Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
November 2021

Mathematics

Unit M1
(With calculator)
Foundation Tier

[GMC11] *GMC11*

MONDAY 29 NOVEMBER, 9.15am–11.00am

TIME

1 hour 45 minutes.

INSTRUCTIONS TO CANDIDATES

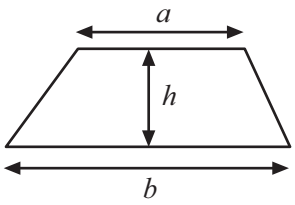
Write your Centre Number and Candidate Number in the spaces provided at the top of this page. **You are provided with Foundation Tier Additional Support Materials for use with this paper.**
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page or on blank pages.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all twenty-seven** 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

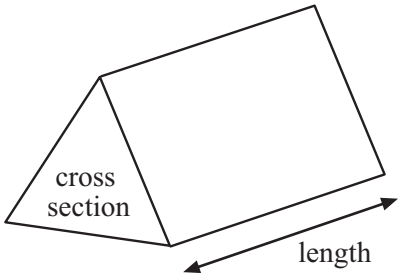
Functional Mathematics is assessed in this unit.
The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

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



Volume of prism = area of cross section × length



1 Draw lines to match each number in words to the correct number in figures.

The first one has been done for you.

Two hundred and seven	20 700
Two thousand seven hundred	207
Twenty thousand seven hundred	2 000 070
Two million and seventy	2 700

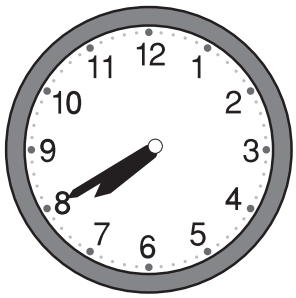
[3]

2 **(a)** Measure the length of the line AB below.

Give your answer correct to the nearest millimetre.

Answer _____ cm [1]

(b) What time is shown on the clock?



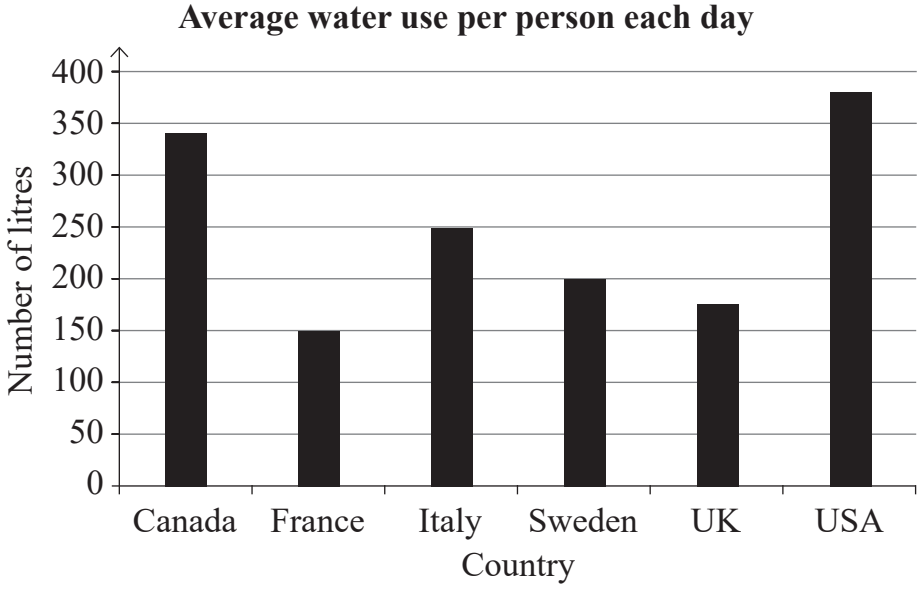
Answer _____ [1]

(c) A film lasts 135 minutes.

How many hours and minutes is this?

Answer _____ hours _____ minutes [1]

3 **(a)** The chart shows the average water use per person each day in some countries.



(i) Which country uses the most water on average per person?

Answer _____ [1]

(ii) Which country uses 175 litres of water on average per person?

Answer _____ [1]

(iii) How many litres of water are used on average per person in Canada?

Answer _____ litres [1]

[Turn over

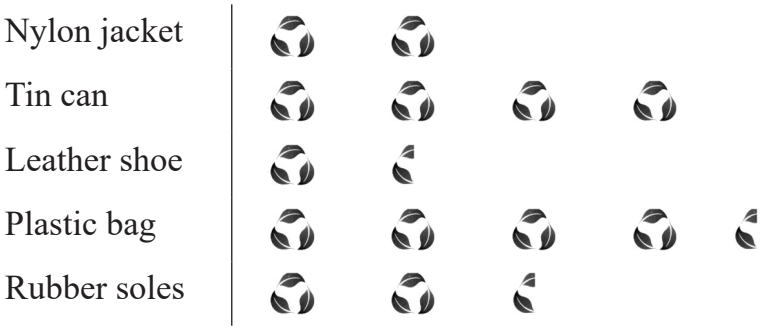
(b) The length of time some objects take to decompose is shown.

Objects	Time (Years)
Nylon jacket	40
Tin can	80
Leather shoe	30
Plastic bag	70
Rubber soles	50

Alice draws a pictogram to show this information.

She makes one mistake.

Time to decompose



Key: represents 20 years

(i) What mistake does Alice make?

Answer _____

_____ [1]

(ii) Glass takes 1 million years to decompose.

Give a reason why it would not be sensible to add glass to Alice's pictogram.

Answer _____

_____ [1]

4 A café has the following breakfast menu.

Meat items	Bread items	Egg items	Other items
60p each Bacon Sausage	30p each Soda bread Potato bread	50p each Fried Poached	35p each Beans Mushrooms

(a) Eric wants to order breakfast consisting of

1 bacon
2 sausages
2 soda breads
1 potato bread
2 fried eggs
1 portion of beans

Work out the total cost for these items.

Answer £ _____ [2]

(b) Eric notices this sign underneath the menu.

Special offer
9 items for £3.50

How much will Eric save on his breakfast?

Answer _____ [1]

[Turn over

5 Information about **monthly** SIM-only mobile phone plans is shown.

Plan	Network	Data (GB)	Minutes	Texts	Price (£)
A	Cell4U	3	3000	unlimited	15
B	E_2	0.5	500	300	6
C	Moby	1	500	500	11
D	Green	40	unlimited	unlimited	30
E	Cell4U	1	750	1000	9
F	E_2	5	unlimited	1500	21
G	Cell4U	10	unlimited	unlimited	26
H	Green	2	1000	400	10

(a) Which is the cheapest Cell4U plan?

Answer Plan _____ [1]

(b) Brian doesn't use data.

He needs unlimited minutes and unlimited texts.

Which is the cheapest call plan he could choose to meet his needs?

Answer Plan _____ [1]

(c) Claire uses about 1 GB of data each **day**.

Which plan should she choose?

Answer Plan _____ [1]

6 Complete the table to show what these metric units measure.

The first row is done.

	Area	Capacity	Length	Mass
centimetres			✓	
milligrams				
square metres				
tonnes				
litres				
kilometres				

[3]

7 Blake works at a car wash.

His pay each day is worked out using the formula

Total pay (£) = 2 × number of cars washed + 10

(a) One day Blake washed 17 cars.

What was his pay for that day?

Answer £ _____ [2]

(b) Does Blake receive any money if he doesn't wash any cars?

You must explain your answer.

Answer _____ because _____

_____ [1]

[Turn over

8 John's bank gave him a 4-digit code.

All the digits are different.

The first digit is a **multiple** of 3

The second digit is a **factor** of 15

The third digit is the **sum** of the **first and second** digits

The fourth digit is the **sum** of the **first and third** digits

Write down John's 4-digit code in the boxes below.

[3]

9 The ages, in years, of a family are shown.

Dave 47 Ellie 21 Fergus 18 Geri 44 Harry 10 Ivy 25

(a) What is the range of the ages?

Answer _____ years [1]

(b) What is the mean age?

Answer _____ years [3]

(c) What was the mean age of the family two years ago?

Answer _____ years [1]

[Turn over

10 Five friends had these bank balances.

	£
Bernie	230
Jonny	–570
Sara	65
Wendy	460
Jason	–190

(a) List the balances in order, starting with the **lowest**.

_____ , _____ , _____ , _____ , _____ [2]

(b) Jason receives £120 for his birthday and puts it into his bank account.

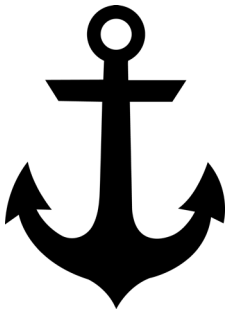
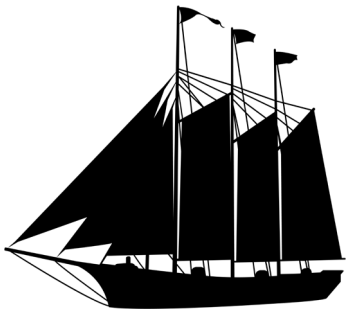
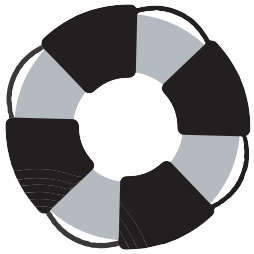
What is his new balance?

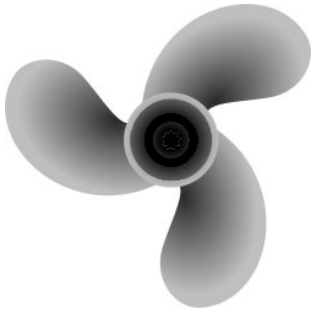
Answer _____ [1]

(c) How much more money is in Bernie's bank account than in Jonny's?

Answer £ _____ [1]

11 Five drawings related to sailing are shown.

		
Anchor	Boat	Lifebuoy

	
Wheel	Propeller

(a) Which drawing has rotational symmetry of order 3?

Answer _____ [1]

(b) Which drawing has exactly 1 line of symmetry?

Answer _____ [1]

(c) Which two drawings have both line symmetry and rotational symmetry?

Answer _____ [1]

[Turn over

12 Pupils were asked which activity they prefer.

The results were

Cinema	35% of the pupils
Bowling	$\frac{2}{5}$ of the pupils
Ice skating	$\frac{1}{4}$ of the pupils

(a) The teacher says "Bowling was more popular than cinema."

Is the teacher correct?

You must show working to explain your answer.

Answer _____ because _____

_____ [2]

(b) 15 pupils said they preferred ice skating.

How many pupils were asked altogether?

Answer _____ [2]

13 Mr Evans booked a family holiday.

He paid a deposit of £300

He then paid £45.50 each week for 26 weeks.

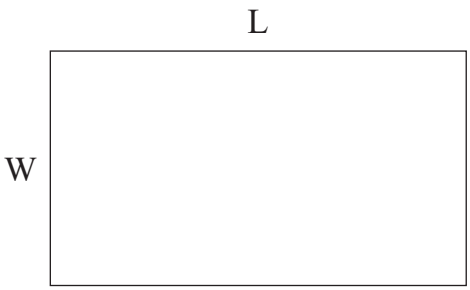
How much did he pay in total?

Answer £ _____ [3]

[Turn over

14 Jessica fits guttering around buildings.

She measures the length (L) and width (W) for rectangular sheds in metres.



To work out the total amount (T) of guttering needed, Jessica uses the formula

$$T = 2L + 2W$$

(a) How much guttering will Jessica need for this shed?

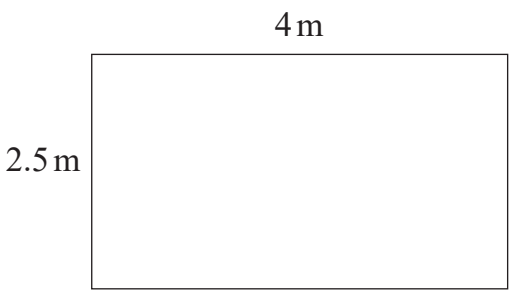


diagram not drawn accurately

Answer _____ m [2]

(b) Jessica measured another shed.

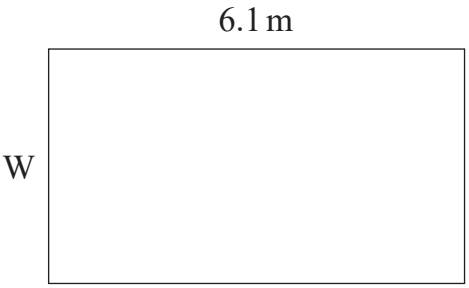


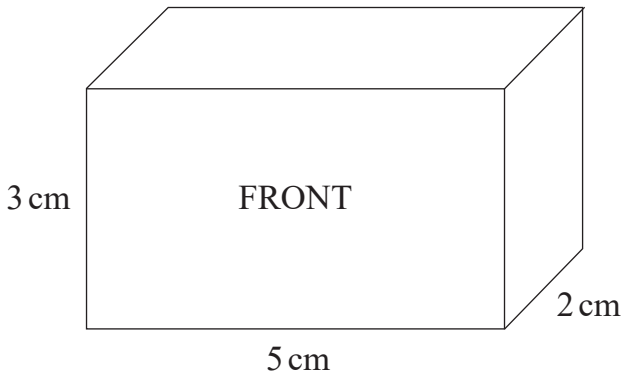
diagram not drawn accurately

The total (T) was 19.9 m.

Work out the width (W) of this shed.

Answer _____ m [3]

15 Here is a cuboid.



(a) What is the area of the front face of the cuboid?

Answer _____ cm^2 [1]

(b) Work out the volume of the cuboid.

Answer _____ cm^3 [2]

16 Dylan needs to get part of his house painted.

He has a budget of £200

He needs to buy 3 tins of paint, each costing £16.75

He employs a painter who is paid £12.30 per hour.

How many **full** hours will the painter have to complete the work without going over Dylan's budget?

Answer _____ [3]

[Turn over

17

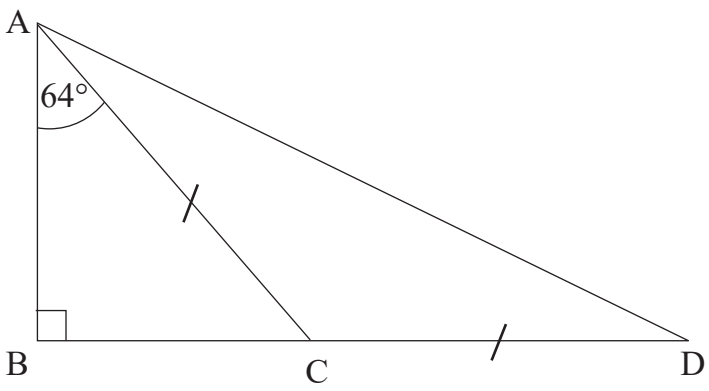


diagram not drawn accurately

ABC is a right-angled triangle.
ACD is an isosceles triangle.
BCD is a straight line.

Calculate the size of

(a) angle ACB,

Answer _____ ° [2]

(b) angle ADC.

Answer _____ ° [3]

18 Guttering costs £4.30 per metre.

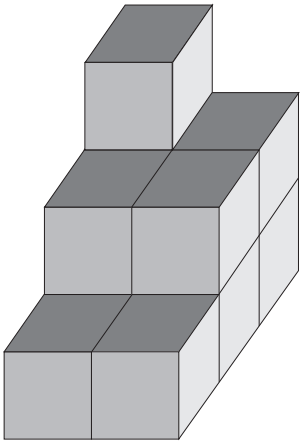
Martin bought 11 metres of guttering and 7 metres of downpipe.

He paid £66.55 in total.

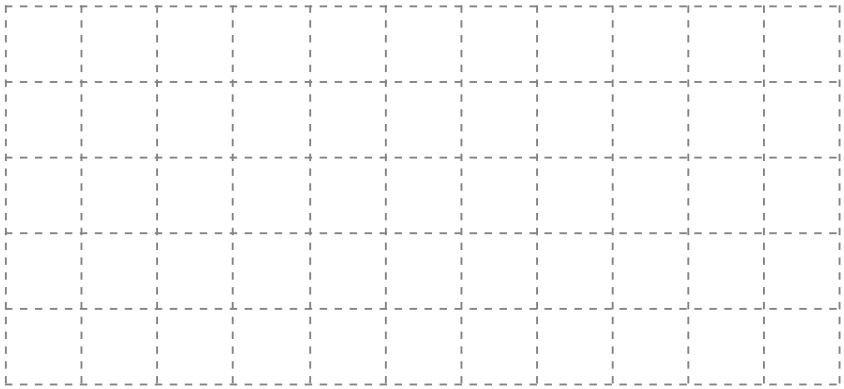
How much does downpipe cost per metre?

Answer £ _____ [4]

19 A solid is made from 1 cm cubes.



(a) On the grid below draw the side elevation of the solid.



[2]

(b) What is the smallest number of cubes you would need to add to the solid to make it into a cube?

Answer _____ [1]

20 In a group of students,

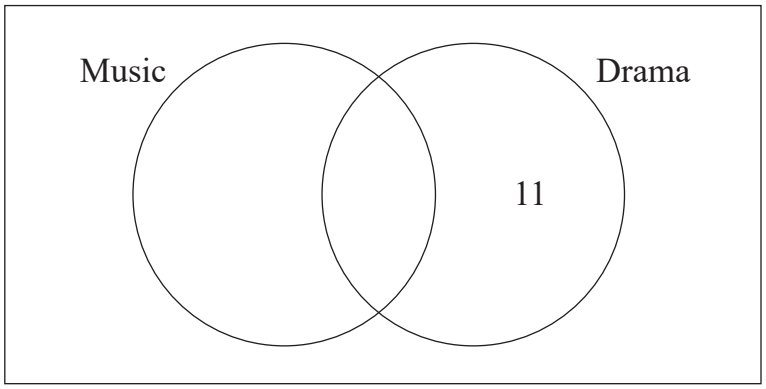
6 study Music

15 study Drama

11 students study only Drama

3 study neither subject.

Complete the Venn diagram to show this information.



[3]

[Turn over

21 A manager is preparing to draw a pie chart to display how 40 workers travel to work.

The table below shows some of her information.

Transport	Number of workers	Angle
Car		45°
Bus		108°
Walk	7	
Train	10	
Bike		
	Total = 40	

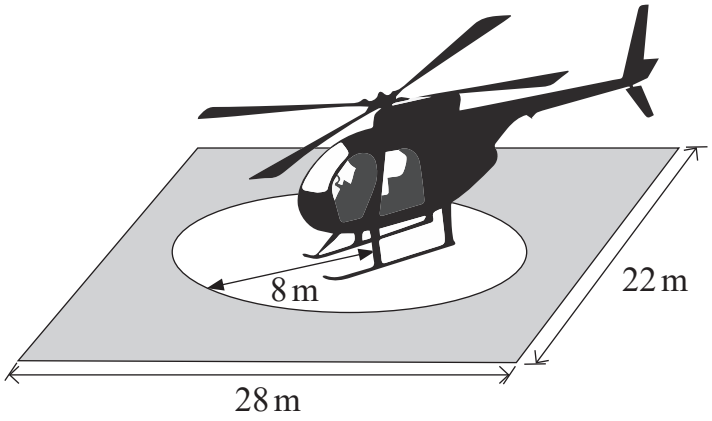
Use the information in the table to work out what angle will represent those who travel by bike.

Show all your working clearly.

Answer _____° [4]

22 The landing pad for a helicopter is a white circle of radius 8 m.

It is painted on a black rectangular plot 28 m by 22 m.



What area of the plot is **not** painted white?

Give units with your answer.

Answer _____ [5]

[Turn over

23 **(a)** Multiply out $4\,(3t - 5)$

Answer _____ [1]

(b) Factorise $18w + 21$

Answer _____ [1]

24 A tracksuit normally cost £75

(a) In a sale the price was reduced by 15%

Calculate the sale price of the tracksuit.

Answer £ _____ [3]

(b) The following week the shop displayed this sign.

FINAL STOCK CLEARANCE
A FURTHER 20% OFF ALL SALE PRICES

Show that the tracksuit now costs £51

[2]

(c) Rhys says, "I am getting 15% off, then 20% off, so I am getting 35% off the £75."

Is he correct?

You must show working to explain your answer.

Answer _____ because _____

_____ [2]

[Turn over

25 A girl collects the following data in metres (m) in a Science experiment.

0.32 0.51 0.43 0.64 0.39 0.49 0.62 0.54 0.52 0.36 0.54 0.68 0.48 0.52 0.60

(a) She states, "The median is the one in the middle so my median is 0.54 m."

Explain why she is not correct.

Answer _____

_____ [1]

(b) She then decides to show her data in a stem and leaf diagram.

The first three are recorded.

Complete the stem and leaf diagram.

0.3	2
0.4	3
0.5	1
0.6	

KEY: 0.3 | 2 = 0.32 m

[2]

(c) Give **one** advantage of displaying the data in a stem and leaf diagram.

Answer _____

_____ [1]

(d) Use the stem and leaf diagram to write down the correct median.

Answer _____ m [1]

26 John receives a wage of £400 per week.

$\frac{2}{5}$ of his wage is spent on rent.

$\frac{1}{4}$ of his wage is spent on food.

$\frac{3}{20}$ of his wage is used to pay other bills.

What **fraction** of John's wage is left?

Answer _____ [3]

27 The attendance for some classes is shown below.

Class A	17 pupils out of 20 were present.
Class B	21 pupils out of 24 were present.
Class C	19 pupils out of 22 were present.

Which class had the **highest percentage attendance**?

You must show working to justify your answer.

Answer _____ [3]

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