Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

C300U10-1

A23-C300U10-1

WEDNESDAY, 8 NOVEMBER 2023 – MORNING

MATHEMATICS – Component 1
Non-Calculator Mathematics
FOUNDATION TIER

2 hours 15 minutes

ADDITIONAL MATERIALS

An additional formulae sheet.

The use of a calculator is not permitted in 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(s) at the back of the booklet, taking care to number the question(s) correctly.

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.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	9	
2.	5	
3.	2	
4.	4	
5.	4	
6.	5	
7.	6	
8.	3	
9.	5	
10.	2	
11.	6	
12.	3	
13.	2	
14.	4	
15.	2	
16.	5	
17.	5	
18.	5	
19.	2	
20.	2	
21.	4	
22.	2	
23.	4	
24.	3	
25.	3	
26.	5	
27.	1	
28.	3	
29.	2	
30.	6	
31.	3	
32.	3	
Total	120	

C300U101
01

NOV23C300U10101

Formula list

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 = πrl

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:

$$v = u + at$$

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

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

Examiner only

1. (a) Work out the following.

(i) 20×40 [1]

.....

.....

.....

(ii) $57 \div 3$ [1]

.....

.....

.....

(iii) $\frac{2}{5}$ of 30 [2]

.....

.....

.....

(iv) 30% of 70 [2]

.....

.....

.....

(v) 1·03 + 12·8 [1]

.....

.....

.....

(b) Write 8% as a decimal. [1]

.....

(c) In the box, write the **smallest** possible whole number to make the statement correct. [1]

4·4 < .....

C300U101
03

Examiner only

2. (a) Most numbers have an **even** number of factors.

For example,
10 has **four** factors: 1, 2, 5 and 10.
11 has **two** factors: 1 and 11.

There is one number between 13 and 19 that has an **odd** number of factors.
Find this number.
Write down all the factors of this number. [2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

The number is .....

The factors of this number are .....

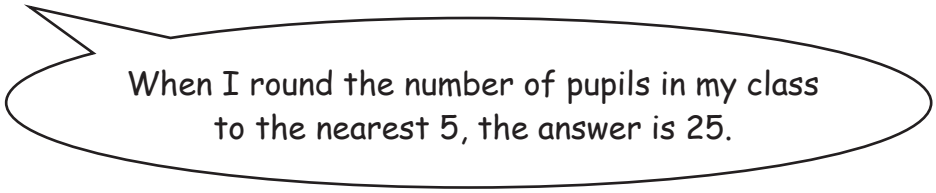
(b) Write down the first three **even** multiples of 7. [1]

.....

..... , ... , ...

Examiner only

(c) Linda says,

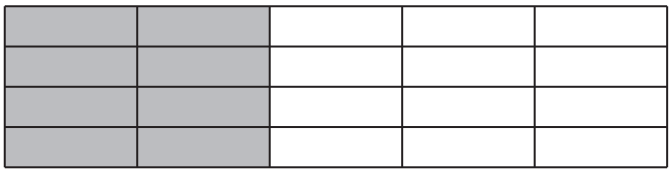


How many pupils could there be in her class?
Write all the possible answers. [2]

.....

.....

3. What percentage of the following shape is shaded? [2]



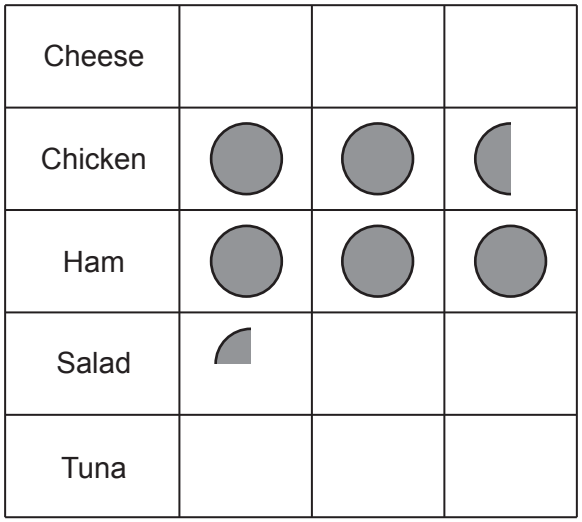
.....

.....

Examiner only

4. A teacher asked a group of students to choose their favourite sandwich filling.
The five options were: cheese, chicken, ham, salad or tuna.
Each student chose **one** option.
The table and the pictogram each show some of the results for the five fillings.

Filling	Number of students
Cheese	3
Chicken	
Ham	
Salad	1
Tuna	6



Key: ● represents ..... students

(a) Complete the key, the table and the pictogram. [3]

.....

.....

(b) What is the modal choice of sandwich filling? [1]

.....

Examiner only

5. (a) Lucy writes down the first five **square** numbers.
Lucy chooses two square numbers that have a difference of 12.

Which square numbers did Lucy choose? [2]

.....

.....

.....

.....

.....

The two square numbers are ..... and .....

(b) Mary adds two **odd** numbers together and gets an answer of 21.

Could Mary's answer be correct?

☐ Yes ☐ No ☐ Cannot tell

Give a reason for your answer. [1]

.....

.....

.....

(c) Write the following values in ascending order. [1]

3 0·3 0·302 0·35 0·8

.....

....

Smallest value Greatest value

C300U101
07

Examiner only

6. (a) Twenty-five players in a rugby team voted for their player of the season.

(i) The three nominations for player of the season were Ashton, Jamal and Oliver.

The frequency table shows the tally of the votes from 10 of the players.

Candidate	Tally	Frequency
Ashton	𝍸	
Jamal	𝍸	
Oliver	𝍸	

The remaining 15 votes are shown below.

Ashton	Oliver	Jamal	Oliver
Oliver	Jamal	Oliver	Jamal
Jamal	Oliver	Ashton	Jamal
Oliver	Oliver	Jamal	

Which player won the vote for player of the season?
You must show all your working. [2]

.....

.....

.....

The player of the season is .....

(ii) What percentage of the 25 students voted for Oliver? [2]

.....

.....

.....

Examiner only

(b) Some of the players in Lindsey's team have missed games because of injury.
She writes a question to find out how many games they have missed.
Here is the question:

How many games have you missed this season due to injury?		
☐ 0–2	☐ 2–4	☐ 5 or more

State **one** criticism of her question. [1]

.....

.....

Examiner only

7. (a) Robin has a scale drawing of his local park.
The scale on the drawing is 1 cm represents 250 cm.
On the drawing a flowerbed is 6 cm long.

What is the actual length of the flowerbed?
Write your answer in **metres**. [3]

.....

.....

.....

.....

The actual length of the flowerbed is ..... m

(b) Robin has 240 daffodils and 60 tulips.

What fraction of these flowers are daffodils?
Give your answer in its simplest form. [2]

.....

.....

.....

(c) Some rose bushes are divided equally between 2 gardeners.

Write this division as a ratio. [1]

.....

.....

..... : .....

Examiner only

8. A shop sells the same brand of lemonade in two different-sized bottles.

1000 ml for £2.50

300 ml for 81p

Which bottle is the better value for money?

☐ The 1000 ml bottle ☐ The 300 ml bottle

You must show all your working. [3]

C300U101
11

Examiner only

9. (a) Solve $6x = 42$. [1]

.....

.....

(b) Calculate the value of $4y$ when $y = -12$. [1]

.....

.....

(c) Simplify $5w + 3(6w - 2)$. [2]

.....

.....

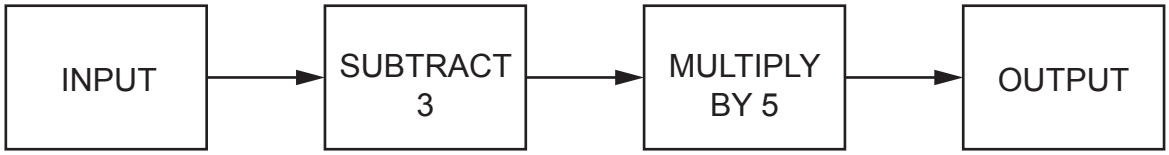
(d) A shirt has t buttons.
Write down, in terms of t, the number of buttons on 8 shirts. [1]

.....

.....

Examiner only

10. Here is a number machine.



(a) The input is 10.
What is the output? [1]

.....

.....

.....

(b) The output is 55.
What is the input? [1]

.....

.....

.....

Examiner only

11. Adele and Lewis are shopping in a bakery.

(a)

Bread rolls

98p each
OR
£4.50 for a bag of 5 rolls

Adele buys a bag of 5 rolls.

How much money does she save compared to buying 5 rolls separately? [3]

.....

.....

.....

.....

.....

(b) Croissants cost 90p each and cinnamon whirls cost £1.25 each.
Lewis buys 4 croissants and some cinnamon whirls.
Lewis has £10.

What is the greatest number of cinnamon whirls that Lewis can buy?
You must show all your working. [3]

.....

.....

.....

.....

.....

.....

.....

.....

Examiner only

12. A wind turbine generates 390 units of electricity per hour.

How many units of electricity will this turbine generate if it continues at this rate for 2 hours and 20 minutes? [3]

.....

.....

.....

.....

Units of electricity generated = ...

13. (a) Ben needs 90 bottles of water for an athletics event.
The bottles of water are sold in packs of 8.

He makes this calculation to find out the number of packs he needs:

90 ÷ 8 = 11·25

He decides to buy 11 packs of water.

Is Ben's decision correct?
You must give a reason for your answer. [1]

☐ Yes ☐ No

.....

.....

(b) Ben divides the 90 bottles in the ratio 4:1.

He says,

"To work out the larger share, we should divide 90 by 4".

Explain what is wrong with Ben's method. [1]

.....

.....

.....

Examiner only

14. The table shows some of the values of $y = 1 - 2x$ for $-2 \leqslant x \leqslant 2$.

x	−2	−1	0	1	2
$y = 1 - 2x$	5		1		

(a) Complete the table. [2]

.....

.....

.....

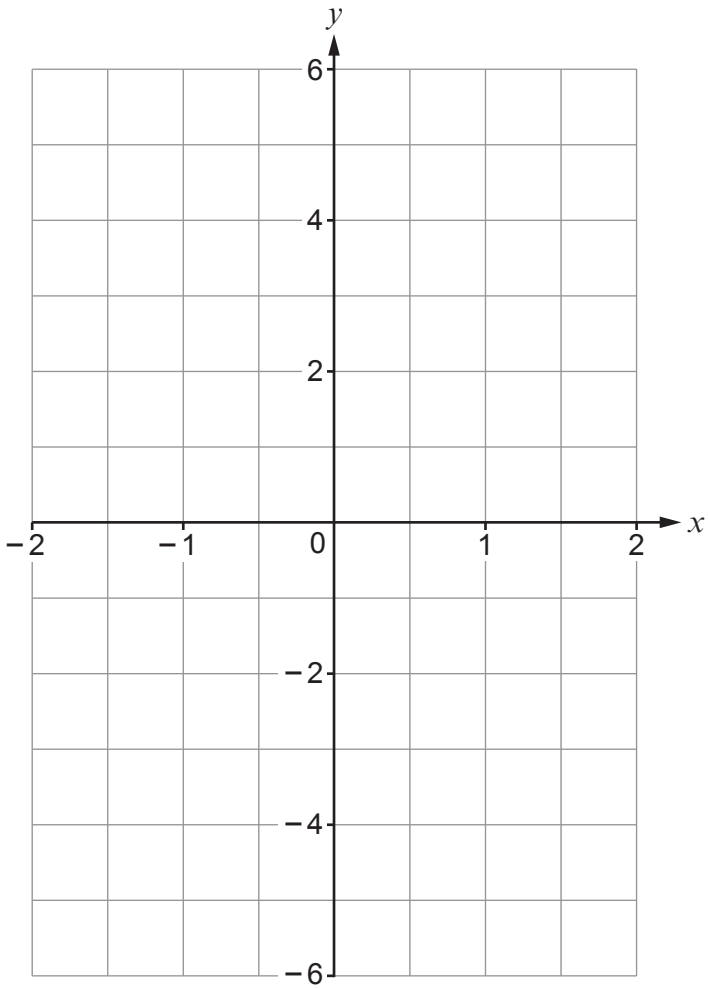
.....

(b) On the grid, draw the line $y = 1 - 2x$ for $-2 \leqslant x \leqslant 2$. [2]

.....

.....

Examiner only



Examiner only

15. A bag contains 100 identically-sized coloured balls.

A ball is selected at random.
The table shows the probability of choosing a blue ball, a red ball or a green ball.

Colour	Blue	Red	Green
Probability	0·42	0·3	0·18

Show that the bag must contain 10 balls that are **not** blue, red or green. [2]

.....

.....

.....

16. Gary owns a garage selling second-hand cars. On Saturday, he had 72 petrol cars and 48 diesel cars for sale.

(a) Write the number of petrol cars to the number of diesel cars as a ratio in its simplest form. [2]

.....

.....

(b) What percentage of cars are diesel? [3]

.....

.....

.....

Examiner only

17. (a) Calculate 12% of £750. [2]

(b) When a fraction is added to $\frac{2}{5}$ the answer is $\frac{7}{15}$.

Find the fraction that is added. [3]

Examiner only

18. Sarah has a water container in the shape of a cuboid.
The area of the base of the container is 150 cm^2.

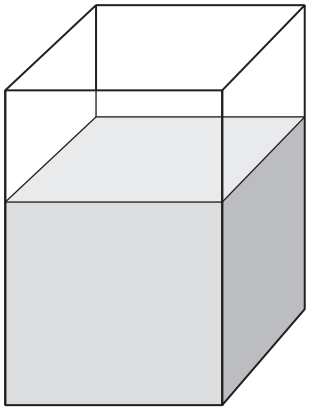


Diagram not drawn to scale

Water is leaking from the container at a constant rate.

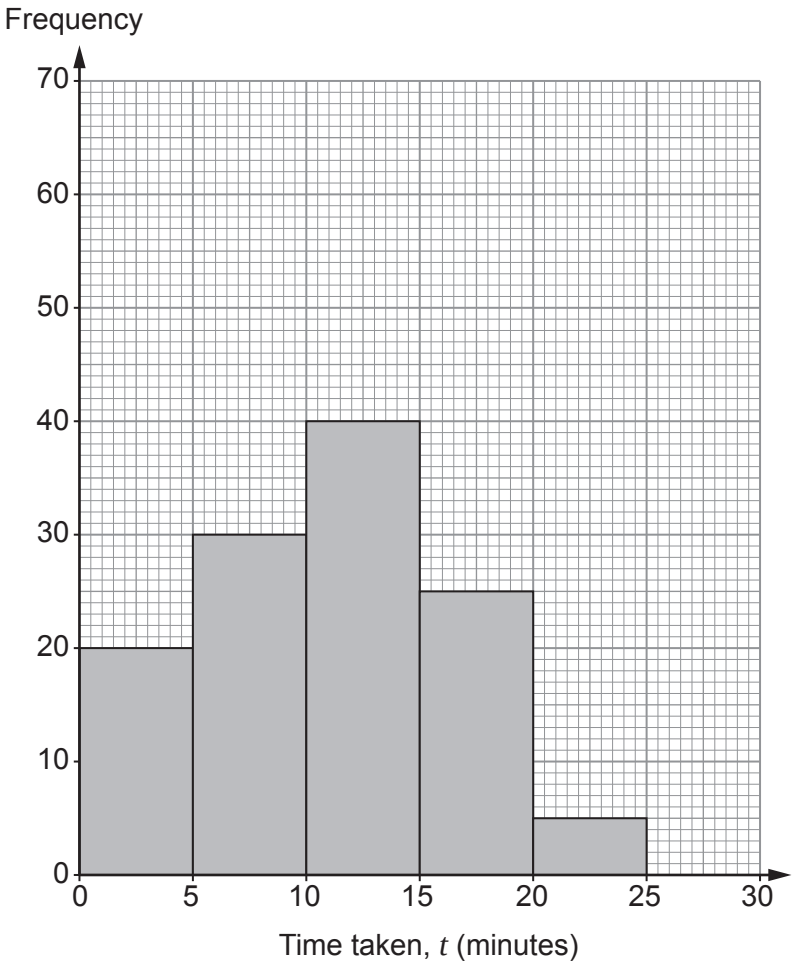
At 10:00 the water is 20 cm high.
At 10:15 the water is 17 cm high.

How much water is in the container at 11:00?
Give your answer in litres. [5]

There are ..... litres of water in the container at 11:00.

Examiner only

19. 120 people each completed a puzzle.
The times taken to complete the puzzle are shown in the diagram below.
The diagram uses groups of width 5 minutes: $0 \leqslant \text{time} < 5$, $5 \leqslant \text{time} < 10$, and so on.



A person is chosen at random.

What is the probability that this person took less than 15 minutes to complete the puzzle? [2]

.....

.....

.....

.....

Examiner only

20. The diagram below shows three straight lines, *AB*, *CD* and *GH*.

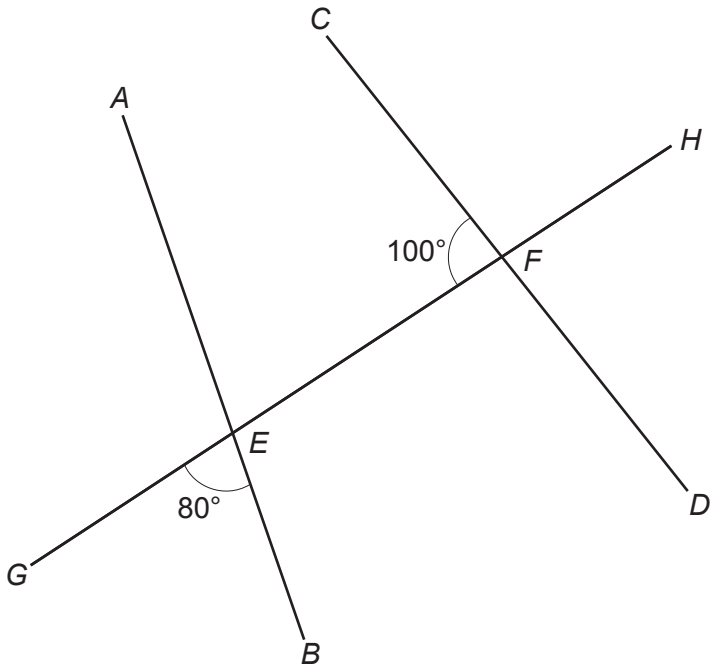


Diagram not drawn to scale

Show that *AB* and *CD* are parallel.
You must give reasons to justify your answer. [2]

.....

.....

.....

.....

.....

.....

.....

.....

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

Examiner only

21. David and Asif are studying the size of leaves.

Before measuring the leaves, they agreed on the following conditions:

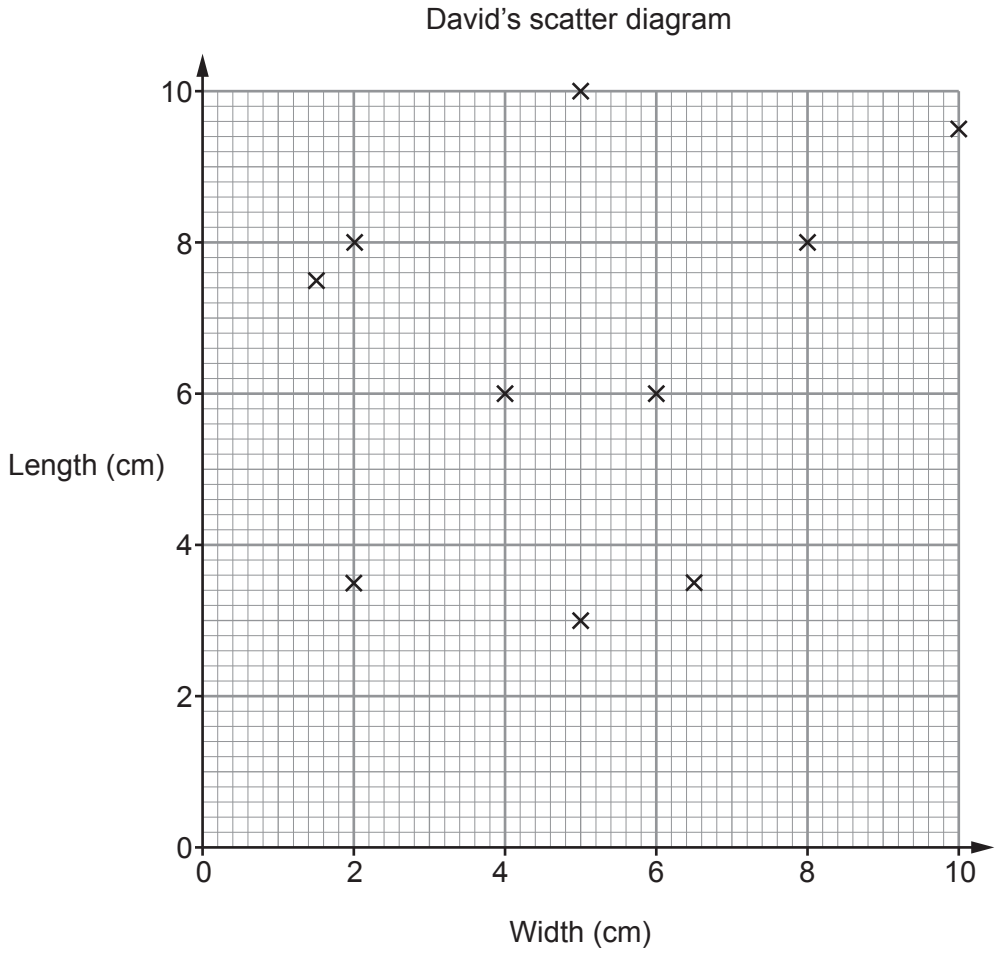
- The length of the leaf does not include the stem.
- The width of the leaf is measured at the widest part of the leaf.

(a) Why do they need to agree on these conditions to measure the leaves? [1]

.....

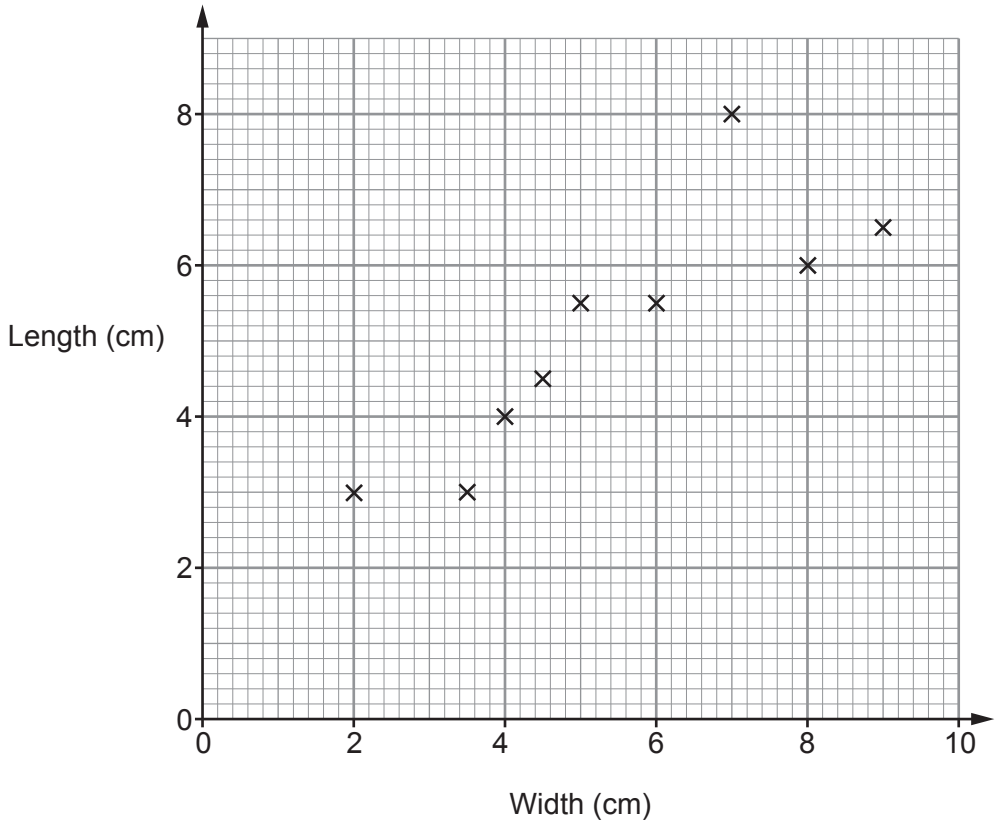
.....

(b) David and Asif have each drawn a scatter diagram to show their results.



Examiner only

Asif's scatter diagram



(i) One of the boys collected all of his leaves from one tree.

Who was this most likely to be?
Give a reason for your answer. [1]

☐ David ☐ Asif

Reason: .....

.....

(ii) Draw a line of best fit on Asif's scatter diagram. [1]

(iii) Asif forgot to include the measurements of one of the leaves on his scatter diagram.
The length of this leaf is 7 cm.

Write down an estimate of the width of this leaf. [1]

.....

Examiner only

22. Ivy mixes lemon juice, pineapple juice and orange juice in the ratio 1 : 2 : 7 to make a fruit drink.
Ivy has 330 ml of her fruit drink in a glass.

How much pineapple juice is in Ivy's glass? [2]

.....

.....

.....

..... ml

23. The shape below consists of a square surrounded by four semi-circles.
The diameter of each semi-circle is 12 cm.

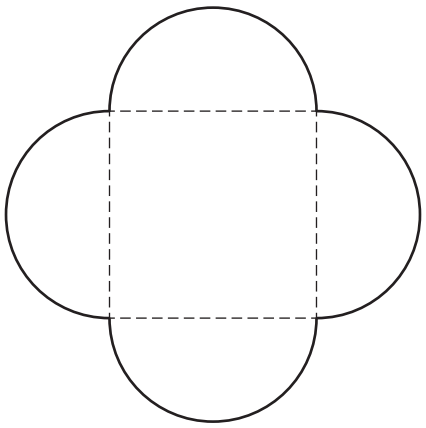


Diagram not drawn to scale

Work out the area of the shape.
Give your answer in the form $a + b\pi$. [4]

.....

.....

.....

.....

.....

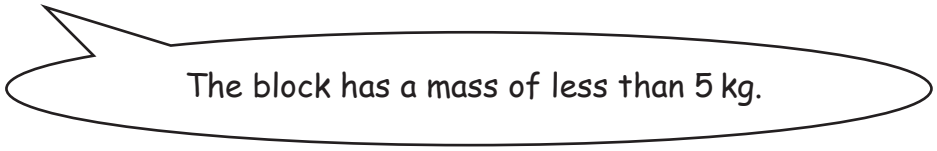
.....

Area = ... cm^2

Examiner only

24. Izaan has a block of stainless steel with volume 700 cm^3.
The stainless steel has a density of 7·5 g/cm^3.

Izaan says,



Is Izaan correct? [3]

☐ Yes ☐ No ☐ Cannot tell

Show how you decide.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Examiner only

25. Write 60 as a product of its prime factors in index form. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

60 = ...

Examiner only

26. The diagram below shows an **equilateral triangle** and a square.

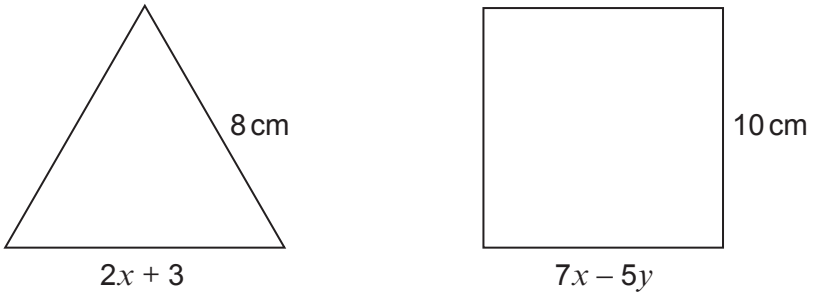


Diagram not drawn to scale

Use an algebraic method to find the value of x and the value of y.
You must show all your working. [5]

x = ...

y = ...

Examiner only

27. Simplify $7\sqrt{2} \times 3$ [1]

.....

.....

28. Factorise $3xy^2 + 6x^2y$ [3]

.....

.....

.....

.....

29. Hans thinks of a number.
When his number is multiplied by $2{\cdot}4 \times 10^5$, the answer is $9{\cdot}6 \times 10^8$.

What number did Hans think of?
Write your answer in standard form. [2]

.....

.....

.....

.....

.....

Examiner only

30. Kate is visiting London.

The probability that she will go on a train is 0·4.
The probability of Kate going to the theatre is independent of her going on a train.

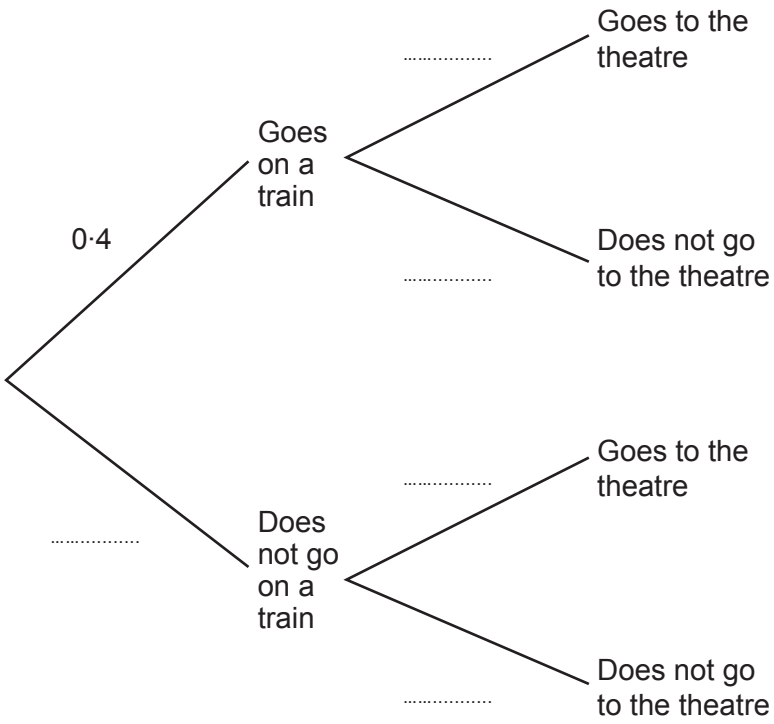
The probability that she goes on a train and goes to the theatre is 0·28.

(a) Complete the following tree diagram. [4]

.....

.....

.....



(b) Calculate the probability that Kate does not go on a train and does not go to the theatre. [2]

.....

.....

.....

Examiner only

31. Show that the lines

$$3y - 12x = 9 \text{ and } 2y = 8x - 13$$

are parallel to each other. [3]

.....

.....

.....

.....

.....

.....

32. It takes 2 hours to empty 8 identical tanks of water using 9 identical pumps.

How long would it take to empty 2 of these tanks using 3 of these pumps? [3]

.....

.....

.....

.....

.....

.....

.....

END OF PAPER

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

Examiner only

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE