

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
Level 1/Level 2 GCSE (9-1)

Centre Number

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Candidate Number

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Time 1 hour 30 minutes

**Paper
reference**

1MA1/1F

Mathematics
PAPER 1 (Non-Calculator)
Foundation Tier

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, Formulae Sheet (enclosed). Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**



Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- Good luck with your examination.

Turn over ►

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.CG Maths.
Worked Solutions


Pearson

Please note that these worked solutions have neither been provided nor approved by Pearson Education and may not necessarily constitute the only possible solutions. Please refer to the original mark schemes for full guidance.

Any writing in blue indicates what must be written in order to answer the questions and get the marks. The worked solutions have been designed to show the smallest amount of work which needs to be done to answer the question.

Anything written in green in a cloud doesn't have to be written in the exam.

Anything written in orange in a rectangle doesn't have to be written in the exam and is there to show what should be put into a calculator or measured using a ruler or protractor.

If you find any mistakes or have any requests or suggestions, please send an email to curtis@cgmaths.co.uk

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Change 40 centimetres into millimetres.

There are 10 millimetres in a centimetre. So multiplying 40 by 10 converts it into millimetres

.....400..... millimetres

(Total for Question 1 is 1 mark)

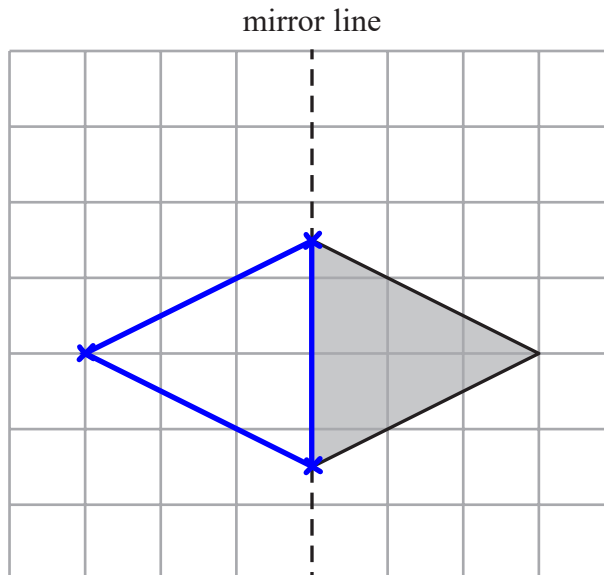
2 Simplify $e + e + e + e$

Multiplication is repeated addition

.....4e.....

(Total for Question 2 is 1 mark)

3 On the grid, reflect the shaded triangle in the mirror line.



(Total for Question 3 is 1 mark)

To reflect, counting the number of jumps to the line for each corner and doing the same number on the other side. Then joining up the corners

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- 4 Write down the value of the 6 in the number 16007

The 6 is in the thousands column

6000

(Total for Question 4 is 1 mark)

- 5 Write these numbers in order of size.
Start with the smallest number.

$$\frac{1}{2}$$

0.55


45%

45% is less than 50%, so is less than $\frac{1}{2}$.
0.55 is more than 0.5, so is more than $\frac{1}{2}$

45%, $\frac{1}{2}$, 0.55

(Total for Question 5 is 1 mark)

- 6 The pictogram gives information about the number of hours of sunshine on a Saturday and on a Sunday.

Saturday	
Sunday	

Key:  represents 2 hours of sunshine

Work out the number of hours of sunshine on Saturday.

There are 4 whole symbols and each one represents 2 hours. $4 \times 2 = 8$

8 hours

(Total for Question 6 is 1 mark)

7 Simon buys some candles.
Each candle costs £2
Simon pays with a £20 note.
He gets £6 change.

Work out the number of candles Simon buys.

$20 - 6$

Subtracting the change from the amount he paid
works out the cost of the candles was £14

$14 \div 2$

Dividing the cost of the candles by the cost of
each candle works out that there were 7 candles

7

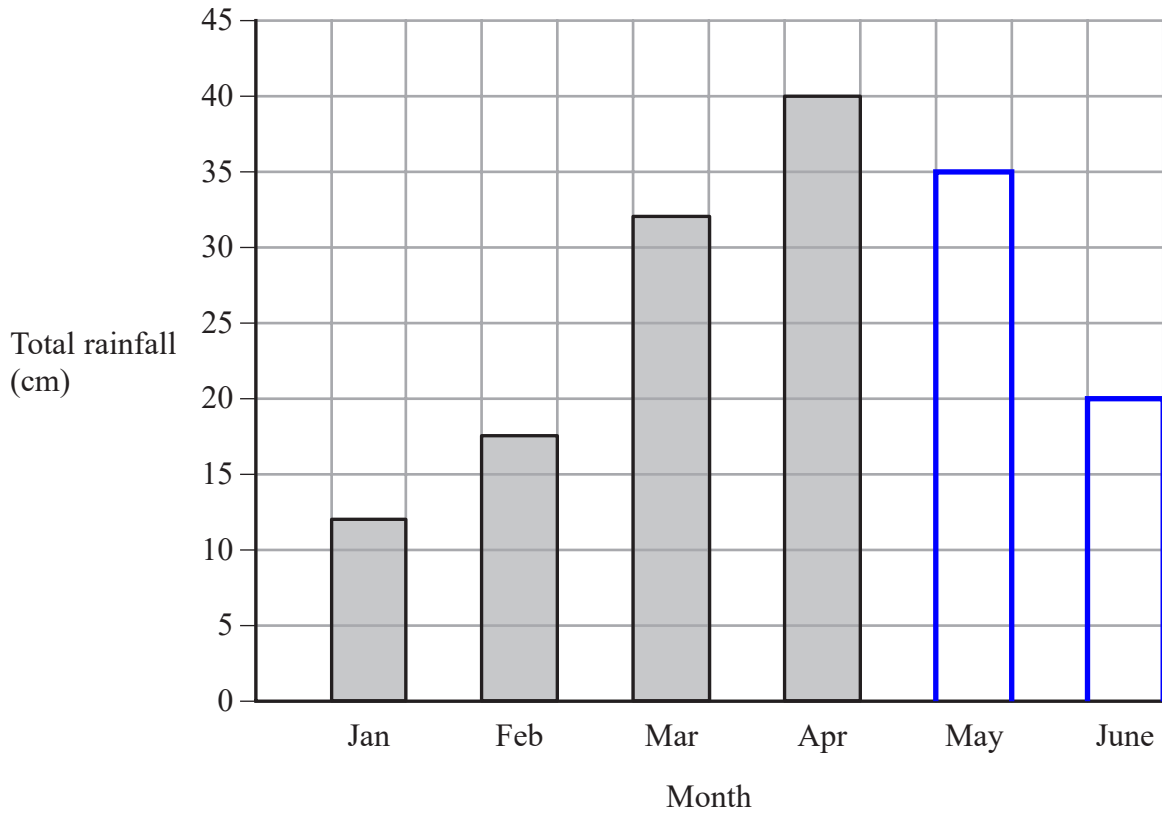
(Total for Question 7 is 3 marks)

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8 The bar chart shows information about the total rainfall each month for four months in a city.



In May, the total rainfall was 35 cm.

In June, the total rainfall was 20 cm.

(a) Use this information to complete the bar chart.

(2)

Rupa says,

“In February there was 15.5 cm of rainfall because the bar is half a square above 15”

(b) Explain why Rupa is incorrect.

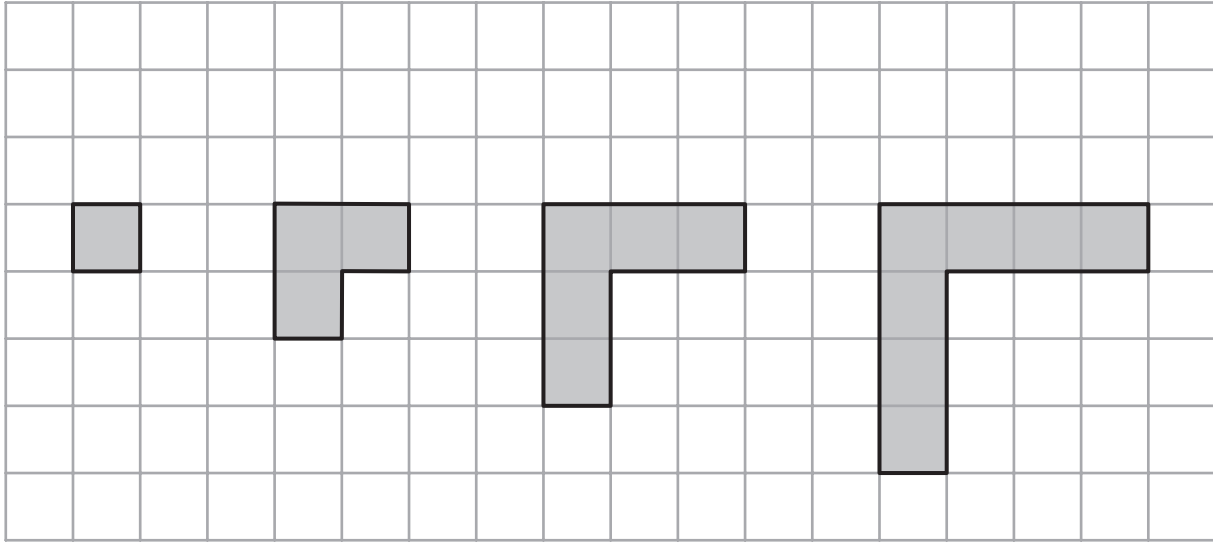
It is 17.5

Each square is worth 5 so half a square is worth 2.5. $15 + 2.5 = 17.5$

(1)

(Total for Question 8 is 3 marks)

9 Here is a sequence of patterns made from grey square tiles.



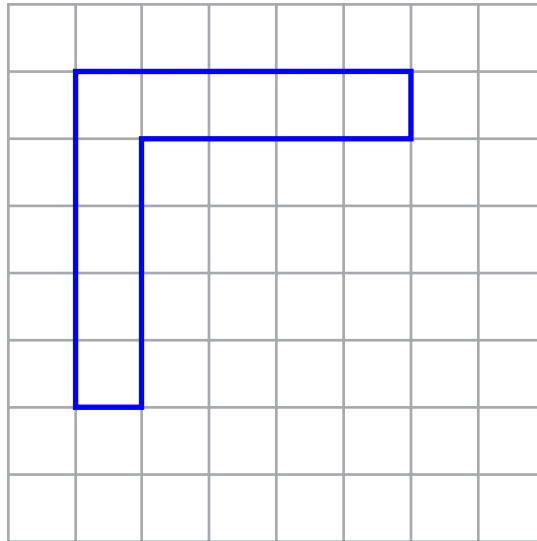
Pattern
number 1

Pattern
number 2

Pattern
number 3

Pattern
number 4

(a) On the grid below, draw Pattern number 5



(1)

(b) Complete the table.

Pattern number	1	2	3	4	5	6
Number of squares	1	3	5	7	9	11

(1)

The number of squares increases by 2 each time

(Total for Question 9 is 2 marks)

- 10 In Norway last year, the lowest temperature was -15°C .
In Norway last year, the highest temperature was 42°C greater than the lowest temperature.

Work out the highest temperature in Norway last year.

$$\begin{array}{r} 42 \\ -15 \\ \hline 27 \end{array}$$

$-15 + 42$ is the same as $42 - 15$

..... 27 $^{\circ}\text{C}$

(Total for Question 10 is 2 marks)

- 11 At the end of October, Fiona's electricity meter reads 88 738 kWh.
At the end of November, her electricity meter reads 89 198 kWh.

Each kWh of electricity Fiona uses costs 16p

Work out how much Fiona had to pay for the electricity she used in November.

$$\begin{array}{r} 89198 \\ -88738 \\ \hline 460 \\ \times 0.16 \\ \hline 2760 \\ 4600 \\ \hline 73.60 \end{array}$$

Subtracting the reading at the end of October from the reading at the end of November works out that 460 kWh were used. Multiplying this by the £0.16 works out the cost of the electricity

..... $\pounds 73.60$

(Total for Question 11 is 4 marks)

12 (a) Work out $\frac{5}{12} + \frac{1}{6}$

$$\frac{5}{12} + \frac{2}{12}$$

Converting $\frac{1}{6}$ into $\frac{2}{12}$ by multiplying both the numerator and denominator by 2 so that the denominators of both fractions are the same and they can be added

$$\frac{7}{12}$$

(2)

(b) Work out $\frac{3}{10} \times \frac{5}{8}$

Give your answer as a fraction in its simplest form.

$$\frac{3}{2} \times \frac{1}{8}$$

Dividing both the 10 and the 5 by 5 as this is a common factor between the numerators and denominators. Then multiplying the fractions together by multiplying the numerators and denominates together

$$\frac{3}{16}$$

(2)

(Total for Question 12 is 4 marks)

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- 13 There are 15 sweets in a jar.
4 of the sweets are red.

Jill takes at random a sweet from the jar.

- (a) Write down the probability that the sweet is red.

4 out of the 15 sweets are red

$\frac{4}{15}$

(1)

There are only green counters and blue counters in a bag.

A counter is taken at random from the bag.

The probability that the counter is green is 0.3

- (b) Find the probability that the counter is blue.

It is certain to either be green or blue so the probability of both added together must be 1. Subtracting the probability of green from 1 leaves the probability of getting blue. $1 - 0.3 = 0.7$

0.7

(1)

(Total for Question 13 is 2 marks)

- 14 $y = 6x - 5$

Work out the value of y when $x = 4$

$6 \times 4 - 5$ ←

The equation has y as the subject so it basically tells how to find y . Substituting x for 4 in the equation. The order of operations needs to be followed so 6×4 is done first, which is 24. Then subtracting 5 from this

$y = 19$

(Total for Question 14 is 2 marks)

- 15 (a) Work out an estimate for the value of 92×1.63
You must show all your working.

90×2

Rounding both amounts to 1 significant figure. $9 \times 2 = 18$ so $90 \times 2 = 180$

180

(2)

Given that

$2.96 \times 3.2 = 9.472$

- (b) find the value of 29.6×32

Both 2.96 and 3.2 are multiplied by 10 so
the answer will be multiplied by 10 twice

947.2

(1)

(Total for Question 15 is 3 marks)

16 Savio leaves his home at 07 30 to drive to work.

He drives a distance of 50 miles.

Savio thinks he drives at an average speed of 40 miles per hour.

(a) If Savio is correct, at what time will he arrive at work?

s^d_t

This is a speed, distance, time problem so writing the formula triangle

$$\frac{50}{40} = \frac{5}{4} = 1\frac{1}{4}$$

From the formula triangle, time = distance/speed. As the speed is in miles per hour, the unit of time will be hours. Simplifying the fraction then converting it into a mixed number

$$4 \overline{) 60} \begin{array}{l} 15 \\ \underline{40} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

Working out how many minutes the $\frac{1}{4}$ of an hour is. There are 60 minutes in an hour so dividing the 60 minutes by 4 works this out

$$\begin{array}{r} 7:30 \\ + 1:15 \\ \hline 8:45 \end{array}$$

Adding 1 hour and 15 minutes to the time he leaves his home to work out the time he will arrive at work

08 45

(3)

In fact, Savio's average speed was greater than 40 miles per hour.

(b) How does this affect your answer to part (a)?

It will be earlier

As the time taken was calculated by dividing the distance by the speed. If the speed is greater this will mean dividing by more and therefore making it less

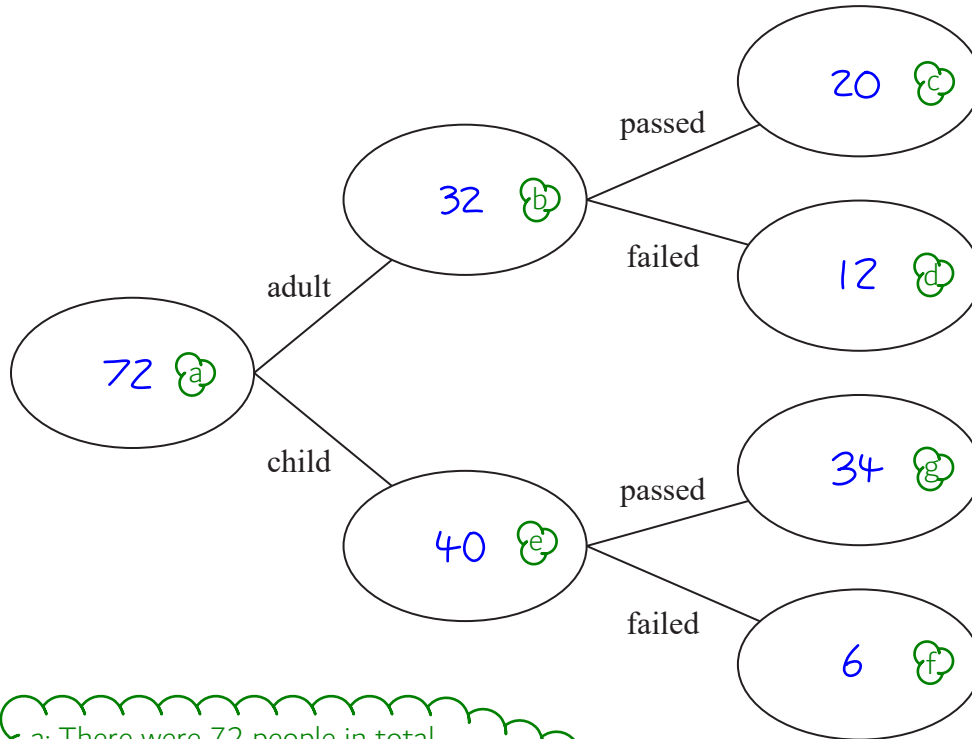
(1)

(Total for Question 16 is 4 marks)

17 72 people did a test.

20 of the 32 adults who did the test passed.
6 of the children who did the test failed.

(a) Use this information to complete the frequency tree.



- a: There were 72 people in total.
 b: 32 were adults.
 c: 20 adults passed the test.
 d: The rest of the 32 adults must have failed. $32 - 20 = 12$
 e: The rest of the 72 people must have been children. $72 - 32 = 40$
 f: 6 children failed.
 g: The rest of the 40 children must have passed. $40 - 6 = 34$

(3)

One of these people is picked at random.

(b) Find the probability that this person is an adult who failed the test.

12 out of the 72 people were adults who failed

$$\frac{12}{72}$$

(2)

(Total for Question 17 is 5 marks)

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18 Here is a list of ingredients for making 10 scones.

Ingredients for 10 scones	
75 g	butter
350 g	self-raising flour
40 g	sugar
150 ml	milk
2	eggs

Mia wants to make 25 scones.
Work out how much sugar she needs.

$$\frac{25}{10}$$

Dividing the 25 scones by the 10 scones works out how many lots of the 10 scones the 25 scones is

$$\begin{array}{r} 2.5 \\ \times 40 \\ \hline 100.0 \end{array}$$

25/10 = 2.5 so there are 2.5 lots of the 10 scones. Therefore there needs to be 2.5 times the amount of sugar needed for 10 scones

.....100..... g

(Total for Question 18 is 2 marks)

19 Increase 240 by 20%

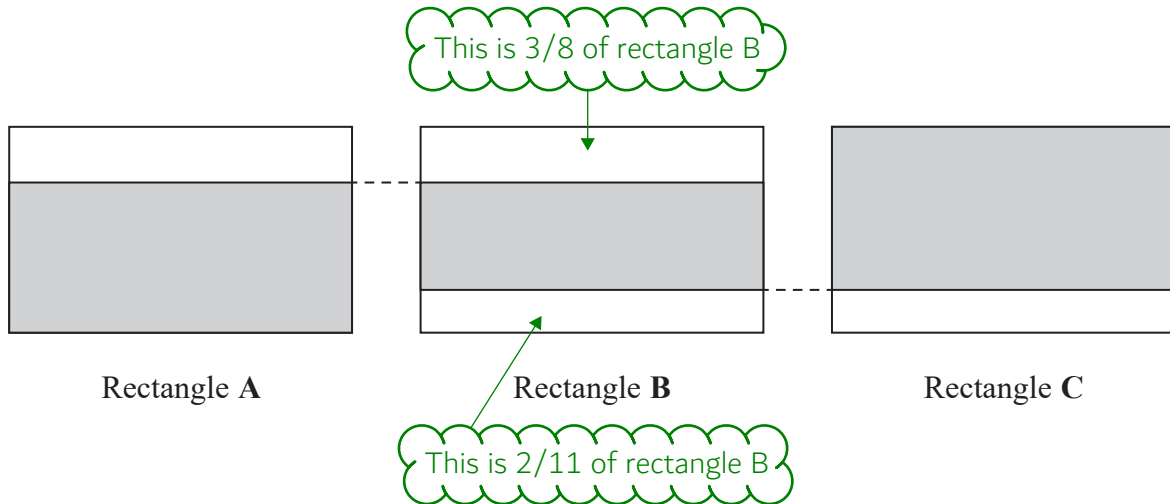
$$\begin{array}{r} 24 \\ \times 2 \\ \hline 48 \\ + 240 \\ \hline 288 \end{array}$$

20% is 2 times 10%. To find 10%, divide by 10. 240/10 = 24. Multiplying this by 2 works out 20%. Adding this to the original amount increases it by the 20%

.....288.....

(Total for Question 19 is 3 marks)

20 The diagram shows three identical rectangles A, B and C.



$\frac{5}{8}$ of rectangle A is shaded.

$\frac{9}{11}$ of rectangle C is shaded.

Work out the fraction of rectangle B that is shaded.

$$1 - \frac{3}{8} - \frac{2}{11}$$

Subtracting the fractions of rectangle B which are not shaded from 1 works out the fraction which is shaded

$$\frac{88}{88} - \frac{33}{88} - \frac{16}{88}$$

1 is basically $\frac{1}{1}$. Converting all 3 fractions so that they have the same denominator. 88 is a common multiple of 1, 8 and 11. Multiplying the denominators to get 88 and multiplying the numerator of each fraction by the same amount to keep them equivalent

$$\begin{array}{r} 88 \\ - 33 \\ - 16 \\ \hline 39 \end{array}$$

Subtracting the numerators

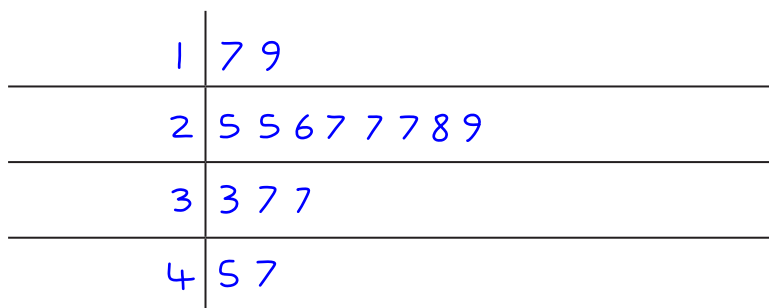
$$\frac{39}{88}$$

(Total for Question 20 is 3 marks)

21 Here are the ages, in years, of 15 people.

19	28	29	33	27
27	37	25	27	37
17	45	47	25	26

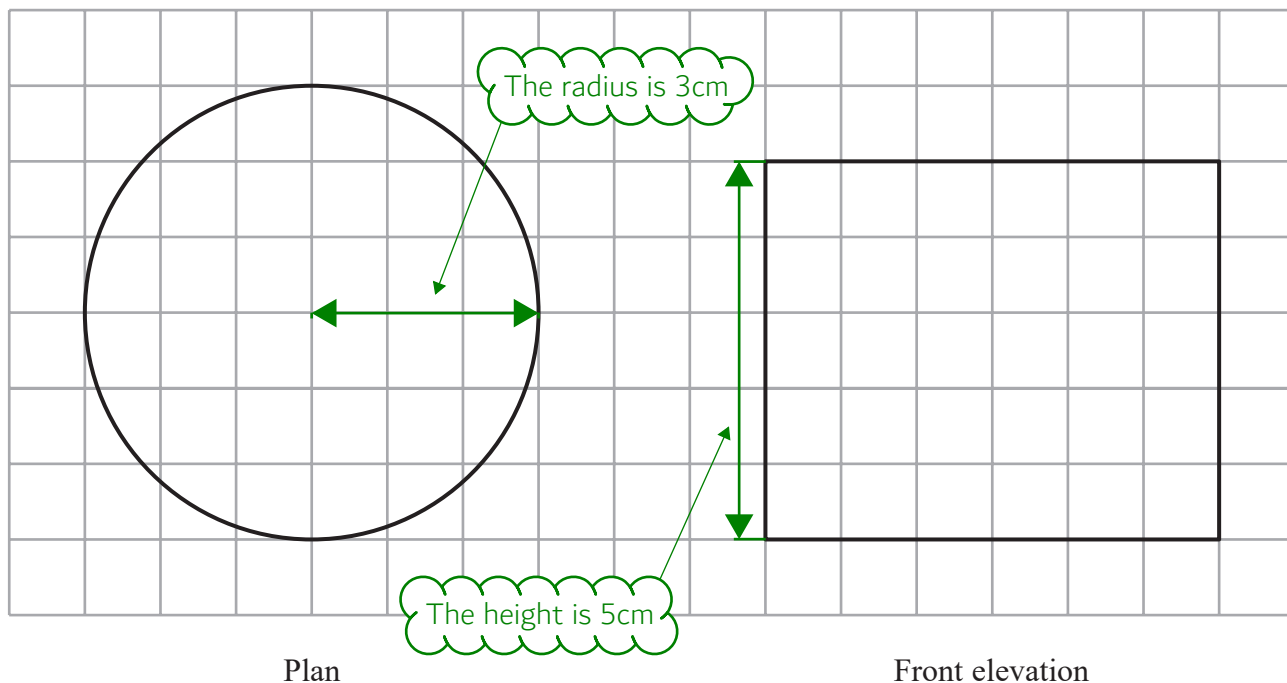
Show this information in a stem and leaf diagram.



Key: $1 | 7 = 17$

(Total for Question 21 is 3 marks)

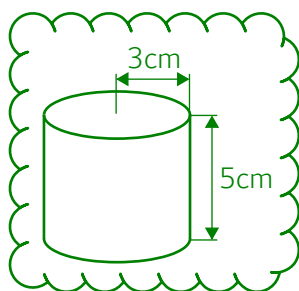
22 The centimetre grid shows the plan and the front elevation of a cylinder.



Work out the volume of the cylinder.
Give your answer in terms of π

$\pi \times 3^2 \times 5$

Volume of cylinder = $\pi \times \text{radius}^2 \times \text{height}$



$3^2 = 3 \times 3 = 9. 9 \times 5 = 45.$ Leaving in terms of π

..... 45π cm^3

(Total for Question 22 is 3 marks)

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23 Solve $7x - 27 < 8$

$$7x < 35$$

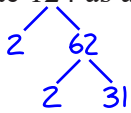
Adding 27 to both sides eliminates the -27 on the left and gets the x term on its own

Dividing both sides by 7 eliminates the 7 on the left

$$x < 5$$

(Total for Question 23 is 2 marks)

24 Write 124 as a product of its prime factors.



Doing a factor tree by splitting each number into factors and stopping at the prime numbers

Writing the primes multiplied together gives $2 \times 2 \times 31$

$$2^2 \times 31$$

(Total for Question 24 is 2 marks)

25 A delivery company has a total of 160 cars and vans.

the number of cars : the number of vans = 3 : 7

Each car and each van uses electricity or diesel or petrol.

$\frac{1}{8}$ of the cars use electricity.

25% of the cars use diesel.

The rest of the cars use petrol.

Work out the number of cars that use petrol.

You must show all your working.

$$160 \div 10$$

There are 10 parts in total in the ratio as $3 + 7 = 10$. These parts represent the total of 160 so dividing by 10 works out that 1 part is worth 16

$$\begin{array}{r} 16 \\ \times 3 \\ \hline 48 \\ - 12 \\ \hline 30 \end{array}$$

Multiplying the worth of 1 part by 3 works out that the 3 parts representing the cars is worth 48. $\frac{1}{8}$ of 48 is 6 so there are 6 electric cars. 25% of 48 is 12 so there are 12 diesel cars. Subtracting these away from the 48 total cars leaves the number which must be petrol

30

(Total for Question 25 is 5 marks)

26 (a) Write 1.63×10^{-3} as an ordinary number.

1.63

$\times 10^{-3}$ basically means to divide by 10 3 times.
The decimal point moves 3 places to the left

0.00163

(1)

(b) Write $438\,000$ in standard form.

$438\,000$ must be divided by 10 5 times to get a number between 1 and 10. It must be multiplied by 10^5 , which is basically multiplying by 10 5 times, to keep it equal

4.38×10^5

(1)

(c) Work out $(4 \times 10^3) \times (6 \times 10^{-5})$
Give your answer in standard form.

24×10^{-2}

The multiplication can be done in any order so multiplying the 4 and 6 together to get 24 and the 10^3 and 10^{-5} to get 10^{-2}

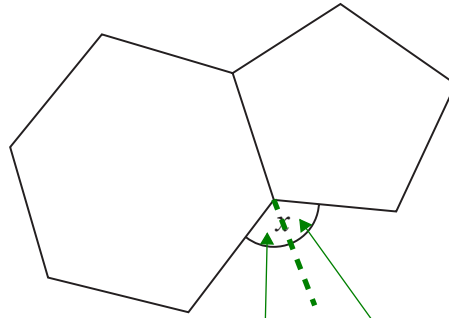
Dividing 24 by 10 once to get 2.4 then multiplying the power of 10 by 10 once to keep it equal. This adds 1 to the power

2.4×10^{-1}

(2)

(Total for Question 26 is 4 marks)

27 Here is a regular hexagon and a regular pentagon.



The exterior angle of the hexagon

The exterior angle of the pentagon

Work out the size of the angle marked x .

You must show all your working.

$$\begin{array}{r} 60 \\ 6 \overline{)360} \end{array}$$

This works out that the exterior angle of the hexagon is 60°

The exterior angles of any polygon add up to 360. So dividing 360 by the number of exterior angles, which is the same as the number of sides, works out each exterior angle

$$\begin{array}{r} 72 \\ 5 \overline{)360} \end{array}$$

This works out that the exterior angle of the pentagon is 72°

$$\begin{array}{r} 60 \\ +72 \\ \hline 132 \end{array}$$

Adding the two exterior angles give x

..... 132 °

(Total for Question 27 is 3 marks)

28 (a) Complete the table of values for $y = x^2 - 3x + 1$

x	-1	0	1	2	3	4
y	5	1	-1	-1	1	5

Substituting each value of x into the equation to find y

$$(-1)^2 - 3(-1) + 1 = 1 + 3 + 1 = 5$$

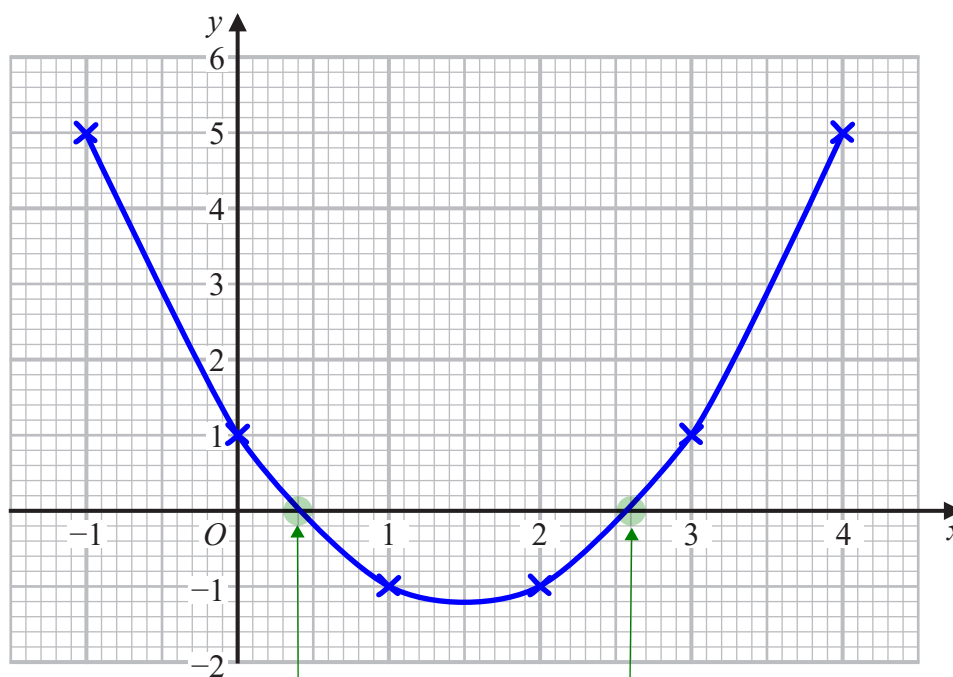
$$2^2 - 3(2) + 1 = 4 - 6 + 1 = -1$$

$$3^2 - 3(3) + 1 = 9 - 9 + 1 = 1$$

$$4^2 - 3(4) + 1 = 16 - 12 + 1 = 5$$

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from -1 to 4



$y = 0$ at both of these points

(2)

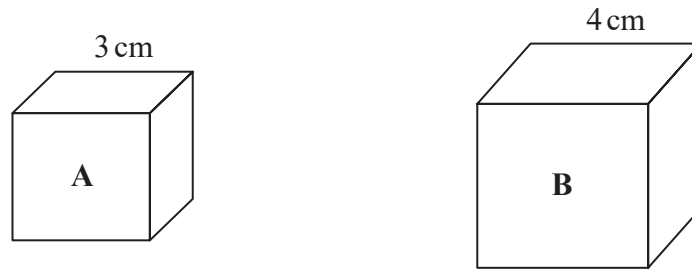
(c) Using your graph, find estimates for the solutions of the equation $x^2 - 3x + 1 = 0$

..... 0.4, 2.6

(2)

(Total for Question 28 is 6 marks)

29 Here are two cubes, A and B.



Cube A has a mass of 81 g.

Cube B has a mass of 128 g.

Work out

the density of cube A : the density of cube B

Give your answer in the form $a : b$, where a and b are integers.

$d \begin{matrix} m \\ v \end{matrix}$ ← This is a density, mass, volume problem so writing the formula triangle

$$\begin{array}{r} 3 \\ 27 \overline{) 81} \\ \underline{27} \\ 54 \\ \underline{54} \\ 0 \end{array}$$
 ← This works out that the density of A is 3 g/cm^3 . From the formula triangle, density = mass/volume. Volume of cube = length³. $3^3 = 3 \times 3 \times 3 = 27$

$$\begin{array}{r} 2 \\ 64 \overline{) 128} \\ \underline{64} \\ 64 \\ \underline{64} \\ 0 \end{array}$$
 ← This works out that the density of B is 2 g/cm^3 . From the formula triangle, density = mass/volume. Volume of cube = length³. $4^3 = 4 \times 4 \times 4 = 64$

3:2

(Total for Question 29 is 3 marks)

30 Write down the value of $\sin 30^\circ$

0 30 45 60 90
0 1 2 3 4

$\frac{1}{2}$

(Total for Question 30 is 1 mark)

TOTAL FOR PAPER IS 80 MARKS

The trig values need to be remembered for the angles of 0, 30, 45, 60, 90. Listing these out and listing 0, 1, 2, 3, 4 underneath. Square rooting then putting them over 2 works out the sin values. $\sqrt{1}/2 = 1/2$