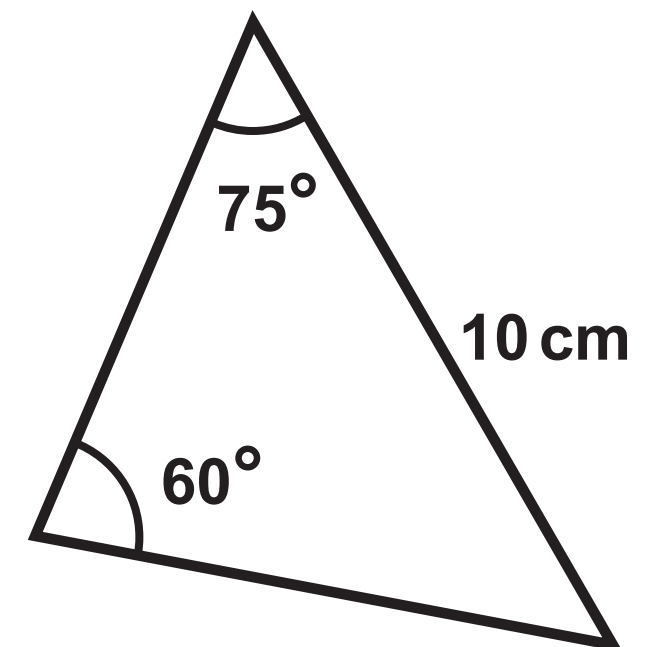
Triangle *B*



Triangle *C*

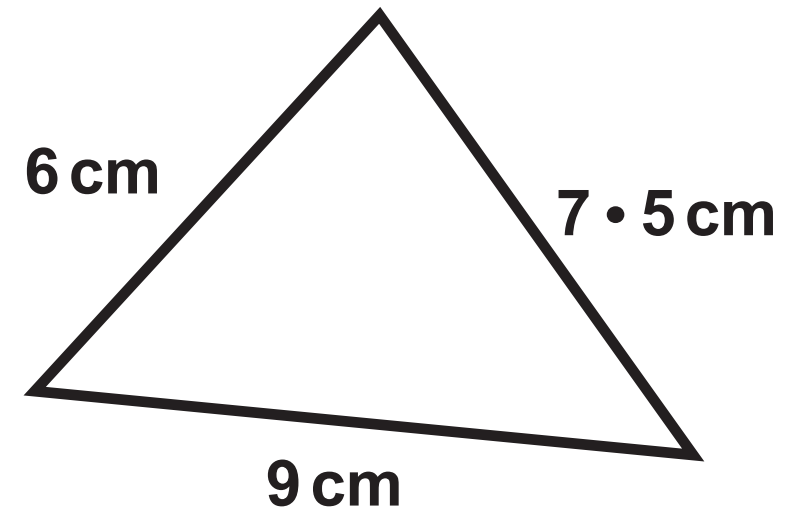
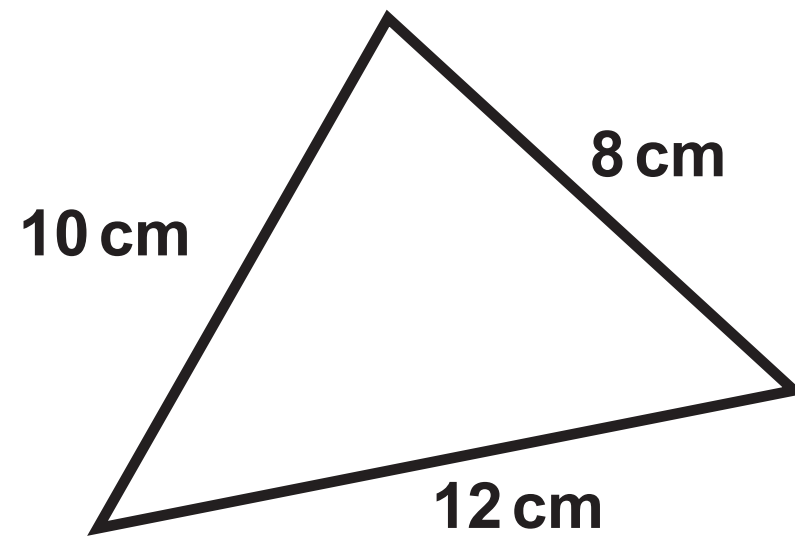


Triangle *D*



Question 25 (c)

Diagram NOT drawn to scale



C300U10-1A

WEDNESDAY, 6 NOVEMBER 2024 – MORNING

MATHEMATICS

FOUNDATION TIER

Additional Formulae

PERIMETER, AREA AND VOLUME

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

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

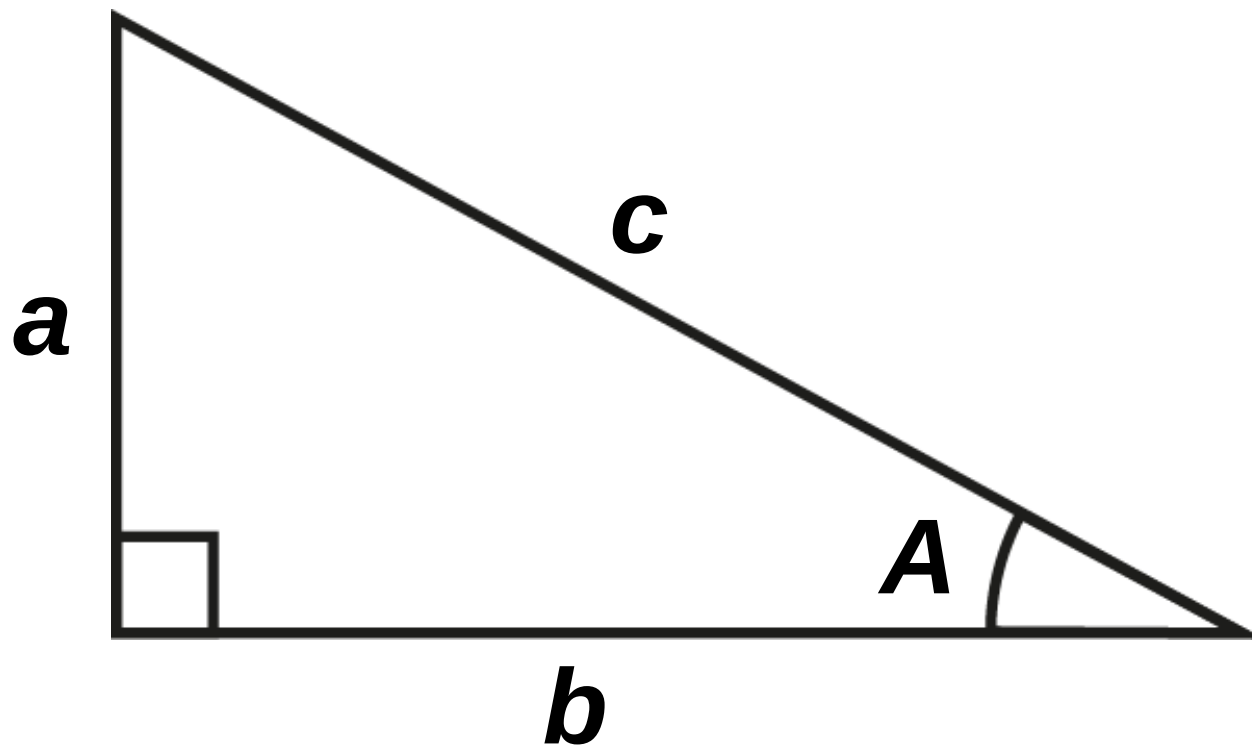
Volume of a prism =
area of cross section $\times$ length

Where r is the radius and
 d is the diameter:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

$$\text{Area of a circle} = \pi r^2$$

PYTHAGORAS' THEOREM AND TRIGONOMETRY



In any right – angled triangle where a , b and c are the length of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

In any right – angled triangle ABC where a , b and c are the length of the sides and c is the hypotenuse:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

COMPOUND INTEREST

Where P is the principal amount,
 r is the interest rate over a given period
and n is number of times that the
interest is compounded:

$$\text{Total accrued} = P \left(1 + \frac{r}{100} \right)^n$$

PROBABILITY

Where $P(A)$ is the probability of
outcome A and $P(B)$ is the probability
of outcome B :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

MATHEMATICS

**FORMULA LIST
FOUNDATION TIER
AND HIGHER TIER
GCSE**

You must not write on these formulae pages.

Anything you write on these formulae pages will gain NO credit.

AREA AND VOLUME FORMULAE

Where r is the radius of the sphere or cone,
 l is the slant height of a cone and
 h is the perpendicular height of a cone:

Curved surface area of a cone = $\pi r l$

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

KINEMATICS FORMULAE

Where a is constant acceleration,
 u is initial velocity, v is final velocity,
 s is displacement from the position
when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$