



General Certificate of Secondary Education
2024

Centre Number

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Candidate Number

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Mathematics

Unit M2
(With calculator)
Foundation Tier



[GMC21]

GMC21

THURSDAY 16 MAY, 9.15 am–11.00 am

TIME

1 hour 45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all thirty** questions.

All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.

You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

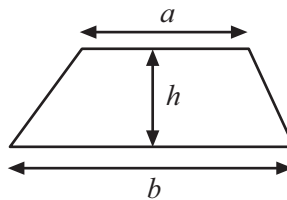
You should have a calculator, ruler, compasses and a protractor.

The Formula Sheet is on page 2.

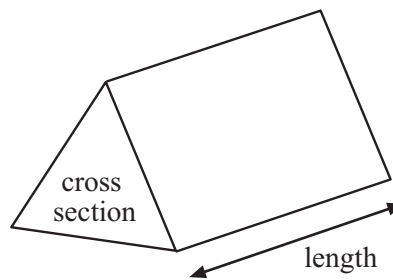


Formula Sheet

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



$$\text{Volume of prism} = \text{area of cross section} \times \text{length}$$



1 A company designs and prints badges.

To work out how much to charge customers, they use the rule

$$\text{Total cost} = \text{£}15 + (\text{£}2 \times \text{number of badges})$$

(a) A sports club ordered 40 badges.

How much was the total cost?

Answer £ _____ [1]

(b) A different sports club paid a total cost of £245

How many badges did they order?

Answer _____ [2]

[Turn over



2 In a game, players try to hit a target placed in the centre of a board.

The game is scored as follows.

20 points for hitting the target (**target**)

0 points for hitting the board but missing the target (**board**)

-5 points for missing the board (**miss**)

(a) Peter had 8 attempts.

His results were

miss target miss board target target board miss

What was his total score?

Answer _____ [2]

(b) Jessica had 5 attempts.

She scored 80 points.

How many times did she hit the target?

Answer _____ [1]



3 (a) Yuri takes the overnight train from Moscow to St Petersburg.

The train departs Moscow at 21:55 and arrives in St Petersburg at 06:06 the next morning.

How long is the journey?

Answer _____ hours _____ minutes [1]

(b) A cargo container is 23 m long, 2.5 m wide and 3 m high.



What is the volume of the cargo container?

Answer _____ m³ [2]

[Turn over



- 4 (a) A meal in Jacob's school canteen costs £3.10

Jacob uses a pre-paid card to pay for his meals.

Jacob has £20 on his pre-paid card.

What is the maximum number of meals he will be able to pay for?

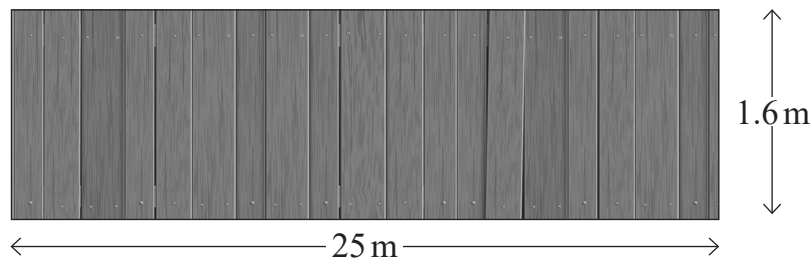
Answer _____ [1]

- (b) How much will be left on the card after he has paid for the maximum number of meals?

Answer £ _____ [2]



5 Taylor is planning to paint one side of his rectangular garden fence.



Source: © Getty Images

The fence is 25 m long and 1.6 m high.

One tin of paint covers 7 m^2 and costs £9

How much will it cost Taylor for the paint?

Answer £ _____ [3]



6 Anita is paid £1950 each month.

She saves 10% of her pay each month.

How much will she have saved after 1 year?

Answer £ _____ [3]





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(Questions continue overleaf)

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[Turn over



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- 7 (a) The minimum and maximum monthly temperatures, in degrees Fahrenheit, for Dublin last year are given in the table.

Month	Minimum (°F)	Maximum (°F)
January	36	47
February	36	47
March	37	50
April	39	54
May	44	59
June	48	64
July	52	67
August	52	66
September	48	63
October	44	57
November	40	51
December	37	47

What is the **range** of temperatures in June?

Answer _____ °F [1]



(b) The monthly rainfall, in millimetres, in Dublin last year is shown.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall (millimetres)	65	50	55	55	60	65	55	75	60	80	75	75

(i) What is the median monthly rainfall?

Answer _____ mm [2]

(ii) The table shows that the wettest **month** last year was October.



Declan says:

The wettest **day** last year must have been in October.



Una says:

The wettest **day** last year may not have been in October.

Who is correct?

Circle your answer.

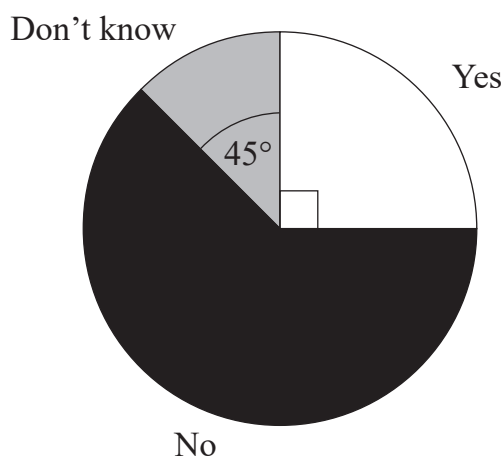
Declan **Una** **Declan and Una** **Neither** [1]

[Turn over



8 (a) The results of a survey are displayed.

Are there enough electric vehicle charging points in Belfast?



(i) 30 people surveyed said “Yes”.

How many people in total were surveyed?

Answer _____ people [1]

(ii) What fraction of those surveyed said “Don't know”?

Answer _____ [1]

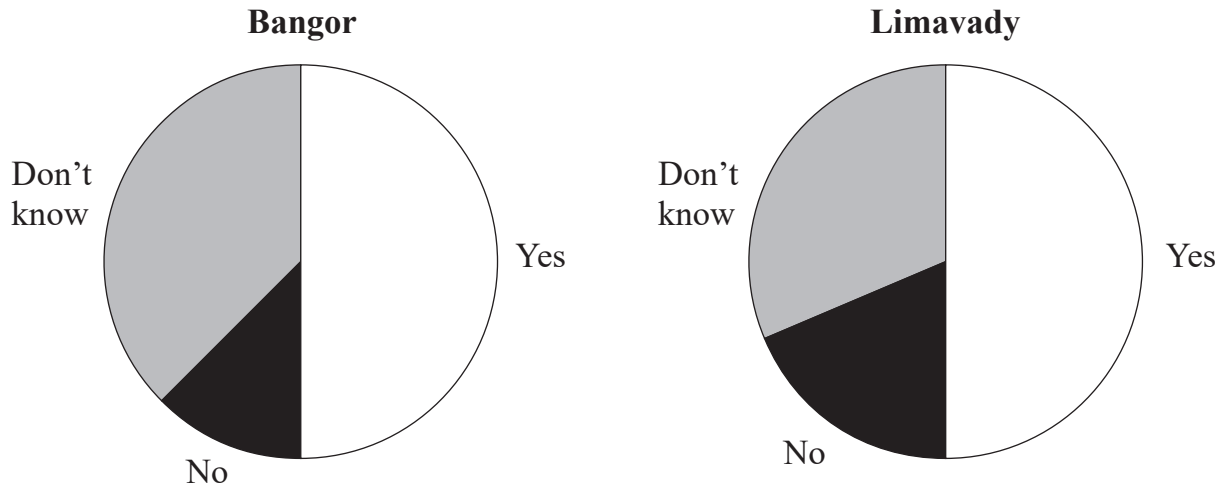


(b) Other surveys were conducted in Bangor and Limavady.

One of the questions asked was:

Will your next vehicle be fully electric?

The results are shown in these pie charts.



Lewis thinks the same number of people in Bangor and Limavady answered “Yes” to this question.

Explain why Lewis may be wrong.

Answer _____
_____ [1]

[Turn over



9 Calculate

$$\frac{8.84 + 24.6}{9.2 - 4.8}$$

Answer _____ [2]

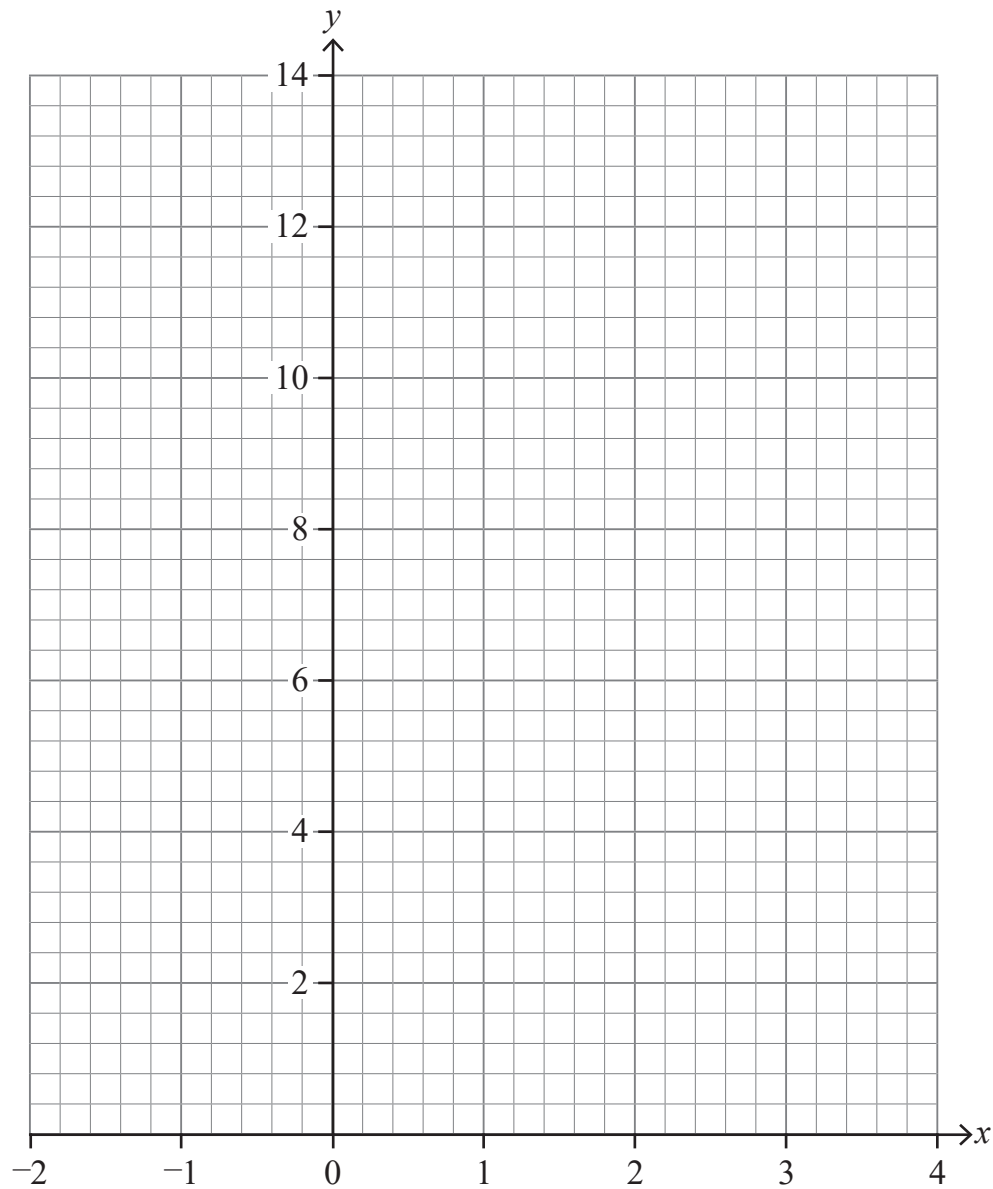


10 (a) Complete the table of values for the equation $y = 10 - 2x$

x	-2	-1	0	1	2	3	4
$y = 10 - 2x$	14		10	8	6		2

[1]

(b) Hence draw the graph of $y = 10 - 2x$ on the grid below.

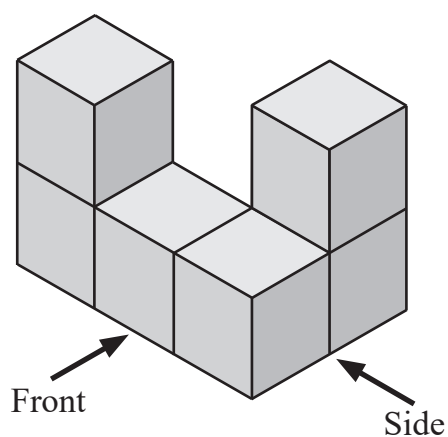


[2]

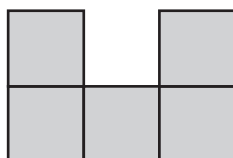
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11 A 3D shape is shown.



(a) Which elevation is drawn below?

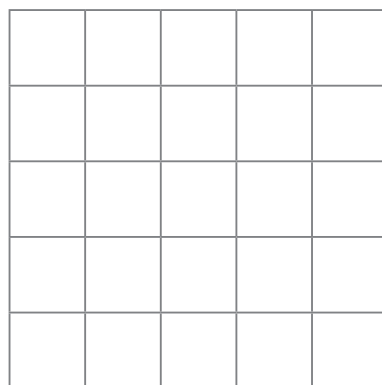


Circle the correct response.

side front neither

[1]

(b) Draw the **plan** of the 3D shape on the grid.



[1]



(c) Rosie is painting the outside of the 3D shape including the base.

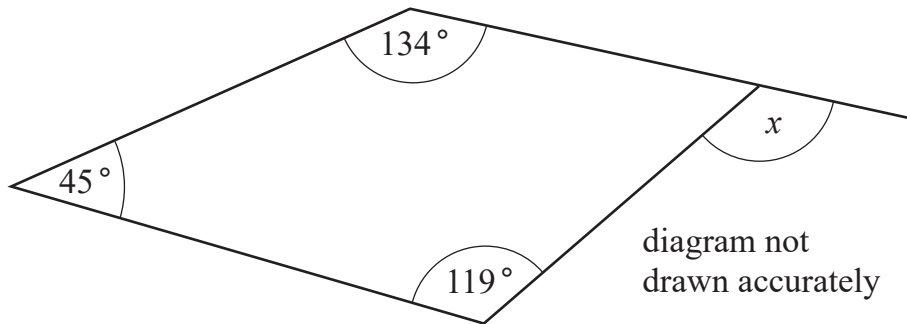
How many squares will Rosie have to paint?

Circle the correct response.

13 26 30 31

[1]

12 Calculate angle x .



Answer $x =$ _____ ° [3]



13 Gavin ordered carpet for his living room and bedroom.

The living room carpet cost £37.20 per square metre.

He ordered 24.5 square metres of living room carpet.

The bedroom carpet cost £14.30 per square metre.

He paid a total price of £1068.70

How much bedroom carpet did he order?

Answer _____ square metres [4]



14 Stacey is going to invite some friends round for a pizza party.

To work out how many pizzas to order, she uses the formula

$$p = \frac{ne}{s}$$

where

p = number of pizzas to order

n = number of people at the party

e = number of slices each person gets

s = number of slices per pizza

How many pizzas, each with 8 slices, are needed if there are 16 people at the party and each person gets 3 slices?

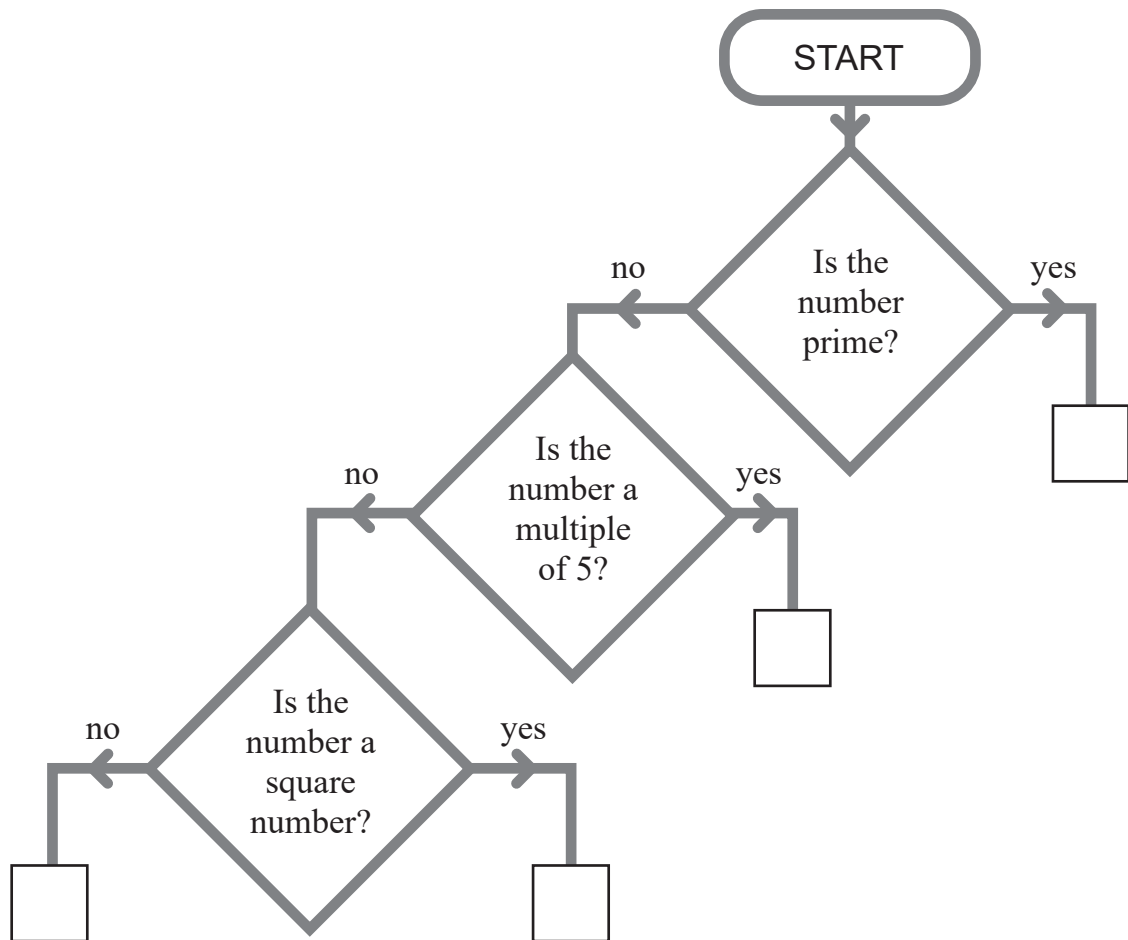
Answer _____ pizzas [3]

[Turn over



15 Look at the diagram below.

Place the numbers **80**, **81**, **82** and **83** in the correct boxes on the diagram.



[2]



16 (a) Two farmers grow apples.

Farmer Jack's apples have a mean weight of 116.85 g and a range of 19.1 g.

Farmer Brown weighs ten of his apples, picked at random.

Their weights, in grams (g), are

113.2 114.5 116.7 118.1 114.0 116.9 115.3 117.3 114.6 115.7

Whose apples are heavier on average?

You must give a mathematical reason with your answer.

Answer Farmer _____ because _____
_____ [3]

(b) A supermarket prefers their apples to be similar in size.

Why might this supermarket prefer to buy Farmer Brown's apples?

Answer _____
_____ [1]

[Turn over



17 Claire wants to buy a new watch.

She looks at special offers for this watch in two different shops.

Shop	Normal price	Special offer
Every Second	£135	15% discount
Minutes Matter	£174	$\frac{1}{3}$ off all prices

Which shop is now selling the watch at the cheapest price?

You must show working to explain your answer.

Answer _____ [4]



18 A car travels at an average speed of 30 miles per hour for one hour.

It then travels at an average speed of 54 miles per hour for half an hour.

Calculate the average speed for the **whole** journey.

Answer _____ miles per hour [3]



19 A wedding venue has circular tables of diameter 2 m.

The bride wants to put ribbon round the edge of each table.

There are 15 tables.

The ribbon is only sold in a **whole number of metres** and costs £1.25 per metre.

What is the minimum total cost of the ribbon?

Answer £ _____ [4]



20 Steve bought a box of 200 hats for £120

He decided to sell them at a local market.

It cost him £20 to hire a stall at the market.

Steve sold 70% of the hats at £3 each.

He sold a quarter of the hats at £2.50 each.

The remaining hats were sold at £1 each.

How much profit did Steve make?

Answer £ _____ [5]

[Turn over

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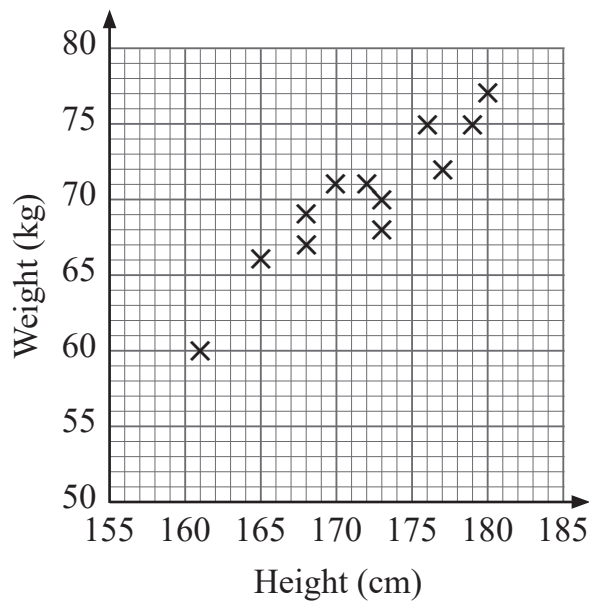
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21 Solve the equation $5(2y + 3) = 79$

Answer $y =$ _____ [3]



22 The scatter graph shows the heights and weights of players on a rugby squad.



(a) Describe the relationship between the heights and weights of the players.

Answer _____ [1]

(b) Jack Morris joins the squad.

The manager records Jack's height as 178 cm.

The manager records Jack's weight as 60 kg.

Plot this information on the scatter graph above. [1]

(c) The manager made an error in reading Jack's weight.

Use the scatter graph to say whether Jack's weight is likely to be lower or higher than 60 kg.

Answer _____ [1]

[Turn over



23 A primary school has a Choir (C) and a Drama Club (D).

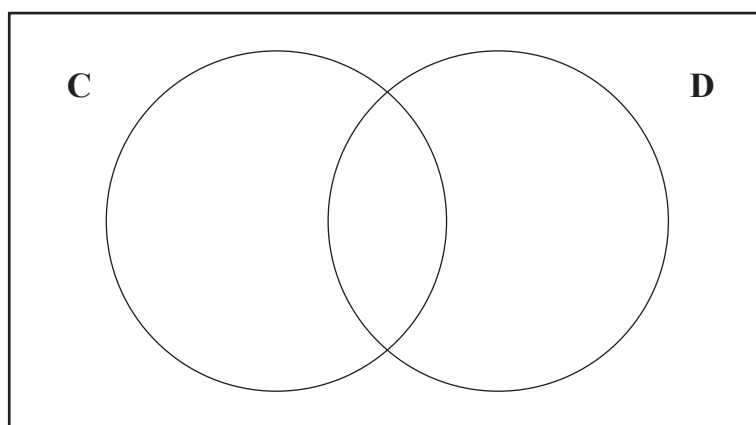
The school has 80 pupils.

45 pupils attend Choir.

30 pupils attend Drama.

15 pupils attend neither.

(a) Complete the Venn diagram using this information.



[3]

(b) What fraction of the pupils attend **only** the Drama Club?

Answer _____ [1]



24 ABC is a right-angled triangle.

$$AC = 15 \text{ cm.}$$

$$BC = 7.5 \text{ cm.}$$

Work out the length of AB.

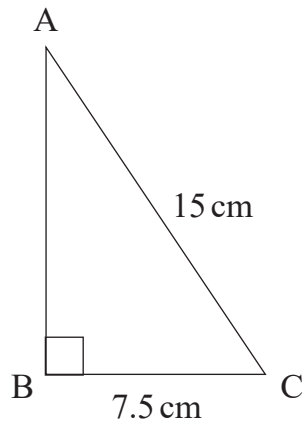


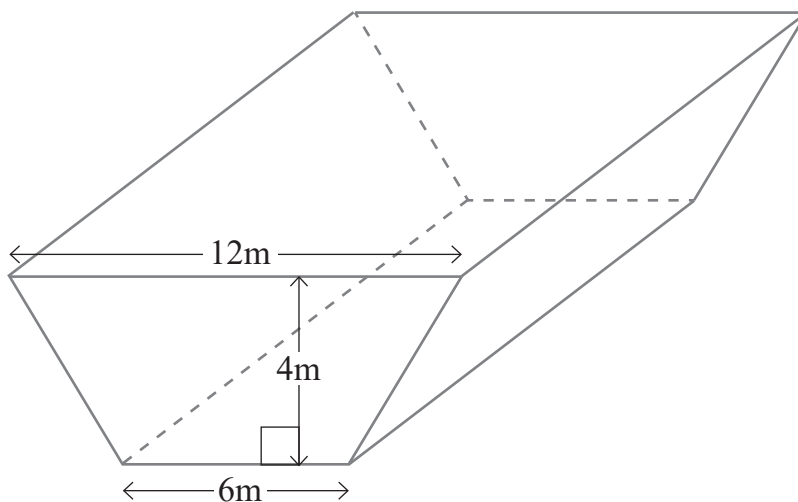
diagram not
drawn accurately

Answer _____ cm [3]

[Turn over



25 A water tank has the dimensions as shown.



The cross-section is a trapezium.

The volume of the tank is 522 m^3

Calculate the length of the tank.

Answer _____ m [3]



26 The heights, in metres, of a number of trees is recorded for a science experiment.

The results are shown in the table below.

Height h (m)	Frequency
$100 \leq h < 110$	6
$110 \leq h < 120$	13
$120 \leq h < 130$	12
$130 \leq h < 140$	15
$140 \leq h < 150$	3
$150 \leq h < 160$	1

(a) Calculate an estimate for the mean height.

Answer _____ m [4]

(b) In which class interval does the median lie?

Answer _____ [1]

[Turn over



27 Alan wants to invest £2400 for 2 years.

He sees the following offers for compound interest.

Bank A	Bank B
3% for the first year 1% for each extra year	4% for the first year 0.5% for each extra year

Calculate, for each bank, the value of the investment after 2 years.

Answer **Bank A:** £ _____

Bank B: £ _____ [4]



28 (a) Find the HCF of 30 and 45

Answer _____ [2]

(b) Write 126 as a product of its prime factors.

Answer _____ [2]

[Turn over



29 A rectangular basketball court is x metres wide.

The length of the court is 13 metres longer than its width.

The perimeter of the court is 86 metres.

Form and solve an equation to find the value of x .

Answer $x =$ _____ m [3]



30 $(2, 5)$ is the midpoint of the line joining (a, b) and $(3a, 3)$.

Find the values of a and b .

Answer $a =$ _____, $b =$ _____ [3]

THIS IS THE END OF THE QUESTION PAPER



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Q3b, Q5, Q7b(ii).....© Getty Images

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