New Specification

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
January 2019

Mathematics

Unit M2
(With calculator)
Foundation Tier

MV18

[GMC21]
TUESDAY 8 JANUARY, 9.15am–11.00am

Time

1 hour 45 minutes, plus your additional time allowance.

Instructions to Candidates

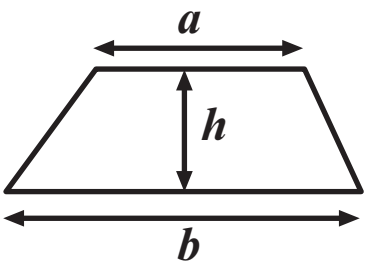
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write on blank pages.
Complete in black ink only.
Answer **all twenty-five** questions.
All working should be clearly shown in the spaces provided.
Marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

Information for Candidates

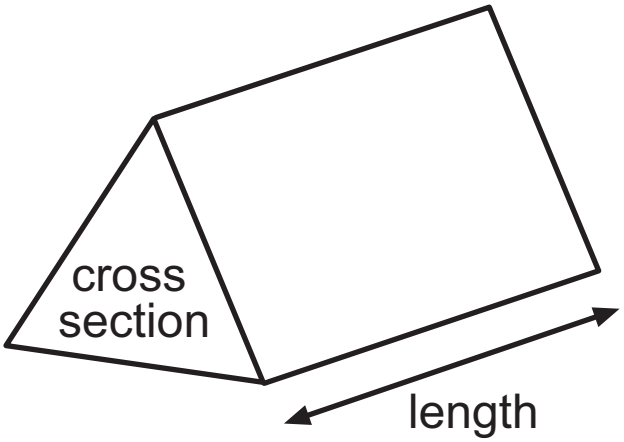
Functional Mathematics is assessed in this unit.
The total mark for this paper is 100.
Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 3.

Formula Sheet

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



Volume of prism = area of cross section × length



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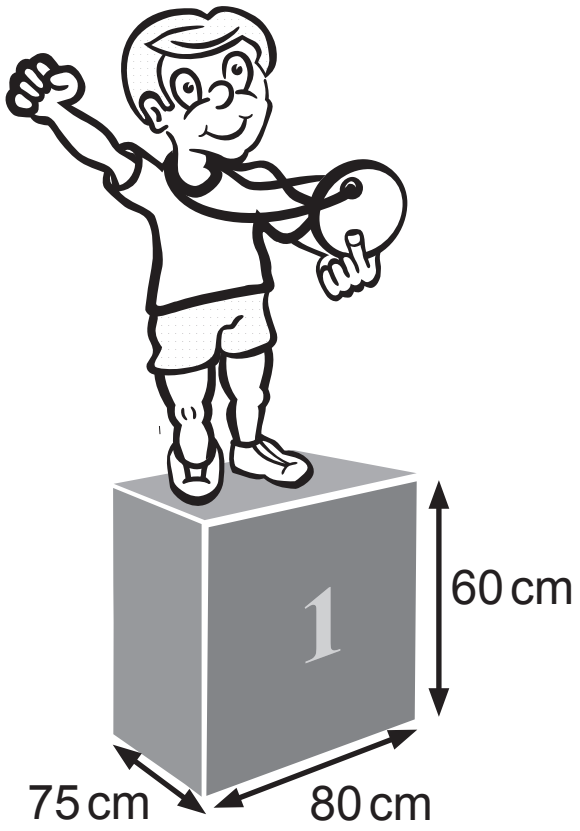
1 A winners' podium (a cuboid) is shown below.



(a) How many **vertices** has the podium? [1 mark]

Answer _____ vertices

(b) What is the area of the **base** of the podium? [2 marks]

Answer _____ cm^2

(c) What is the volume, in m^3, of the podium? [2 marks]

Answer _____ m^3

2 Eight leaders and 143 members of a youth club go by bus to a bowling alley.

The Beezer Bus Company has buses for hire that hold 32 passengers each.

(a) How many buses will the youth club need to hire? [3 marks]

Answer _____

(b) How many spare seats will there be altogether? [2 marks]

Answer _____

(c) Each bus costs **£**140 to hire.

The cost is split equally between the members.

The leaders do not pay.

How much does each member need to pay to cover the cost of hiring the buses? [3 marks]

Answer **£** _____

3 The average monthly temperatures in Colorado during the ski season are shown below.

December	−14°C
January	−15°C
February	−13°C
March	−9°C
April	−5°C

(a) Which month was warmest? [1 mark]

Answer _____

(b) What was the difference in temperature between the warmest and coldest months? [1 mark]

Answer _____°C

4 The hourly rates of pay for some jobs in a warehouse are shown below.

Warehouse Associate **£**8.07

Warehouse Worker **£**8.24

Health and Safety Officer **£**9.94

Picker **£**7.59

(a) Work out the mean of these four hourly rates. [3 marks]

Answer **£** _____

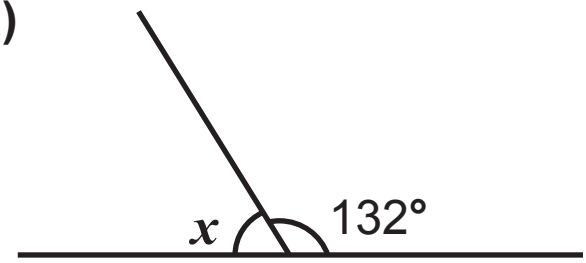
(b) What is the range of the hourly rates? [1 mark]

Answer **£** _____

5 Work out the size of the missing angle in each of the diagrams below. [1 mark for each]

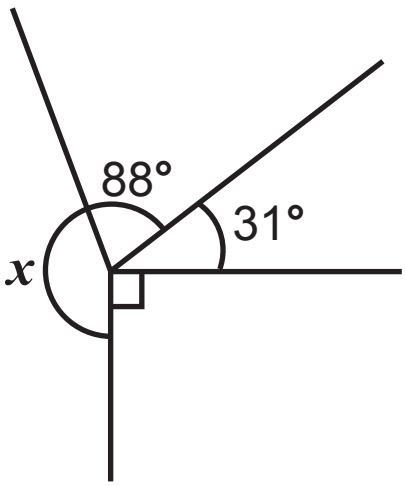
Diagrams not drawn accurately.

(a)



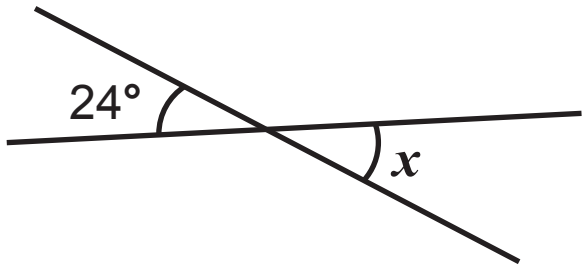
Answer x = _____ °

(b)



Answer x = _____ °

(c)



Answer x = _____ °

6 **(a)** Simplify $9a - 5a + 2a$ [1 mark]

Answer _____

(b) Solve $4y = 60$ [1 mark]

Answer $y =$ _____

(c) Solve $m - 4 = 9$ [1 mark]

Answer $m =$ _____

7 Brian hired some equipment.

There was a fixed charge of **£**45 plus a hire fee of **£**13.50 per day.

He paid **£**274.50 in total.

How many days did he hire the equipment for? [3 marks]

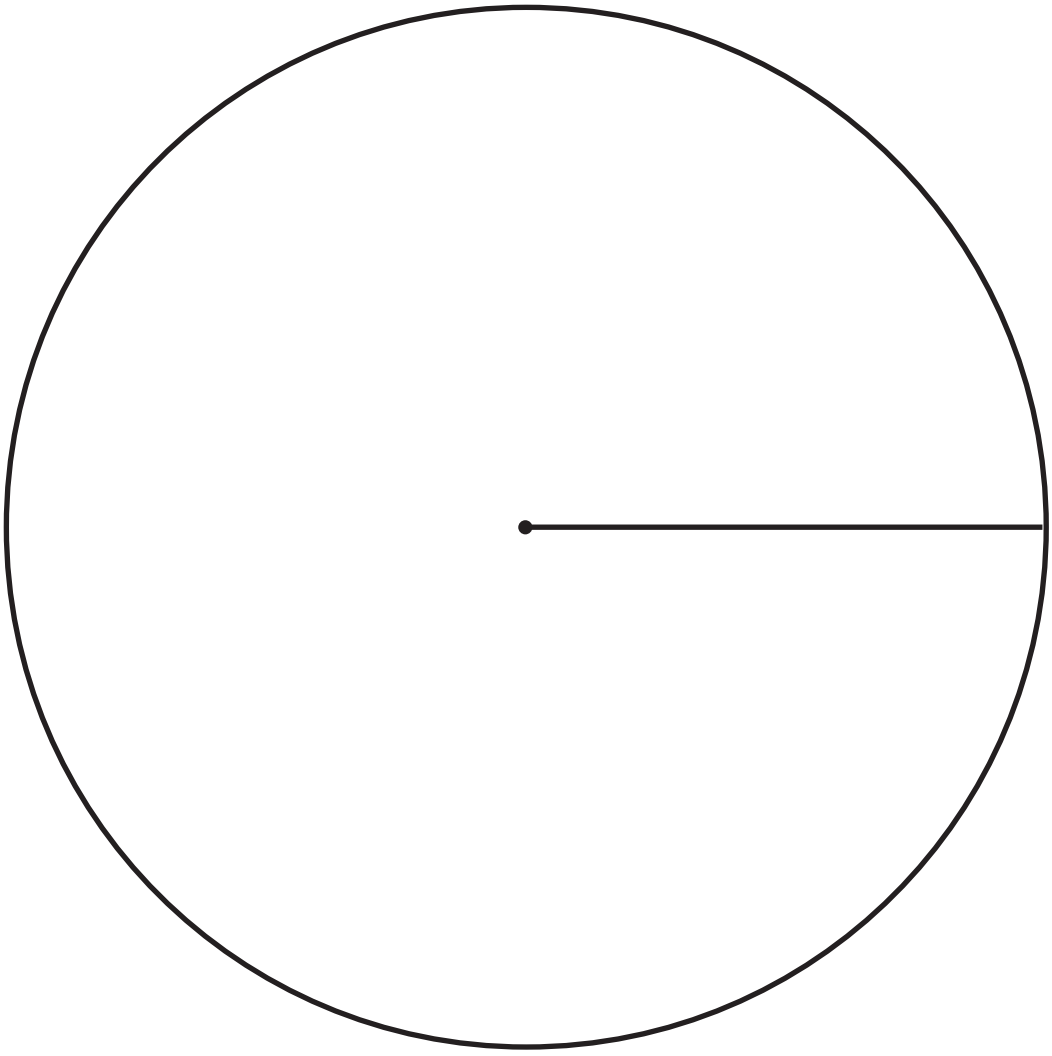
Answer _____

8 **(a)** Dodd's Ice Cream shop sold four sizes of ice cream tubs.

The owner wants to see a pie chart showing the numbers of tubs sold.

Size of tub	**Number of tubs sold**	**Angle**
Small	50	
Medium	34	
Large	24	
Family	12	

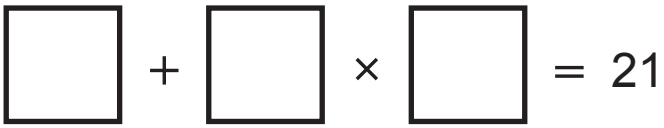
Draw a pie chart to show this information.
[4 marks]



(b) Complete the table to find the total number of scoops used. [2 marks]

Size of tub	Number of tubs sold	Number of scoops per tub	Number of scoops used
Small	50	1	50
Medium	34	2	68
Large	24	3	
Family	12	10	
		Total	

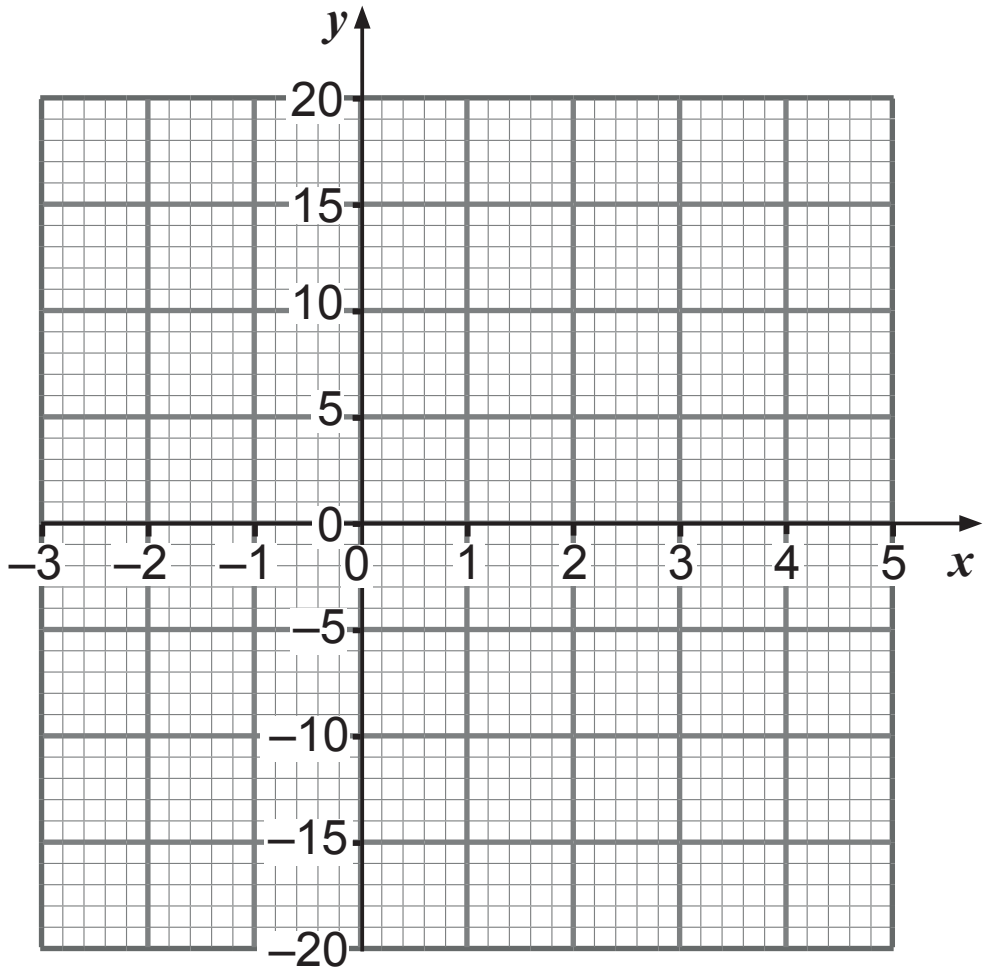
9 Place a digit from 1, 2, 3, 4, 5 in each box to make a true statement. [2 marks]



10 (a) Complete the table below for $y = 5x - 4$
[1 mark]

x	−2	−1	0	1	2	3	4
y	−14		−4	1		11	16

(b) On the grid below, draw the graph of $y = 5x - 4$
[2 marks]



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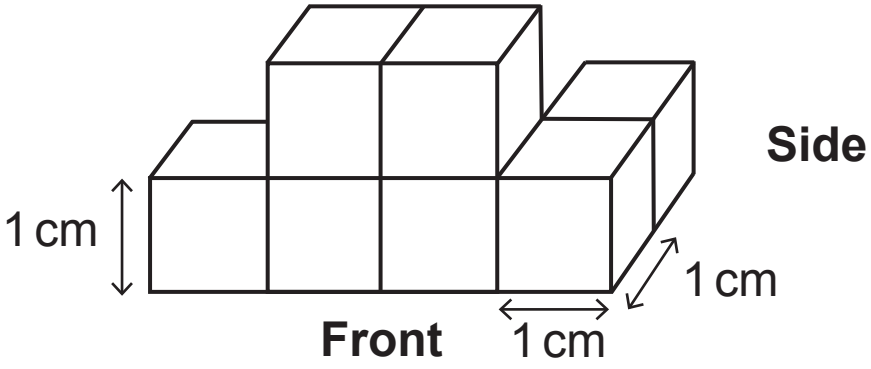
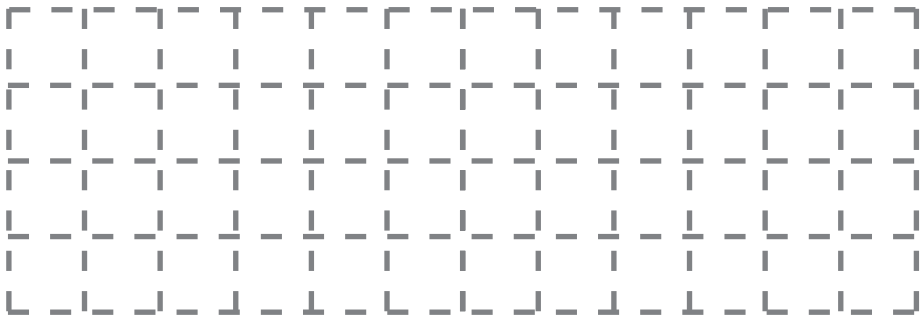
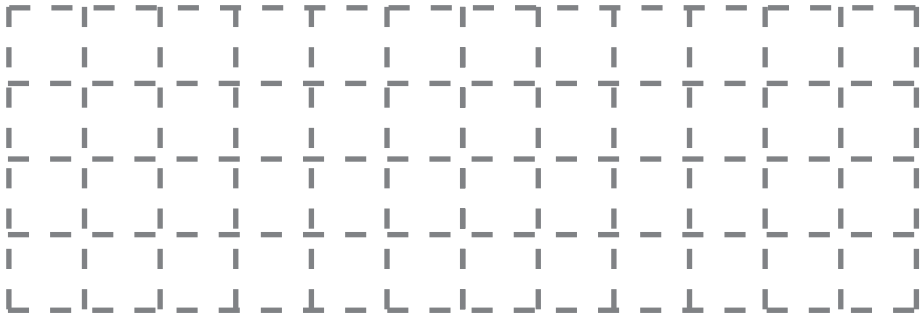


Draw the front and side elevations on the grid below.
[3 marks]

Front



Side



12 Mary raised some money.

She gave $\frac{2}{5}$ of the money to a charity.

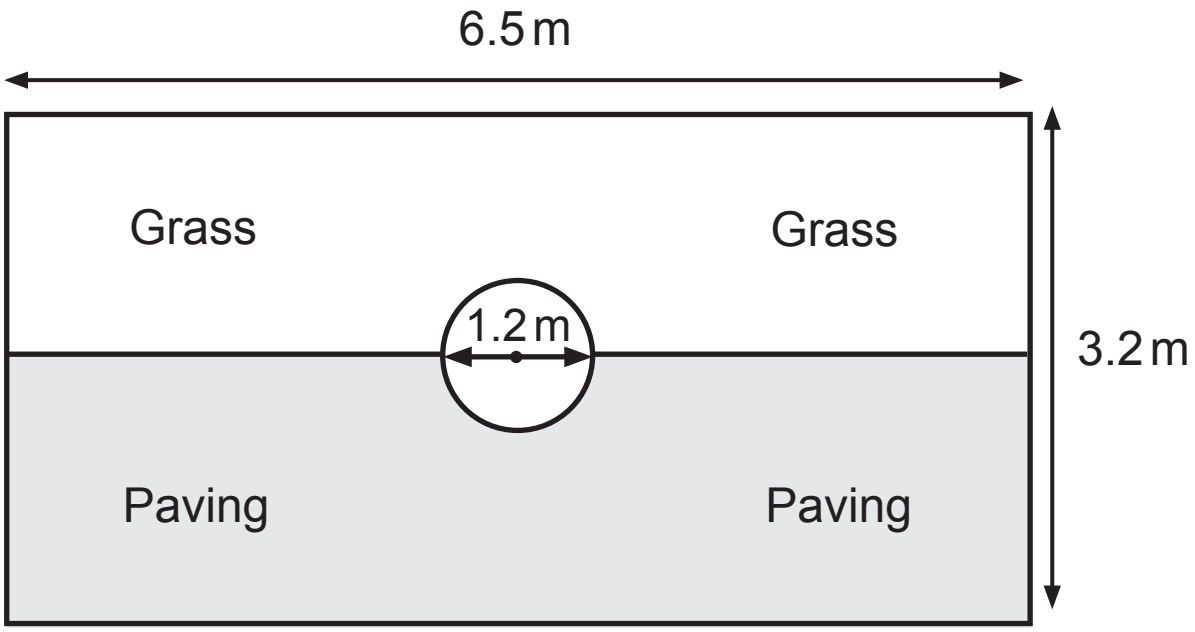
She gave $\frac{1}{4}$ of the money to a housing project.

She gave the rest of the money to a first aid group.

What **percentage** of the money did the first aid group receive? [4 marks]

Answer _____**%**

13 The diagram below shows a rectangular garden with a circular pond in the centre.



(a) Work out the area of the pond. [3 marks]

State the units of your answer.

Answer _____

(b) Paving costs **£**30 per square metre.

It can only be bought in whole square metres.

How much will it cost to pave the section shown on the diagram? [4 marks]

Answer **£** _____

14 Leah wants to check how economical her car is.

She travels 275 miles, using 22 litres of petrol.

(a) How many miles does her car travel per litre of petrol?
[1 mark]

Answer _____ miles

(b) The 275 mile journey took Leah 5 hours 30 minutes.

What was her average speed for the journey?
[3 marks]

Answer _____ miles per hour

15 Dean bought a new car.

He had to pay **£**220 plus 20**%** VAT per month for 3 years.

The mileage allowed before any charge was 30 000 miles for the 3 years.

Each additional mile was charged at 8p per mile.

After 3 years Dean had driven 37 200 miles.

How much did Dean pay in total for the 3-year period?
[5 marks]

Answer **£** _____

16 Jayne owns a hotel.

On Monday morning 54 of her 75 guests had breakfast.

What percentage had breakfast? [2 marks]

Answer _____ **%**

17 **(a)** Multiply out $5\ (2t + 7)$ [1 mark]

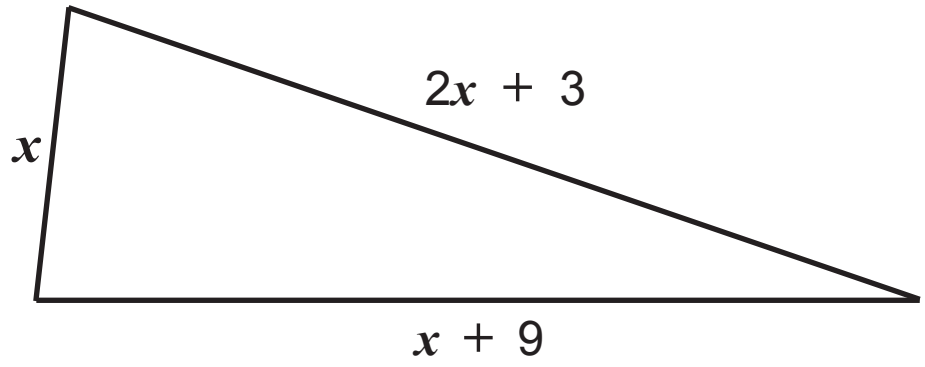
Answer _____

(b) Factorise $16r - 8$ [1 mark]

Answer _____

18 (a) Write an expression, in terms of x, for the perimeter of the triangle shown. [2 marks]

Give your answer in its simplest form.



Answer _____

(b) The perimeter of this triangle is 32

(i) Write down an equation in terms of x. [1 mark]

Answer _____

(ii) Solve your equation to find x. [1 mark]

Answer _____

19 (a) (i) Fiona wanted to do a survey about attendance at her school.

She designed a questionnaire for students to complete.

One of the questions was:

"How many days have you had off school?"

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

Answer _____

_____

(ii) She decides to give her questionnaires out to the first 20 students coming out of the Year 12 assembly one Monday.

State **two** reasons why her sample may not be representative of the whole school population. [2 marks]

Answer _____

_____

_____

_____

(b) Fiona asked the school office for information about pupils who had arrived late to school on a certain day.

They told her that 14 pupils were late that day.

The list below shows how many minutes late each pupil was.

8	12	15	27	19	26	24
38	29	14	11	16	23	16

Show this information in an ordered stem and leaf diagram. [3 marks]

20 A badge is the shape of a quarter circle as shown below.

Calculate the perimeter of the badge. [3 marks]

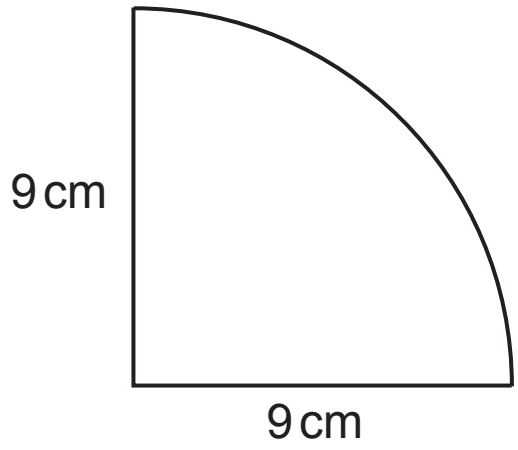


diagram not
drawn accurately

Answer _____ cm

21 The test scores for the 10 boys in a class are

7 8 5 8 7 9 4 5 3 9

The mean test score for the 5 girls in the class is 8

Calculate the mean for this class. [3 marks]

Show your working clearly.

Answer _____

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22 (a) Given that $4\,500 = 2^a \times 3^2 \times 5^b$

work out the values of a and b. [3 marks]

Answer $a =$ _____ $b =$ _____

(b) Hence, write down the lowest value by which 4 500 needs to be multiplied to make a **cube** number. [2 marks]

Answer _____

23 The speeds of cars on a road were recorded over a period of time.
The results are recorded in the grouped frequency table.

Speed (s miles per hour)	**Frequency**		
$20 < s \leqslant 30$	12		
$30 < s \leqslant 40$	16		
$40 < s \leqslant 50$	18		
$50 < s \leqslant 60$	2		
$60 < s \leqslant 70$	2		

(a) How many cars were travelling at more than 40 mph?
[1 mark]

Answer _____

(b) Which class interval contains the median speed?
[1 mark]

Answer _____

(c) Calculate an estimate for the mean speed of the cars on the road. [4 marks]

Answer _____ mph

24 A child's height increased from 84 cm to 91 cm.

Calculate the percentage increase. [3 marks]

Answer _____ %

25 ABCD is a square of side 6 cm.

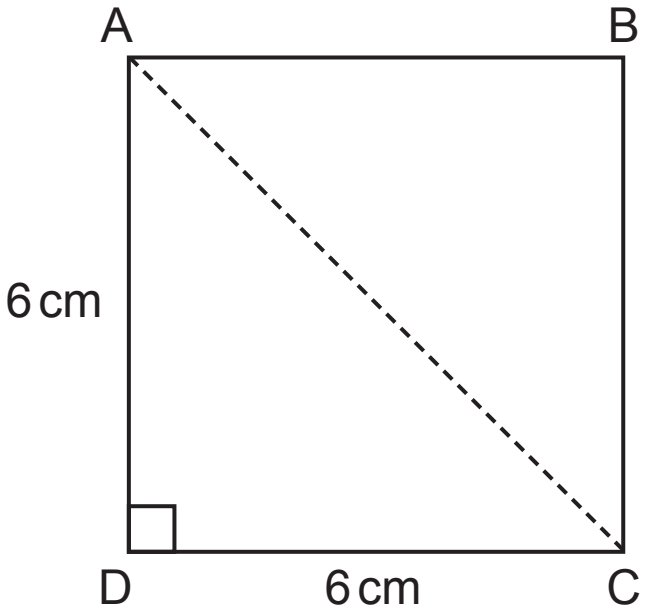

diagram not drawn accurately

How much longer is AC than AD? [4 marks]

You must show all your working.

Answer _____ cm

THIS IS THE END OF THE QUESTION PAPER

For Examiner's use only	
Question Number	**Marks**
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