

Write your name here

Surname

**MODEL ANSWERS**

Other names

**Pearson Edexcel**  
**Level 1 / Level 2**  
**GCSE (9–1)**

Centre Number

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Candidate Number

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# Mathematics

## Paper 2 (Calculator)

**Foundation Tier**

Thursday 8 June 2017 – Morning

**Time: 1 hour 30 minutes**

Paper Reference

**1MA1/2F**

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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 be used.**
- If your calculator does not have a  $\pi$  button, take the value of  $\pi$  to be 3.142 unless the question instructs otherwise.



### 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.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Pearson

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Simplify  $5p - 3p + p$   
 $2p + p$

$3p$   
 .....  
 (1)

(b) Simplify  $m^3 + m^3$

$2m^3$   
 .....  
 (1)

(c) Simplify  $10 + 3c + 5d - 7c + d$

$10 + 3c - 7c + 5d + d$   
 $10 - 4c + 6d$

$10 + 6d - 4c$   
 .....  
 (2)

(Total for Question 1 is 4 marks)

2 Write 56.78 correct to one significant figure.

↳ 2<sup>nd</sup> sf is greater than 5,  
 so round up.

$60$   
 .....

(Total for Question 2 is 1 mark)

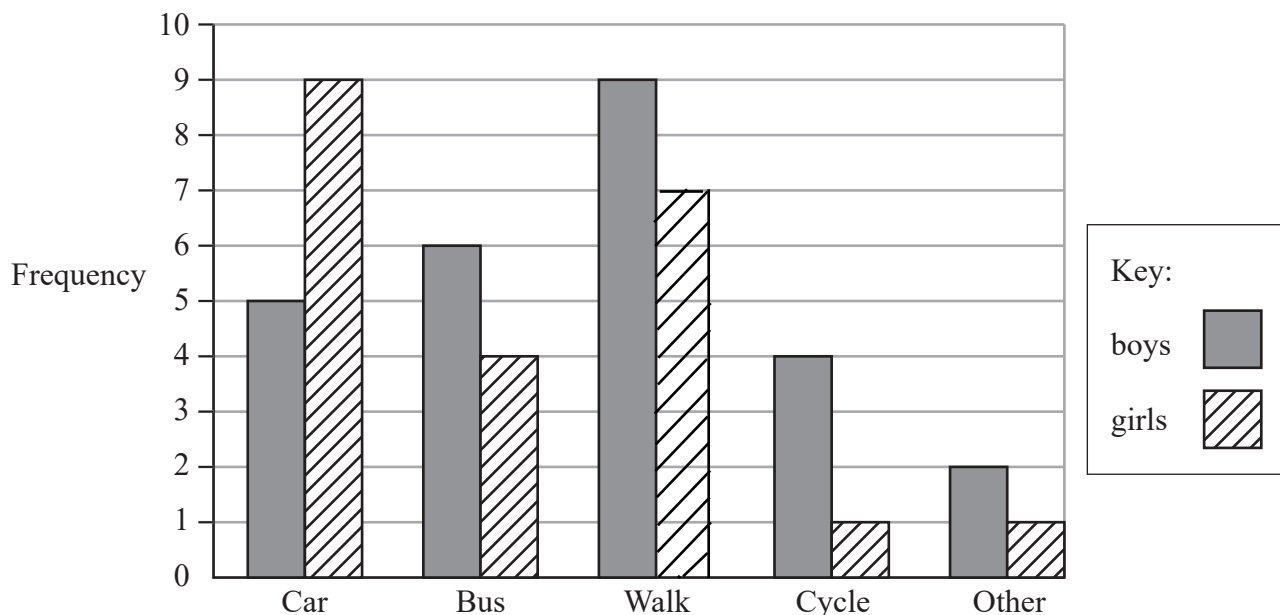
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3 A teacher asks the students in Year 6 what type of transport they use to get to school. The dual bar chart shows some of the results.



(a) What is the most popular type of transport used by the boys?

Walk.

(1)

7 girls walk to school.

(b) Show this information on the dual bar chart.

(1)

More of the students get to school by car than by bus.

(c) How many more?

$$\begin{aligned} \text{Car: } 5 + 9 &= 14 && 14 - 10 \\ \text{Bus: } 6 + 4 &= 10 \end{aligned}$$

4

(1)

The number of students in Year 5 is the same as the number of students in Year 6

(d) What is the total number of students in Years 5 and 6?

$$\begin{aligned} \text{Total in year 6: } &5 + 9 + 6 + 4 + 9 + 7 + 4 + 1 + 2 + 1 \\ &= 48 \end{aligned}$$

$$\text{Total} = 2(48)$$

*As both years have same no. of students.*

96

(2)

(Total for Question 3 is 5 marks)



4 Here are four fractions.

$$\frac{2}{5}$$

$$\frac{11}{30}$$

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

$$\frac{7}{15}$$

Write these fractions in order of size.  
Start with the smallest fraction.

convert all fractions to the same denominator.  
x Use LCM as the denominator (30)

$$\frac{2}{5} \times \frac{6}{6}$$

$$\frac{12}{30}$$

(2)

$$\frac{11}{30}$$

$$\frac{11}{30}$$

(1)

$$\frac{1}{2} \times \frac{15}{15}$$

$$\frac{15}{30}$$

(4)

$$\frac{7}{15} \times \frac{2}{2}$$

$$\frac{14}{30}$$

(3)

$$\frac{11}{30}, \frac{2}{5}, \frac{7}{15}, \frac{1}{2}$$

(Total for Question 4 is 2 marks)

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5 David sells CDs in a shop.

The tally chart shows information about the number of CDs David sold on Monday, on Tuesday and on Wednesday.

	Tally	Frequency
Monday		12
Tuesday		18
Wednesday		8

(a) Write down **one** thing that is wrong with the tally chart.

Tally shows 13 while the frequency is 12.

(1)

David drew this pictogram to show the information for Tuesday and Wednesday.

Tuesday	⊙ ⊙ ⊙ ⊙ ⊙
Wednesday	⊙ ⊙ ⊙

Key: ⊙ represents 3 CDs

(b) Write down **one** thing that is wrong with this pictogram.

⊙ = 1.5, while half a CD is not possible.

(1)

(Total for Question 5 is 2 marks)

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6 There are 495 coins in a bottle.

$\frac{1}{3}$  of the coins are £1 coins.

124 of the coins are 50p coins.

The rest of the coins are 20p coins.

Work out the total value of the 495 coins.

£1 coins

$$495 \times \frac{1}{3} \times £1 = £165$$

50p coins

$$124 \times £0.5 = £62$$

20p coins

$$\begin{aligned} \text{No. of 20p coins: } & 495 - (165 + 124) \\ & 495 - 289 = 206 \end{aligned}$$

$$206 \times £0.2 = £41.2$$

$$\text{Total Value} = 165 + 62 + 41.2$$

£ 268.20

(Total for Question 6 is 4 marks)

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7 The probability that a new fridge has a fault is 0.015

What is the probability that a new fridge does **not** have a fault?

$$\rightarrow Q = 1 - P \quad \leftarrow \text{Prob. of success}$$

$$\text{Prob of failure} = 1 - 0.015$$

$$\uparrow$$

$$\text{Total probability} \quad \dots\dots\dots 0.985$$

(Total for Question 7 is 1 mark)

8 Here is a list of numbers.

- 21    22    23    24    25    26    27    28    29

(a) From the numbers in the list, write down a square number.

$$5^2 = 25$$

$\dots\dots\dots 25$   
 (1)

(b) From the numbers in the list, write down a number that is a multiple of **both** 4 and 6

$$4 \times 6 = 24$$

$\dots\dots\dots 24$   
 (1)

(c) Write down all the prime numbers in the list.

No factors except  
 1 and itself

$\dots\dots\dots 23, 29$   
 (1)

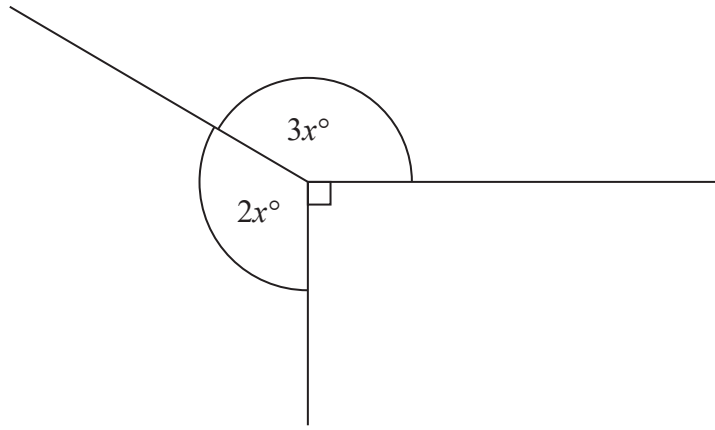
(Total for Question 8 is 3 marks)

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9



Find the value of  $x$ .

Right angle =  $90^\circ$

$3x + 2x + 90 = 360$  ← Angles in a point add up to 360.

$5x + 90 = 360$

$5x = 270$  }  $\div 5$

$x = 54$

54

(Total for Question 9 is 3 marks)

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10 Suha is going to buy 150 envelopes.

Here is some information about the cost of envelopes in two shops.

**Letters2send**

Pack of 25 envelopes for £3.49

**Stationery World**

Pack of 10 envelopes for £2.10

Buy 2 packs get 1 pack free

Suha wants to buy the envelopes as cheaply as possible.

Which shop should Suha buy the 150 envelopes from?

You must show how you get your answer.

Letters2send

$$\text{No. of packs} = \frac{150}{25} = 6$$

$$\begin{aligned} \text{cost} &: 6 \times 3.49 \\ &= \text{£}20.94 \end{aligned}$$

Stationery world

$$\begin{aligned} 3 \text{ packs} &= 2 \times \text{£}2.10 \text{ (cost for} \\ & \text{(30 cards))} = \text{£}4.20 \text{ only two} \\ & \text{packs.} \end{aligned}$$

$$\begin{aligned} \text{cost} &: \frac{150}{30} \times \text{£}4.20 \\ &= \text{£}21 \end{aligned}$$

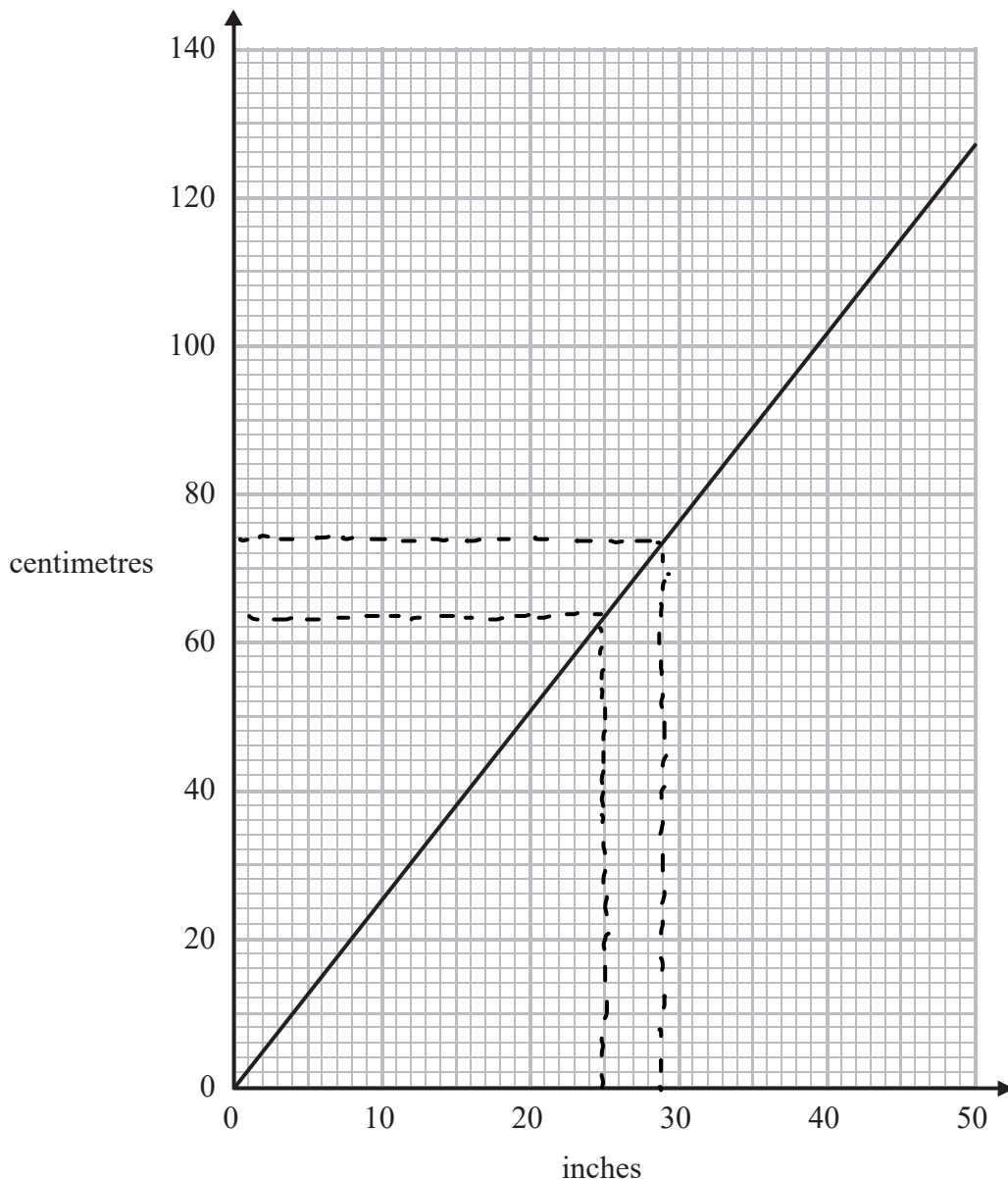
$$\text{£}20.94 < \text{£}21$$

$\therefore$  Letters2Send is lower and  
Suha should buy from this.

(Total for Question 10 is 4 marks)



11 You can use this graph to change between inches and centimetres.



(a) Change 74 cm to inches.

Draw line horizontally at 74 on y-axis to the line and read the x-axis value.

.....29..... inches  
(1)

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Daniel's height is 6 feet 3 inches.

1 foot = 12 inches

(b) What is Daniel's height in centimetres?

convert to inches:

$$6(12) + 3 = 72 + 3 = 75 \text{ inches.}$$

convert to cm:

x3 ↪ 25 inches: 64 cm  
75 inches:  $64 \times 3 = 192 \text{ cm}$

x Graph only has readings to 50 inches. ∴ use a lower multiple

.....192.....centimetres  
(3)

(Total for Question 11 is 4 marks)

12 Find the value of  $\frac{\sqrt{13.4 - 1.5}}{(6.8 + 0.06)^2}$

Write down all the figures on your calculator display.

⇒ Do steps individually

$$13.4 - 1.5 = 11.9$$

$$6.8 + 0.06 = 6.86$$

⇒ Substitute to the equation

$$\frac{\sqrt{11.9}}{(6.86)^2}$$

.....0.07330359081.....

(Total for Question 12 is 2 marks)

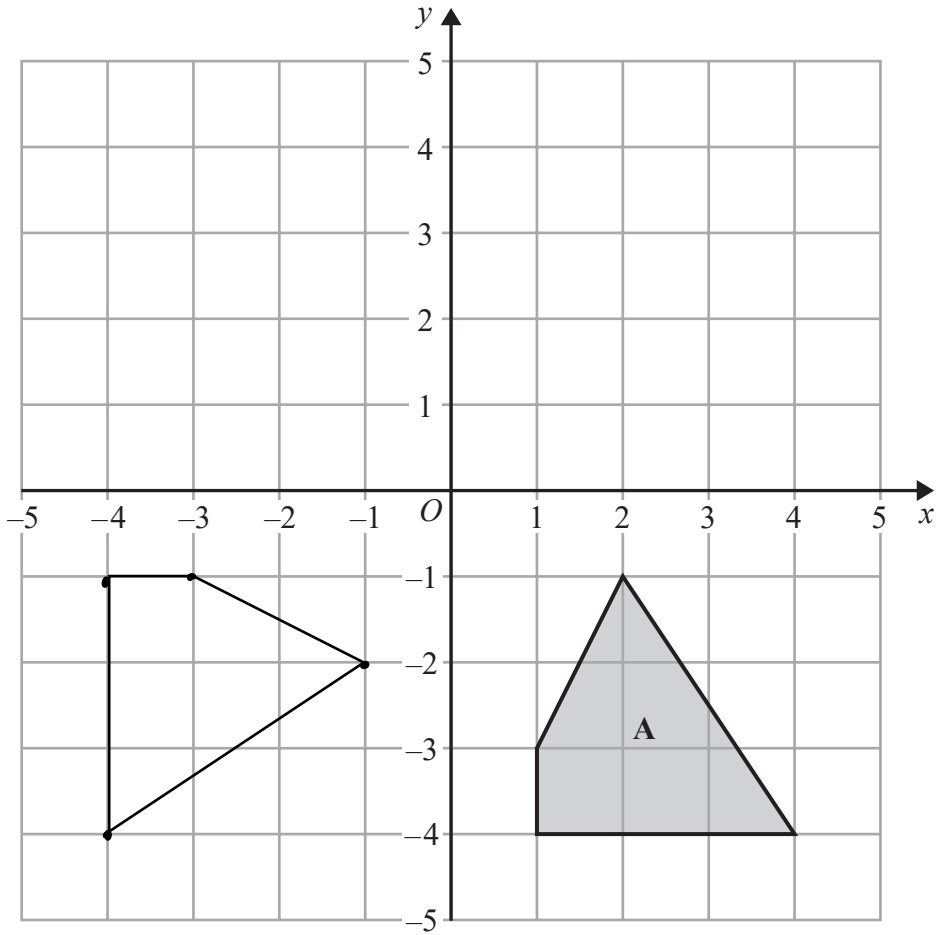


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13



(a) Rotate shape A  $90^\circ$  clockwise about centre  $O$ .

(2)

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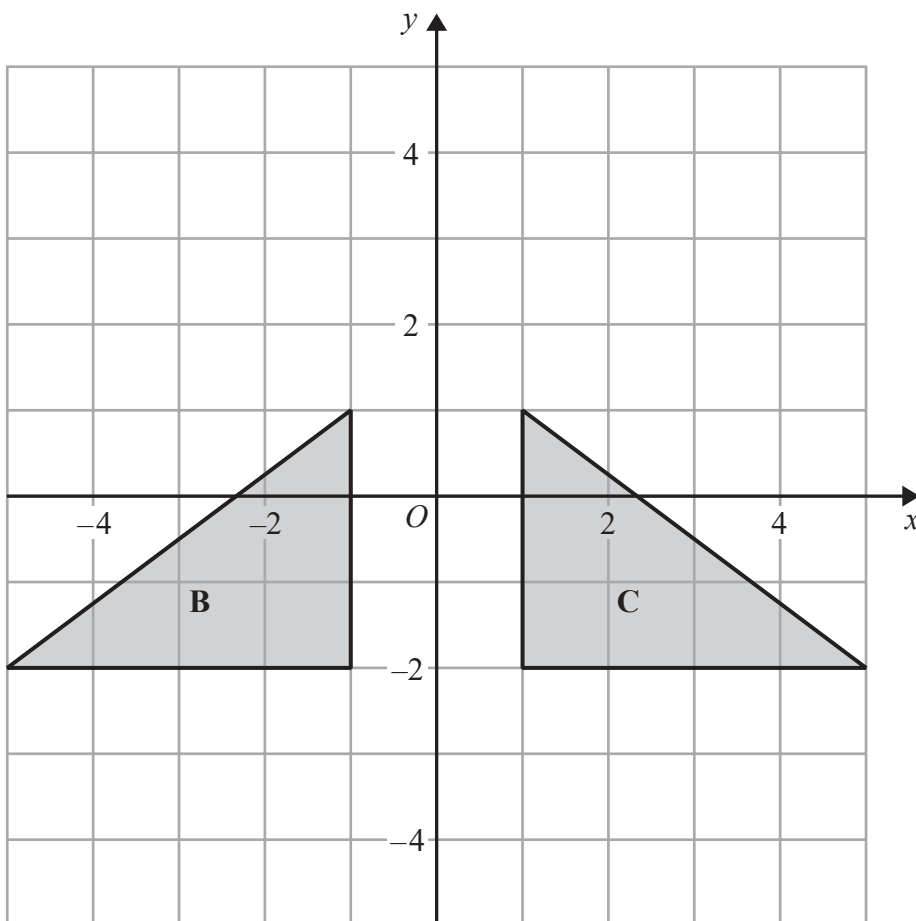
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(b) Describe fully the single transformation that maps triangle B onto triangle C.

Reflection in y-axis. Type? Reflection  
 Position? y-axis.

(2)

(Total for Question 13 is 4 marks)



14 (a) Factorise  $5 - 10m$ 

$$5(1-2m) \leftarrow \text{Both are multiples of 5.}$$

$$\underline{5(1-2m)}$$

(1)

(b) Factorise fully  $2a^2b + 6ab^2$ 

$$2ab(a+3b) \leftarrow 2ab \text{ is in both. Now put inside the bracket what is left over.}$$

$$\underline{2ab(a+3b)}$$

(2)

(Total for Question 14 is 3 marks)

15 (a) Write  $4.7 \times 10^{-1}$  as an ordinary number.

$$10^{-1} = \frac{1}{10}$$

$$4.7 \times \frac{1}{10} = 0.47$$

$$\underline{0.47}$$

(1)

(b) Work out the value of  $(2.4 \times 10^3) \times (9.5 \times 10^5)$   
Give your answer in standard form.

Multiply ordinary no.s

$$2.4 \times 9.5 = 22.8$$

Multiply powers of 10.

$$10^3 \times 10^5 = 10^{3+5} = 10^8$$

combine and write in standard form.

$$22.8 \times 10^8 = 2.28 \times 10^9$$

$$\underline{2.28 \times 10^9}$$

(2)

(Total for Question 15 is 3 marks)

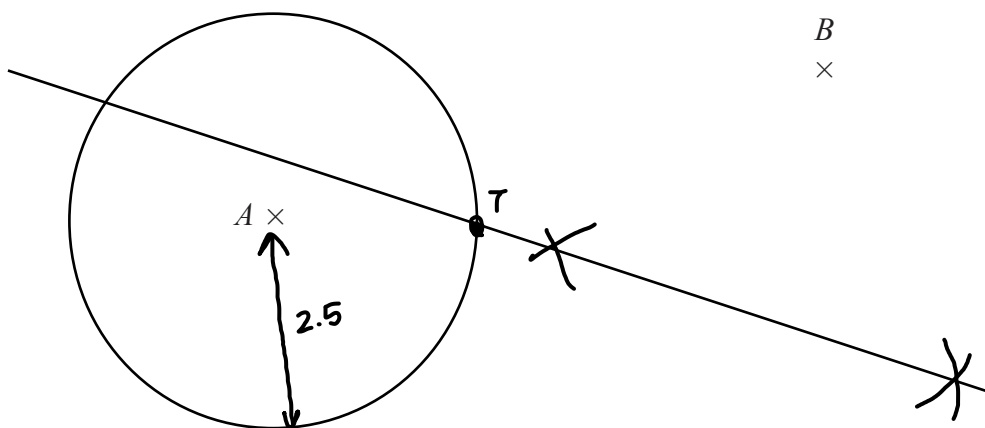
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16  $A$ ,  $B$  and  $C$  are three points on a map.



1 cm : 100 m  
 2.5 cm : 250 m  $\times 2.5$

- $\Rightarrow$  Draw a circle with radius 2.5 cm around  $A$ .
- $\Rightarrow$  Draw a  $\perp$  bisector of  $BC$  using a compass.

1 cm represents 100 metres.

Point  $T$  is 250 metres from point  $A$ .

Point  $T$  is equidistant from point  $B$  and point  $C$ .

On the map, show one of the possible positions for point  $T$ .

(Total for Question 16 is 3 marks)



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17 The table shows the probabilities that a biased dice will land on 2, on 3, on 4, on 5 and on 6

Number on dice	1	2	3	4	5	6
Probability	0.31	0.17	0.18	0.09	0.15	0.1

Neymar rolls the biased dice 200 times.

Work out an estimate for the total number of times the dice will land on 1 or on 3

$$P(1): 1 - (0.17 + 0.18 + 0.09 + 0.15 + 0.1)$$

$$1 - (0.69) = 0.31$$

↳ 1 = total probability.

$$P(1) + P(3): 0.31 + 0.18 = 0.49$$

$$\text{No. of rolls} : (0.49)(200)$$

98

(Total for Question 17 is 3 marks)

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- 18 On Saturday, some adults and some children were in a theatre.  
The ratio of the number of adults to the number of children was 5 : 2

Each person had a seat in the Circle or had a seat in the Stalls.

$\frac{3}{4}$  of the children had seats in the Stalls.

117 children had seats in the Circle.

There are exactly 2600 seats in the theatre.

On this Saturday, were there people on more than 60% of the seats?  
You must show how you get your answer.

$\frac{3}{4}$  of children in Stalls and  $\therefore \frac{1}{4}$  in circles.

$$\begin{array}{l} \times 4 \quad \left( \begin{array}{l} \frac{1}{4} = 117 \\ 1 = 468 \end{array} \right) \times 4 \end{array}$$

468 children

Ratio: Adults : Children

$$\begin{array}{l} \times 234 \quad \left( \begin{array}{l} 5 : 2 \\ 1170 : 468 \end{array} \right) \times 234 \end{array}$$

$$\text{Total people: } 1170 + 468 = 1638$$

$$60\% \text{ of seats: } 2600 \times \frac{60}{100} = 1560$$

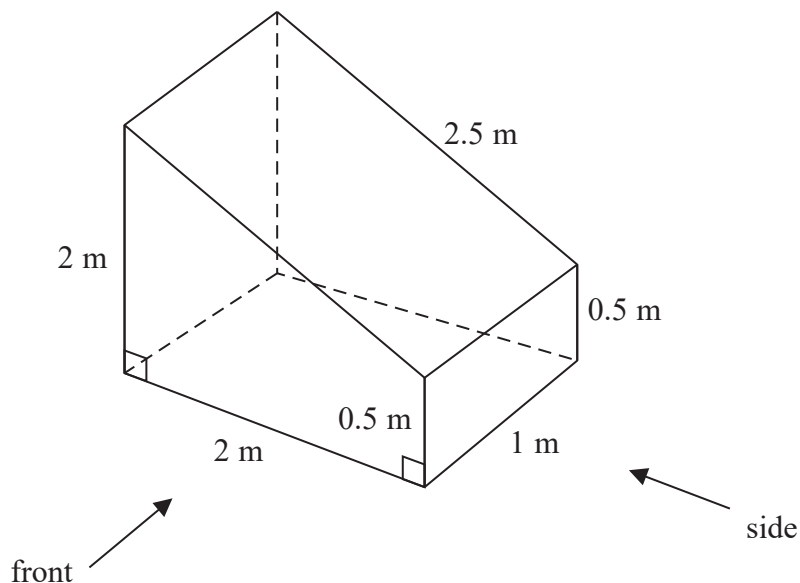
$$1638 > 1560$$

$\therefore$  Yes there were people on more than 60% of seats.

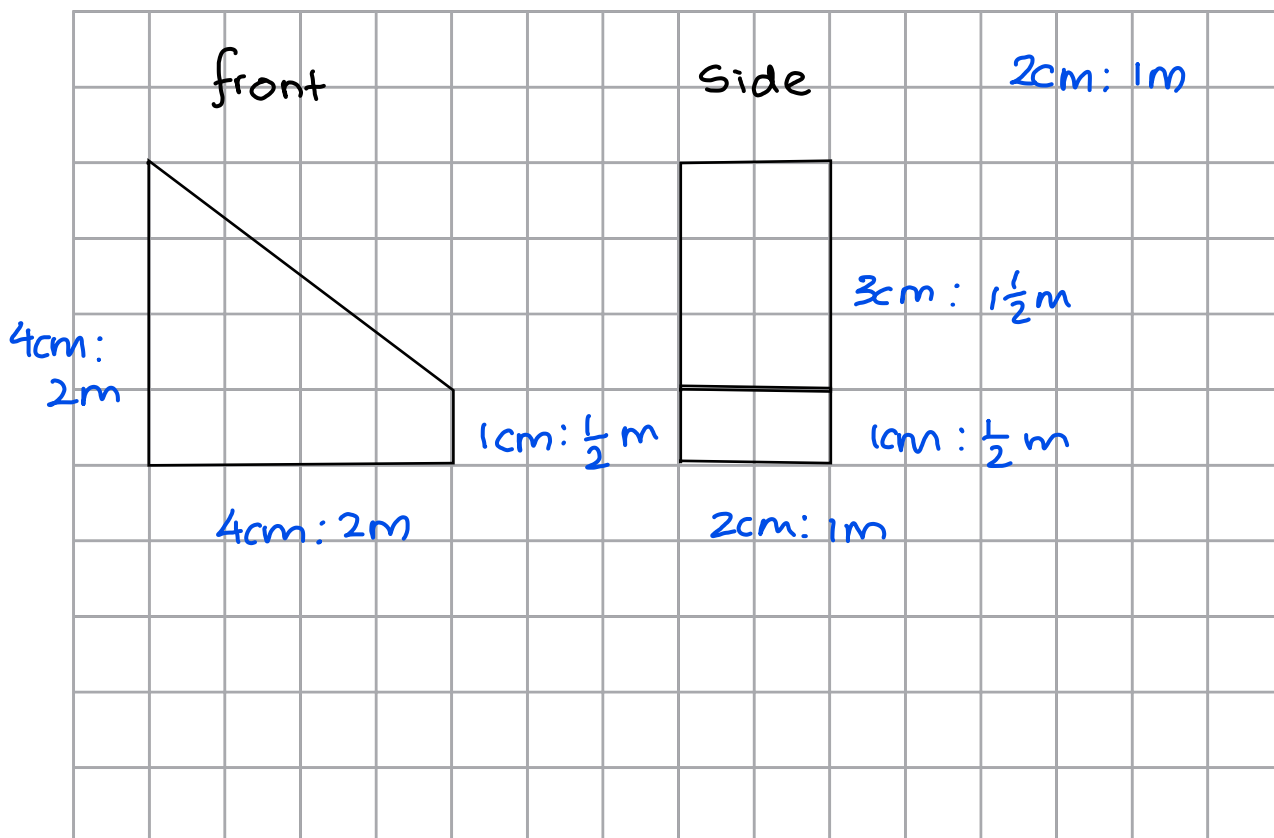
(Total for Question 18 is 5 marks)



19 The diagram shows a prism with a cross section in the shape of a trapezium.



On the centimetre grid below, draw the front elevation and the side elevation of the prism. Use a scale of 2 cm to 1 m.



(Total for Question 19 is 4 marks)



20 Olly drove 56 km from Liverpool to Manchester.  
He then drove 61 km from Manchester to Sheffield.

Olly's average speed from Liverpool to Manchester was 70 km/h.  
Olly took 75 minutes to drive from Manchester to Sheffield.

(a) Work out Olly's average speed for his total drive from Liverpool to Sheffield.

Liverpool → Manchester → Sheffield

$$d = 56 \text{ km}$$

$$s = 70 \text{ km/h}$$

$$t = 1.25 \text{ hrs}$$

$$d = 61 \text{ km}$$

convert minutes  
to hrs.  
 $\frac{75}{60} = 1.25 \text{ hrs}$

$$s = \frac{d}{t}$$

$$70 = \frac{56}{t}$$

$$t = \frac{56}{70}$$

$$= 0.8 \text{ hrs.}$$

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{56 + 61}{0.8 + 1.25}$$

$$= \frac{117}{2.05} = 57.07$$

$$\dots\dots\dots 57.1 \dots\dots\dots \text{ km/h}$$

(4)

Janie drove from Barnsley to York.

Janie's average speed from Barnsley to Leeds was 80 km/h.

Her average speed from Leeds to York was 60 km/h.

Janie says that the average speed from Barnsley to York can be found by working out the mean of 80 km/h and 60 km/h.

(b) If Janie is correct, what does this tell you about the two parts of Janie's journey?

The time taken for each part of the journey

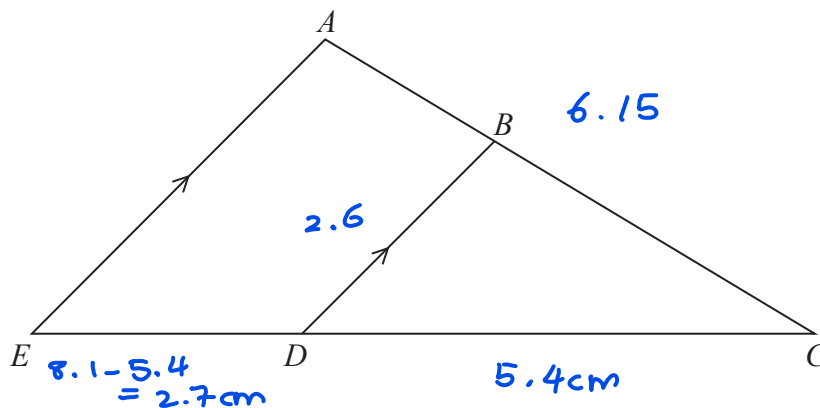
should be the same.

(1)

(Total for Question 20 is 5 marks)

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$ABC$  and  $EDC$  are straight lines.  
 $EA$  is parallel to  $DB$ .

$EC = 8.1$  cm.  
 $DC = 5.4$  cm.  
 $DB = 2.6$  cm.

(a) Work out the length of  $AE$ .

*x They are similar triangles. can compare ratios of lengths.*

$$\frac{EC}{DC} = \frac{AE}{DB}$$

$$\frac{8.1}{5.4} = \frac{AE}{2.6}$$

$$AE = \frac{8.1}{5.4} \times 2.6 = 3.9$$

..... 3.9 ..... cm  
 (2)

$AC = 6.15$  cm.

(b) Work out the length of  $AB$ .

*x They are similar triangles and can compare ratios of lengths.*

$$\frac{EC}{DC} = \frac{AC}{BC}$$

$$\frac{8.1}{5.4} = \frac{6.15}{BC}$$

$$BC = \frac{6.15}{8.1} \times 5.4 = 4.1 \text{ cm}$$

..... 2.05 ..... cm  
 (2)

$$BC + AB = 6.15$$

$$4.1 + AB = 6.15$$

$$AB = 6.15 - 4.1$$

(Total for Question 21 is 4 marks)

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22 Anil wants to invest £25 000 for 3 years in a bank.

<p><b>Personal Bank</b></p> <p>Compound Interest</p> <p>2% for each year</p>
--

<p><b>Secure Bank</b></p> <p>Compound Interest</p> <p>4.3% for the first year</p> <p>0.9% for each extra year</p>
---

Which bank will give Anil the most interest at the end of 3 years?  
You must show all your working.

Personal Bank

use this eq<sup>n</sup> to calculate total balance for a investment (P) at a rate of (r) per year and for (n) years.

$$A = P \left( 1 + \frac{r}{100} \right)^n$$

$$= 25000 \left( 1 + \frac{2}{100} \right)^3$$

$$= \text{£} 26530.2$$

$$\begin{aligned} \text{Interest} &= \text{£} 26530.2 - \text{£} 25000 \\ &= \text{£} 1530.2 \end{aligned}$$

Secure Bank

$$\begin{aligned} \text{First year: } & 25000 \times \left( 1 + \frac{4.3}{100} \right) \\ &= \text{£} 26075 \end{aligned}$$

$$\begin{aligned} \text{Last two years} &: 26075 \left( 1 + \frac{0.9}{100} \right)^2 \\ &\approx \text{£} 26546.5 \end{aligned}$$

$$\begin{aligned} \text{Interest} &= \text{£} 26546.5 - \text{£} 25000 \\ &= \text{£} 1546.5 \end{aligned}$$

$$\text{£} 1546.5 > \text{£} 1530.2$$

∴ Secure Bank gives a higher interest.

(Total for Question 22 is 3 marks)

23 A number,  $n$ , is rounded to 2 decimal places.  
The result is 4.76

Using inequalities, write down the error interval for  $n$ .

$$4.755 \leq n < 4.765$$

If the third dp is greater than or equal to 5, it is round up to give 4.76

If the third dp is smaller than 5, the value is round down to 4.76

$$4.755 \leq n < 4.765$$

(Total for Question 23 is 2 marks)



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24 Solve  $x^2 + 5x - 24 = 0$

Factorise:  $x^2 - 3x + 8x - 24 = 0$   
 $x(x-3) + 8(x-3) = 0$   
 $(x-3)(x+8) = 0$

$\therefore x-3=0$  or  $x+8=0$   
 $x=3$  or  $x=-8$

Alternatively use

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-5 \pm \sqrt{25 - 4(1)(-24)}}{2}$$

$$\frac{-5 \pm \sqrt{121}}{2}$$

$$\frac{-5 \pm 11}{2} = \frac{-5+11}{2} \text{ OR } \frac{-5-11}{2}$$

$$\frac{6}{2} \text{ OR } \frac{-16}{2}$$

$x = -8$  or  $x = 3$

(Total for Question 24 is 3 marks)

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25 Here are the first six terms of an arithmetic sequence.

$$3 \quad 8 \quad 13 \quad 18 \quad 23 \quad 28$$

↘ +5 ↗   ↘ +5 ↗   ↘ +5 ↗   ↘ +5 ↗   ↘ +5 ↗

(a) Find an expression, in terms of  $n$ , for the  $n$ th term of this sequence.

x Should be a multiple of 5.  $(5n)$

x plugging in  $n=1$  should give  $(3)$ .

$\therefore 5n-2$  is the  $n$ th term.

$$5n-2$$

(2)

The  $n$ th term of a different sequence is  $3n^2$

Nathan says that the 4th term of this sequence is 144

(b) Is Nathan right?

Show how you get your answer.

x Plugging in  $n=4$  should give 144

$$n=4 \quad 3(4)^2 = 3(16) = 48$$

$48 \neq 144 \therefore$  Nathan is wrong. (1)

(Total for Question 25 is 3 marks)

TOTAL FOR PAPER IS 80 MARKS



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