

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

--	--	--	--	--

Candidate Number

--	--	--	--	--

**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 ►

P66306RA

©2021 Pearson Education Ltd.

1/1/1/1/1



Pearson

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.

$$1 \text{ cm} = 10 \text{ mm}$$

$$40 \text{ cm} = 40 \times 10 \text{ mm} \\ = 400 \text{ mm} \text{ (1)}$$

400 ..... millimetres

(Total for Question 1 is 1 mark)

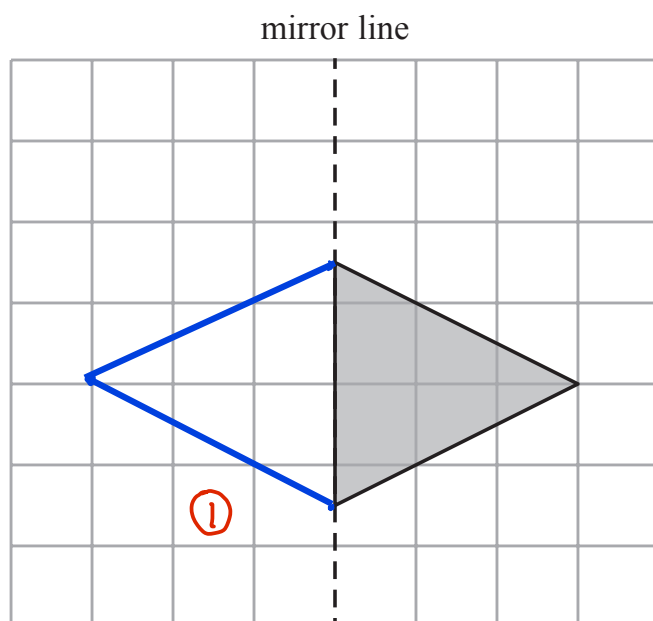
2 Simplify  $e + e + e + e$

$$e + e + e + e = 4e \text{ (1)}$$

4e

(Total for Question 2 is 1 mark)

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



tip:  
reflect the vertices of the shape, then connect them with the edges

(Total for Question 3 is 1 mark)

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

6 is in the thousands place

6000 ①

(Total for Question 4 is 1 mark)

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

convert all numbers  
to decimals:

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

0.55

45%

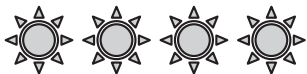
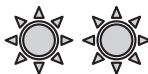
$$\frac{1}{2} = 0.5$$

$$45\% = 0.45$$

so the order is: 45%,  $\frac{1}{2}$ , 0.55 ①

(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.

Saturday has 4 suns.  
Each sun represents 2 hours

$$2 \times 4 = 8 \text{ ①}$$

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.

Find out how much Simon paid:

$$£20 - £6 = £14 \quad (1)$$

Each candle costs £2:

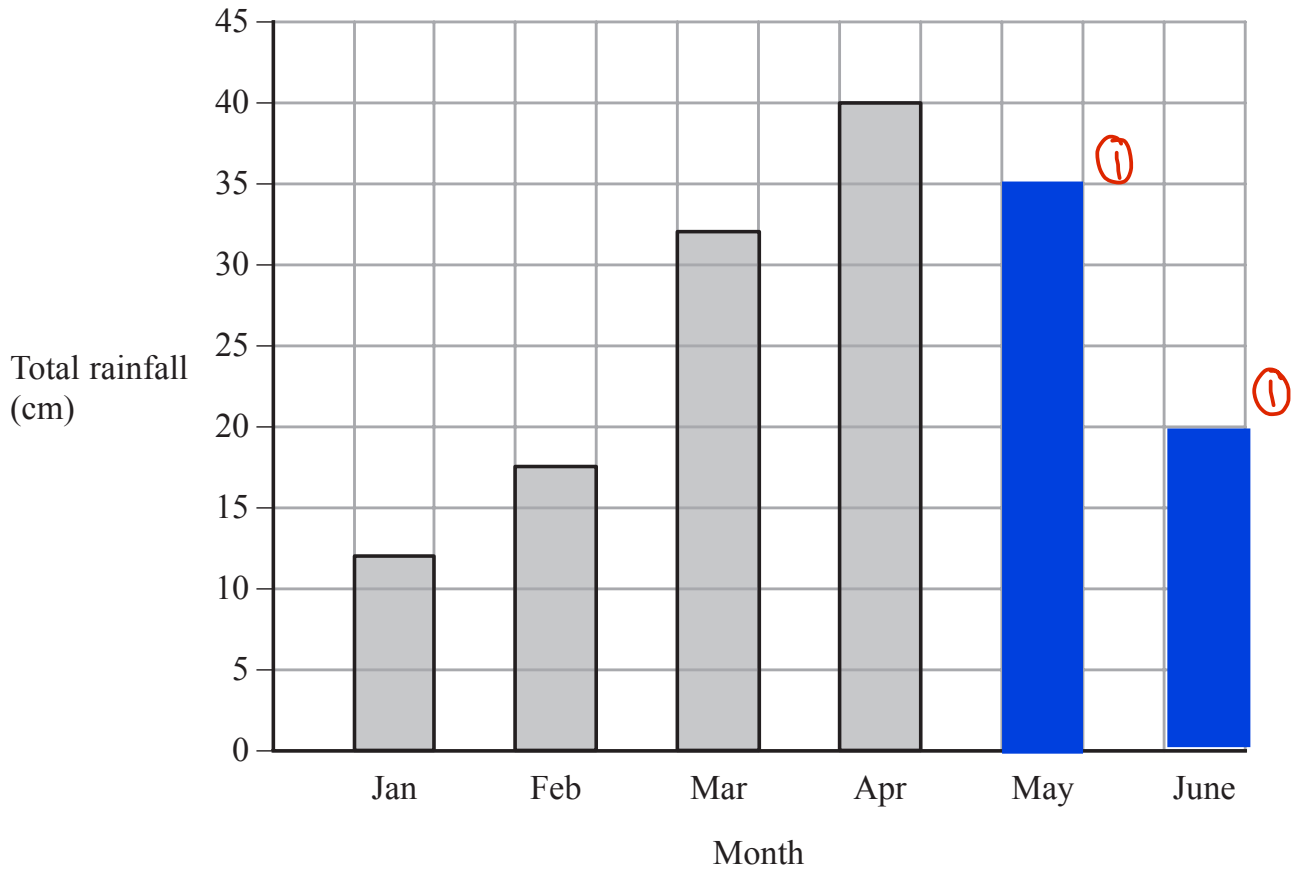
$$14 \div 2 = 7 \quad (1)$$

7 (1)

---

(Total for Question 7 is 3 marks)

- 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.

Each square = 5cm  
 $35 \div 5 = 7$  squares  
 $20 \div 5 = 4$  squares

- (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”

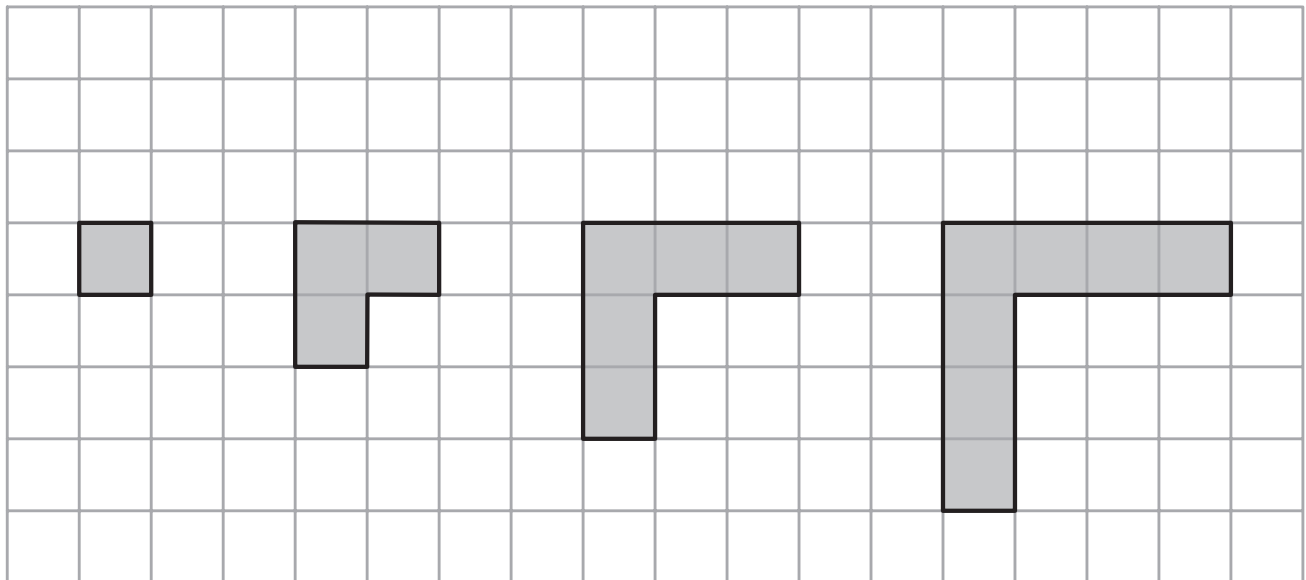
- (b) Explain why Rupa is incorrect.

Each square is 5cm, so half a square is 2.5cm. ①  
 $15\text{cm} + 2.5\text{cm} = 17.5\text{cm}.$

(1)

(Total for Question 8 is 3 marks)

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



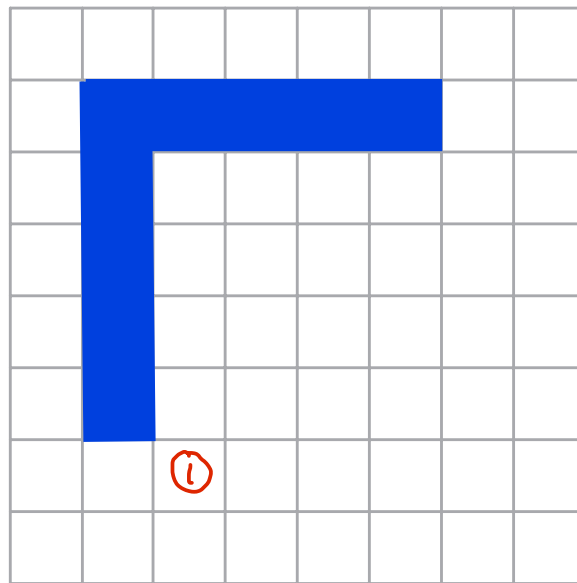
Pattern number 1

Pattern number 2

Pattern number 3

Pattern number 4

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



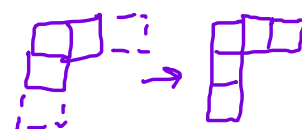
(1)

(b) Complete the table.

<b>Pattern number</b>	1	2	3	4	5	6
<b>Number of squares</b>	1	3	5	7	9	11

(1)

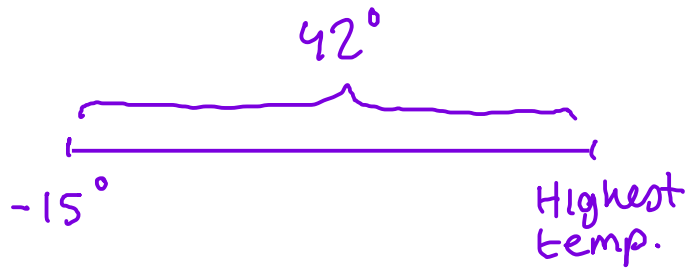
Each new pattern adds two squares to the 'ends' of the previous, e.g:



(1)

(Total for Question 9 is 2 marks)

- 10 In Norway last year, the lowest temperature was  $-15^{\circ}\text{C}$ .  
 In Norway last year, the highest temperature was  $42^{\circ}\text{C}$  greater than the lowest temperature.  
 Work out the highest temperature in Norway last year.



$$-15 + 42 = 27 \text{ (1)}$$

.....  $27^{\circ}\text{C}$  (1)

(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.

Find how much electricity Fiona used in November

$$\begin{array}{r} 89198 \\ - 88738 \\ \hline 00460 \end{array}$$

$$89198 - 88738 = 460 \text{ (1)}$$

Fiona used 460 kWh in Nov.

Each kWh used costs £0.16p

$$\begin{array}{r} \phantom{0}460 \\ \times 0.16 \\ \hline 2760 \\ 4600 \\ + 0000 \\ \hline 7360 \end{array}$$

$$460 \times 0.16 = 73.60 \text{ (2)}$$

so the electricity cost £73.60

..... £73.60p (1)

(Total for Question 11 is 4 marks)

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

Find common denominator;  
lowest common multiple of both  
denominators (12 and 6) is 12.

$$\frac{5}{12} + \frac{1}{6}$$
$$= \frac{5}{12} + \frac{2}{12}$$

denominator is multiplied by 2,  
so numerator must also be  
multiplied by 2

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

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

(2)

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

Give your answer as a fraction in its simplest form.

$$\frac{3}{10} \times \frac{5}{8} = \frac{15}{80} \rightarrow \frac{3}{16}$$

both can  
÷ by 5

$$5 \overline{) 80} \begin{array}{r} 16 \\ \underline{50} \\ 30 \\ \underline{30} \\ 0 \end{array}$$

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

(2)

(Total for Question 12 is 4 marks)



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.

$$\frac{\text{red sweets}}{\text{all sweets}} = \frac{4}{15} \text{ (1)}$$

$$\frac{4}{15}$$

(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.

$$1 - 0.3 = 0.7 \text{ (1)}$$

All probabilities add up to 1,  
The counter is either green or blue.

$$0.7$$

(1)

(Total for Question 13 is 2 marks)

14  $y = 6x - 5$

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

Substitute  $x = 4$

$$\begin{aligned} y &= 6(4) - 5 \text{ (1)} \\ &= 24 - 5 \\ &= 19 \end{aligned}$$

$$y = 19 \text{ (1)}$$

(Total for Question 14 is 2 marks)

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

Round the values 92 and 1.63

e.g. round 92 to 90

round 1.63 to 1.5

$$92 \times 1.63 \approx 90 \times 1.5 \quad (1)$$

$$\begin{array}{r} 90 \\ \times 1.5 \\ \hline 450 \\ + 900 \\ \hline 135.0 \end{array}$$

$$\begin{array}{r} 135 \quad (1) \\ \hline (2) \end{array}$$

Given that

$$2.96 \times 3.2 = 9.472$$

- (b) find the value of  $29.6 \times 32$

$$\begin{aligned} 29.6 \times 32 &= (2.96 \times 10) \times (3.2 \times 10) \\ &= 2.96 \times 3.2 \times 100 \\ &= 9.472 \times 100 \end{aligned}$$

$$\begin{array}{r} 947.2 \quad (1) \\ \hline (1) \end{array}$$

(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?

$$\text{Use time} = \frac{\text{distance}}{\text{speed}}$$

$$\text{time taken to drive to work} = \frac{50}{40} = 1.25 \text{ hours} \quad (1)$$

Convert hours to minutes by multiplying by 60

$$1.25 \times 60 = (1 + 0.25) \times 60 = 60 + 15 = 75 \text{ minutes} \\ = 1 \text{ h } 15 \text{ minutes} \quad (1)$$

$$07:30 + 1 \text{ h } 15 \text{ min} \\ = 08:45$$

$$08:45 \quad (1)$$

---

(3)

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

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

Savio drove faster  $\rightarrow$  he got there earlier

The time will be earlier (1)

(1)

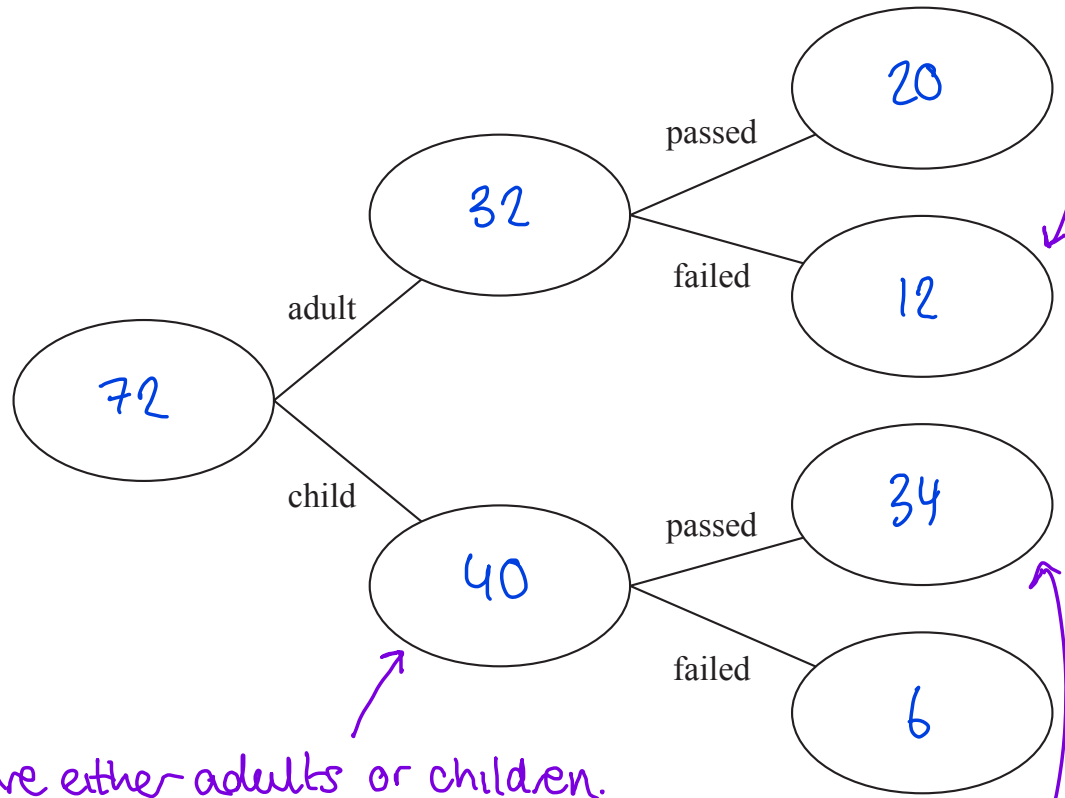
(Total for Question 16 is 4 marks)

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.

The adults either passed or failed.  
Number who failed =  $32 - 20 = 12$



People are either adults or children.  
Number of children =  $72 - 32 = 40$

Children either passed or failed. Number who passed =  $40 - 6 = 34$

③

(3)

One of these people is picked at random.

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

probability =  $\frac{\text{adults who failed}}{\text{all that did the test}} = \frac{12}{72}$  ① ①

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

Note: did not ask for simplest form.

(2)

(Total for Question 17 is 5 marks)

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.

Find the scale factor:

$$25 \div 10 = 2.5 \quad \textcircled{1}$$

This means all ingredients must be multiplied by 2.5 to make 25 scones.

$$40\text{g} \times 2.5 = 100\text{g} \quad \textcircled{1}$$

..... 100 g

(Total for Question 18 is 2 marks)

19 Increase 240 by 20%

Method: Find 20% of 240, then add this onto 240.

$$20\% \text{ of } 240 = \frac{1}{5} \times 240 = \frac{240}{5} = 48 \quad \textcircled{1}$$

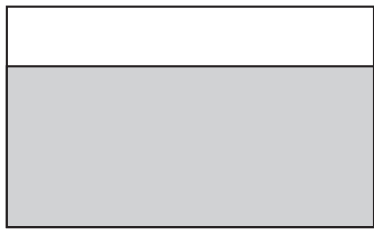
$$5 \overline{) 240} \begin{array}{r} 048 \\ \underline{5} \phantom{0} \\ 240 \\ \underline{240} \\ 0 \end{array}$$

$$\begin{array}{r} 240 \\ + 48 \\ \hline 288 \end{array} \quad \textcircled{1}$$

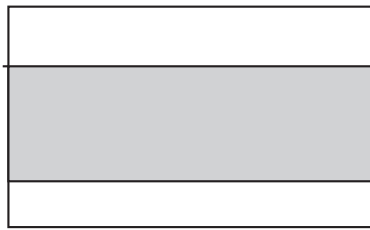
..... 288  $\textcircled{1}$

(Total for Question 19 is 3 marks)

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



Rectangle A



Rectangle B



Rectangle C


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


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

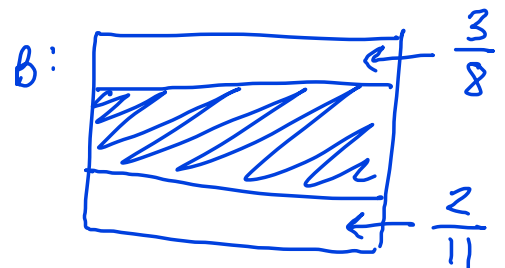
Work out the fraction of rectangle B that is shaded.

Method:

Find what fraction of A is unshaded  
Find what fraction of C is unshaded

A:  unshaded =  $1 - \frac{5}{8} = \frac{8}{8} - \frac{5}{8} = \frac{3}{8}$  ①

C:  unshaded =  $1 - \frac{9}{11} = \frac{11}{11} - \frac{9}{11} = \frac{2}{11}$



Shaded fraction of B  
=  $1 - \frac{3}{8} - \frac{2}{11}$  ①  
=  $\frac{39}{88}$  ①

(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.

Notes:

Items in the same row should be ordered  
(e.g. 1|79 NOT 1|97)

1	7 9
2	5 5 6 7 7 7 8 9
3	3 7 7
4	5 7

②

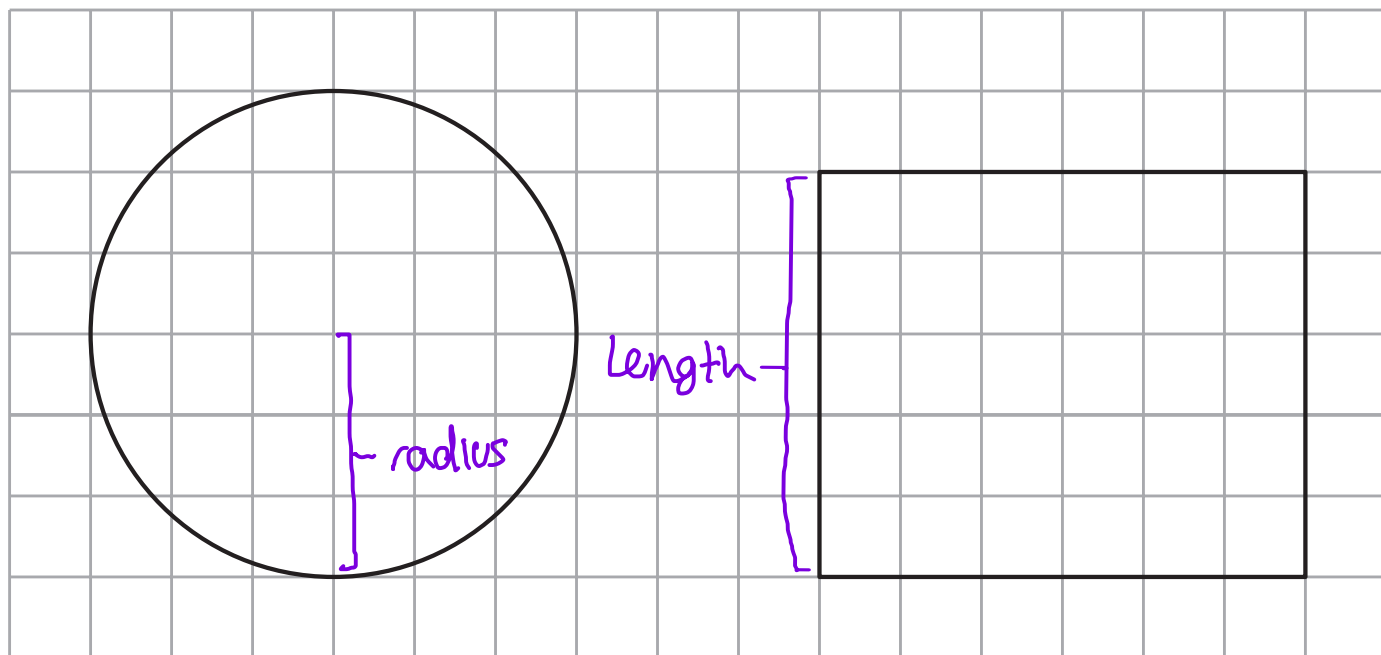
Key:

e.g.  
2|5 = 25 years

①

(Total for Question 21 is 3 marks)

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



Plan

Front elevation

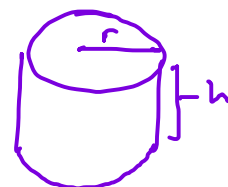
Work out the volume of the cylinder.

Give your answer in terms of  $\pi$

Find radius of the cylinder by counting squares

$$\text{Radius} = 3 \text{ squares} = 3 \text{ cm}$$

$$\therefore \text{Area of cross-section is } \pi r^2 = \pi(3)^2 = 9\pi \quad (1)$$



Find length of cylinder

$$\text{Length} = 5 \text{ squares} = 5 \text{ cm}$$

Area of cylinder = area of cross-section  $\times$  length

$$\therefore \text{area is } 9\pi \times 5 = 45\pi \quad (1)$$

$$\dots\dots\dots 45\pi \text{ cm}^3 \quad (1)$$

(Total for Question 22 is 3 marks)



23 Solve  $7x - 27 < 8$

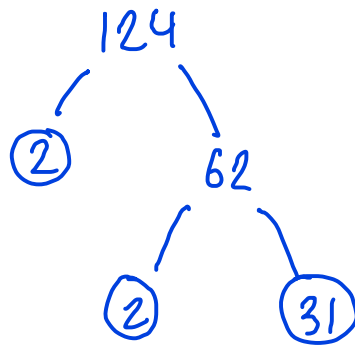
$$\begin{aligned} 7x - 27 &< 8 \\ +27 & \quad +27 \quad \textcircled{1} \\ 7x &< 35 \\ \div 7 & \quad \div 7 \\ x &< 5 \quad \textcircled{1} \end{aligned}$$

$$\begin{array}{r} + \quad 27 \\ \quad \quad 8 \\ \hline 35 \end{array}$$

$x < 5$

(Total for Question 23 is 2 marks)

24 Write 124 as a product of its prime factors.



$$\begin{array}{r} 062 \\ 2 \overline{)124} \end{array}$$

$$\begin{array}{r} 31 \\ 2 \overline{)62} \end{array}$$

31 is prime.

$$\begin{aligned} 124 &= 2 \times 2 \times 31 \\ &= 2^2 \times 31 \quad \textcircled{2} \end{aligned}$$

$2^2 \times 31$

(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.

$$\begin{array}{l} \text{cars: vans} \\ 3 : 7 \\ \times 16 \downarrow \quad \uparrow \times 16 \\ 48 : \_ \end{array} \quad \begin{array}{l} 3 + 7 = 10 \\ 160 \div 10 = 16 \quad (1) \end{array} \quad \begin{array}{r} 16 \\ \underline{3} \\ 48 \quad (1) \end{array}$$

So there are 48 cars.

Number of cars using electricity:

$$\frac{1}{8} \times 48 = \frac{48}{8} = 6 \quad (1)$$

Number of cars using diesel:

$$25\% \text{ of } 48 = \frac{1}{4} \times 48 = 12 \quad (1)$$

Number of cars using petrol

$$= 48 - 6 - 12 = 30 \quad (1)$$

↑  
from electricity

↙  
from diesel

30

(Total for Question 25 is 5 marks)

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

divide by 1000  $\rightarrow$  move decimal place  
3 places to the left

0.00163

(1)

(b) Write 438000 in standard form.

$4.38 \times 10^5$

(1)

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

Method: multiply regular numbers, add powers of 10

$$= 4 \times 6 \times 10^3 \times 10^{-5}$$

$$= 24 \times 10^{3-5} \quad (1)$$

$$= 24 \times 10^{-2}$$

$$\div 10 \quad \downarrow \quad \downarrow \times 10$$

$$= 2.4 \times 10^{-1}$$

keeps value  
the same

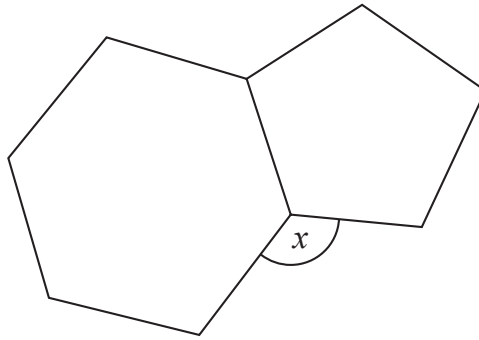
Note: in standard form  
the front number is  
between 1 and 10.

$2.4 \times 10^{-1}$

(2)

(Total for Question 26 is 4 marks)

27 Here is a regular hexagon and a regular pentagon.

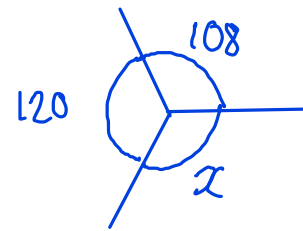


Work out the size of the angle marked  $x$ .  
You must show all your working.

$$\text{Interior angle} = \frac{180}{n} \times (n-2), \quad n = \text{number of sides}$$

For hexagon,  $n=6$

$$\begin{aligned} \text{interior angle} &= \frac{180}{6} \times (6-2) \\ &= 30 \times 4 \\ &= 120 \quad \textcircled{1} \end{aligned}$$



All add to 360, so

$$\begin{aligned} x &= 360 - (120 + 108) \quad \textcircled{1} \\ &= 132 \quad \textcircled{1} \end{aligned}$$

For pentagon,  $n=5$

$$\begin{aligned} \text{Interior angle} &= \frac{180}{5} \times (5-2) \\ &= 36 \times 3 \\ &= 108 \end{aligned}$$

..... 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

(2)

$x = -1:$   
 $y = (-1)^2 - 3(-1) + 1$   
 $= 1 + 3 + 1$   
 $= 5$

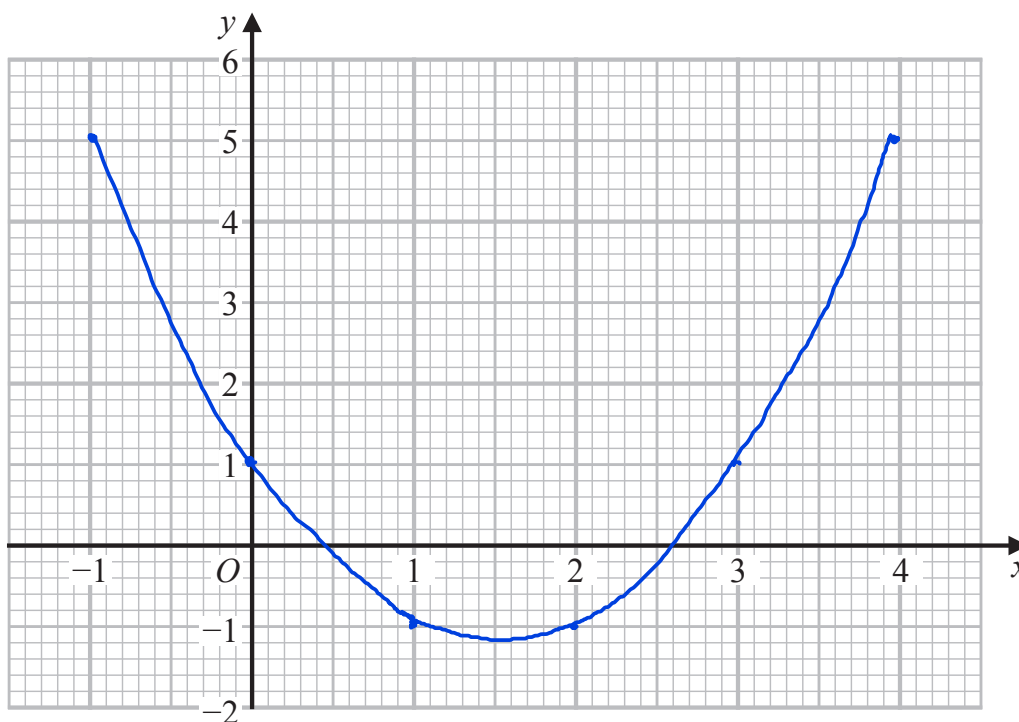
$x = 2:$   
 $y = (2)^2 - 3(2) + 1$   
 $= 4 - 6 + 1$   
 $= -1$

$x = 3:$   
 $y = (3)^2 - 3(3) + 1$   
 $= 9 - 9 + 1$   
 $= 1$

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

(2)

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



(2)

Tips:

- plot points, then connect them
- do not extend graph beyond range

(2)

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

(2)

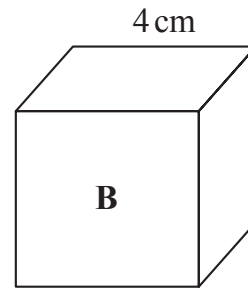
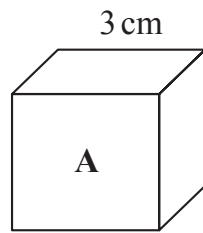
Where graph cuts the x-axis

e.g.  $x = 0.4, x = 2.6$

(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.

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Find volumes of both cubes

$$A: \text{vol} = 3 \times 3 \times 3 = 27 \quad (1)$$

$$B: \text{vol} = 4 \times 4 \times 4 = 64$$

Find densities of both cubes

$$A: \text{density} = \frac{81}{27} = 3$$

$$B: \text{density} = \frac{128}{64} = 2 \quad (1)$$

$$\text{Ratio A:B} \\ 3:2 \quad (1)$$

.....  
3:2

(Total for Question 29 is 3 marks)

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

$$\sin 30 = \frac{1}{2} \text{ (1)}$$

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

---

(Total for Question 30 is 1 mark)

---

**TOTAL FOR PAPER IS 80 MARKS**

**BLANK PAGE**