Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | Candidate Number

Tuesday 15 January 2019

Morning (Time: 2 hours) | Paper Reference **4MA1/2FR**

Mathematics A

Level 1/2
Paper 2FR
Foundation Tier

You must have:
Ruler graduated in centimetres and millimetres, protractor, 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
  Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- 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.
- Check your answers if you have time at the end.

Turn over ▶

P59023A

1/1/1/

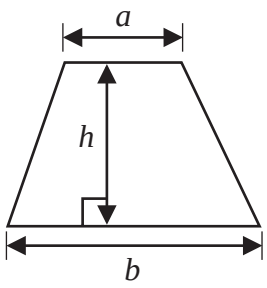
P 5 9 0 2 3 A 0 1 2 4

Pearson

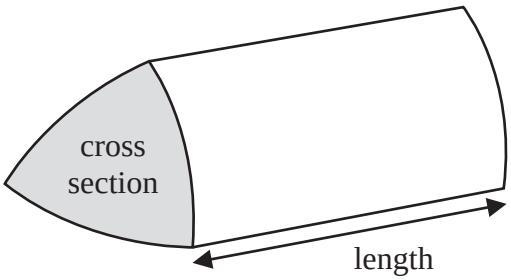
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

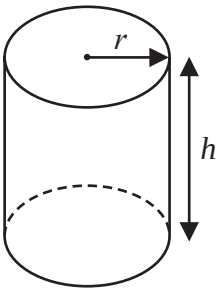


Volume of prism = area of cross section × length



Volume of cylinder = $\pi r^2 h$

Curved surface area of cylinder = $2\pi rh$



Answer ALL TWENTY FIVE questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 (a) Write these decimals in order of size.
Start with the smallest decimal.

7.831 7.04 7.002 7.9 7.013

7·002, 7·013, 7·04, 7·831, 7·9

(1)

(b) Write 7% as a decimal.

$\frac{7}{100} = 0.07$

↳ 2 zeros = 2 decimal places

(1)

(c) Write 0.47 as a fraction.

0·47 → $\frac{47}{100}$

2 decimal places
↳ ∴ 2 zeros

(1)

(d) Write 0.63 as a percentage.

0·63 × 100
= 63·

%

(1)

(e) Write a number in the box to make the calculation correct.

3 × 3 = 9

0.003 × 3000 = 9

3 decimal places = 3 zeros

(1)

(Total for Question 1 is 5 marks)

2 Amelie is using ribbon to make decorations.

She has 7 metres of ribbon.
Each decoration needs 45 centimetres of ribbon.

What is the greatest number of decorations that Amelie can make?

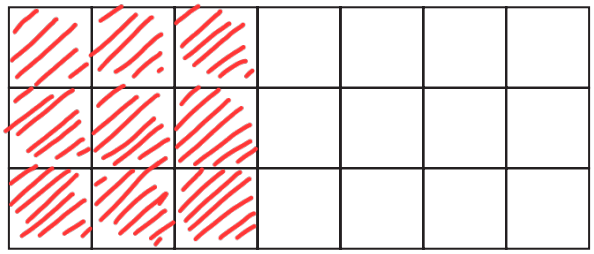
7 metres
$\Rightarrow 7 \times 100 = 700$ centimetres

$\frac{700}{45} = \frac{140}{9} = 15.55$

↳ greatest no. of decorations = 15 [whole number]

(Total for Question 2 is 3 marks)

3 (a) Shade $\frac{3}{7}$ of the rectangle.



total squares = 21

$\frac{3}{7} \times \frac{3}{3} = \frac{9}{21}$

∴ 9 squares shaded out of 21

(1)

(b) Write $\frac{23}{3}$ as a mixed number.

$3 \times 7 = 21 \Rightarrow 21 + 2 = 23$

$\therefore \frac{23}{3} = 7\frac{2}{3}$

(1)

(c) Find $\frac{2}{5}$ of 60 cm.

$\frac{2}{5} \times 60 = \frac{120}{5} = 24$

cm

(2)

Claude says that $\frac{1}{6}$ is exactly halfway between $\frac{1}{4}$ and $\frac{1}{8}$

(d) Is Claude correct?
You must give a reason for your answer.

equate denominators

4, 8
↳ common multiple = 24

$\frac{1}{6} \times \frac{4}{4} = \frac{4}{24}$

$\frac{1}{4} \times \frac{6}{6} = \frac{6}{24}$

$\frac{1}{8} \times \frac{3}{3} = \frac{3}{24}$

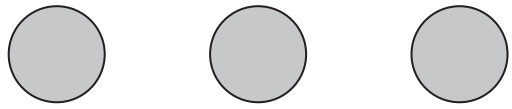
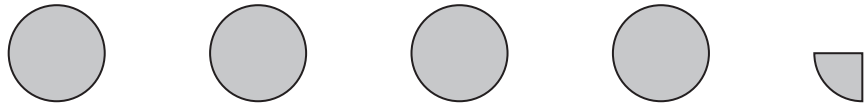
↳ 4 is not halfway 3 and 6

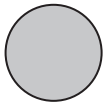
∴ No, Claude is incorrect

(2)

(Total for Question 3 is 6 marks)

4 The pictogram gives information about the number of cakes Peony baked on Monday, on Tuesday, on Wednesday and on Thursday.

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

 represents 8 cakes

(a) How many cakes did Peony bake on Wednesday?

$8 + 8 + \frac{3}{4}(8) = 22$

(1)

Peony baked more cakes on Thursday than on Monday.

(b) How many more?

Monday : $8 \times 3 = 24$

Thursday : $(4 \times 8) + \frac{1}{4}(8) = 32 + 2 = 34$

$34 - 24 = 10$ cakes more

(1)

Peony baked 20 cakes on Friday.

(c) Show this information on the pictogram.

$8 \times 2 = 16$: 2 full circles

$16 + 4 = 20$: $4 = \frac{1}{2}$ circle

(1)

(Total for Question 4 is 3 marks)

5 The table gives the midnight temperatures on 1st January for five cities in the USA.

City	Midnight temperature
Boston	–5 °C
Philadelphia	–4 °C
Orlando	10 °C
Chicago	–6 °C
Phoenix	8 °C

Here are the temperatures in °C.

–5 –4 10 –6 8

(a) Write these numbers in order of size.
Start with the smallest number.

$-6, -5, -4, 8, 10$

(1)

(b) Work out the difference between the midnight temperature in Orlando and the midnight temperature in Boston.

$10-(-5) = 10+5 = 15$

°C

(1)

(c) Work out the temperature that is exactly halfway between 8 °C and –6 °C.

Average $\frac{8+(-6)}{2} = \frac{2}{2} = 1$

°C

(1)

On 1st January the midnight temperature in Minneapolis was 10 °C lower than the midnight temperature in Philadelphia.

(d) Work out the midnight temperature in Minneapolis.

$-4-10 = -14$

°C

(1)

(Total for Question 5 is 4 marks)

6 80 students studying sciences were asked which science subject they liked the best.

Some information about the results is shown in the two-way table.

	Biology	Chemistry	Physics	Total
Boys	25	9-4 = 5	7	25+5+7= 37
Girls	31-25 = 6	4	43-(6+4)=33 (6 & 10)	43
Total	31	80-(31+40) = 9	7+33 = 40	80

(a) Complete the two-way table.

(3)

One of the students is picked at random.

(b) Write down the probability that this student is a girl.

Total students = 80

Total girls = 43

∴ Probability = $\frac{43}{80}$

Probability = $\frac{\text{number of events}}{\text{total possible outcomes}}$

(1)

One of the girls is picked at random.

(c) Write down the probability that this girl likes Chemistry the best.

Girls liking chemistry = 4

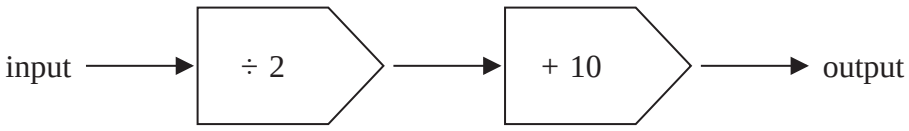
Total girls = 43

Probability = $\frac{4}{43}$

(2)

(Total for Question 6 is 6 marks)

7 Here is a number machine.



(a) Work out the output when the input is 8

$8 \div 2 = 4 \Rightarrow 4 + 10 = 14$

(1)

(b) Work out the input when the output is 120

Go backwards → do the opposite

$120 - 10 = 110 \Rightarrow 110 \times 2 = 220$

(2)

(Total for Question 7 is 3 marks)

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8 A train journey started at 17 50 and finished at 02 25 the next day.

How long did the train journey take?
Give your answer in hours and minutes.

17:50 → 02:25

total hours in a day = 24

17:50 − 18 = 10 min

18 + (6) = 24 (+2) → of the next day

8 hours 10 min

+ final 25 min

↳ 8 hours 35 min

8 hours 35 minutes

(Total for Question 8 is 2 marks)

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9 Pierre bought

2 cups of coffee at 2.10 euros a cup
2 cups of tea at 1.80 euros a cup
and 3 croissants

$2 \times 2{\cdot}10 = 4{\cdot}2$
$2 \times 1{\cdot}8 = 3{\cdot}6$

Pierre paid with a 20 euro note.
He received 8.75 euros change.

$20 - 8{\cdot}75 = 11{\cdot}25$
total cost

The cost of each croissant was the same.

Work out the cost of 1 croissant.

$11{\cdot}25 - (3{\cdot}6 + 4{\cdot}2) = 3{\cdot}45$

3 of them
$\therefore \frac{3{\cdot}45}{3} = 1{\cdot}15$ euros each

euros

(Total for Question 9 is 3 marks)

10 Here is a sketch of triangle *ABC*.

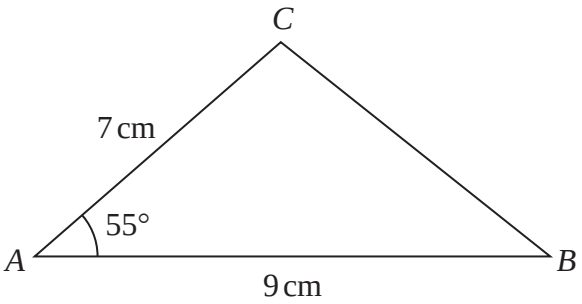
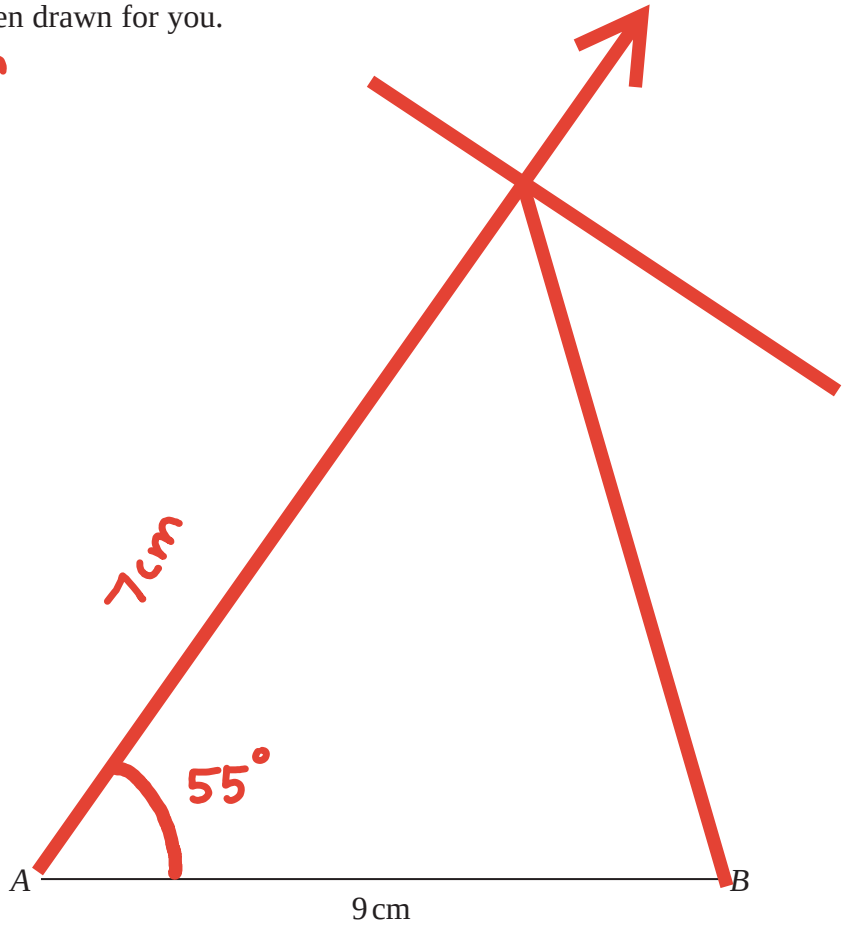


Diagram **NOT** accurately drawn

In the space below, make an accurate drawing of triangle *ABC*.
The line *AB* has been drawn for you.

The diagram may not be very accurate



(Total for Question 10 is 2 marks)

11 (a) Factorise $3x^2 - x$

x common in both - take x out
- divide everything by x

$x(3x - 1)$

(1)

(b) Expand $4(2y + 3)$

$(4 \times 2y) + (4 \times 3)$

$= 8y + 12$

(1)

$C = 5a + 4d$

(c) Work out the value of C when $a = -3$ and $d = 6$

$C = 5(-3) + 4(6)$

$C = -15 + 24$

$= 9$

$C =$ 9

(2)

$P = 3t^2 + 7t$

(d) Work out the value of P when $t = -4$

$3(-4)^2 + 7(-4)$

$-4 \times -4 = 16$

$\hookrightarrow 3(16) + 7(-4)$

$48 - 28$

$= 20$

$P =$ 20

(2)

(Total for Question 11 is 6 marks)

12 The diagram shows the plan of the floor in a room.

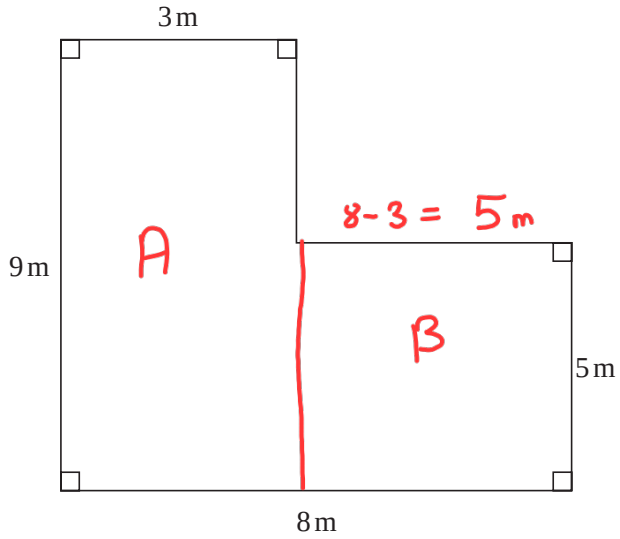


Diagram **NOT** accurately drawn

Alonso is going to cover the floor once with polish.
He buys some tins of polish.

Each tin has enough polish to cover 14 m^2 of the floor.
Each tin costs 9.59 euros.

Work out the total cost of the tins that Alonso needs to buy.

Total Area = Area(A) + Area(B)

Area(A)
↳ length × breadth
= 9 × 3 = 27 m²

Area(B)
↳ 5 × 5
= 25 m²

Total = 27 + 25
= 52 m²
⇒ 1 tin = 14 m²

$\frac{52}{14} = 3.7$ ⇒ 4 tins

4 × 9.59 euros
= 38.36 euros

38.36 euros

(Total for Question 12 is 5 marks)

13 (a) Solve $7x + 3 = x - 18$

$-x$ | $6x + 3 = -18$

-3 | $6x = -18 - 3$

$6x = -21$

$\div 6$ | $x = \frac{-21}{6} = -3.5$

$x = -3.5$

(2)

(b) Make w the subject of $t = 7w + 3$

-3 | $t - 3 = 7w$

$\div$ | $\frac{t-3}{7} = w$

$w = \frac{t-3}{7}$

(2)

Pencils cost 2 dollars each.
Rulers cost 3 dollars each.

Edith buys p pencils and r rulers.
The total cost is T dollars.

(c) Write down a formula for T in terms of p and r.

Total cost = cost of pencils + cost of rulers

$T = 2p + 3r$

(3)

(Total for Question 13 is 7 marks)

14

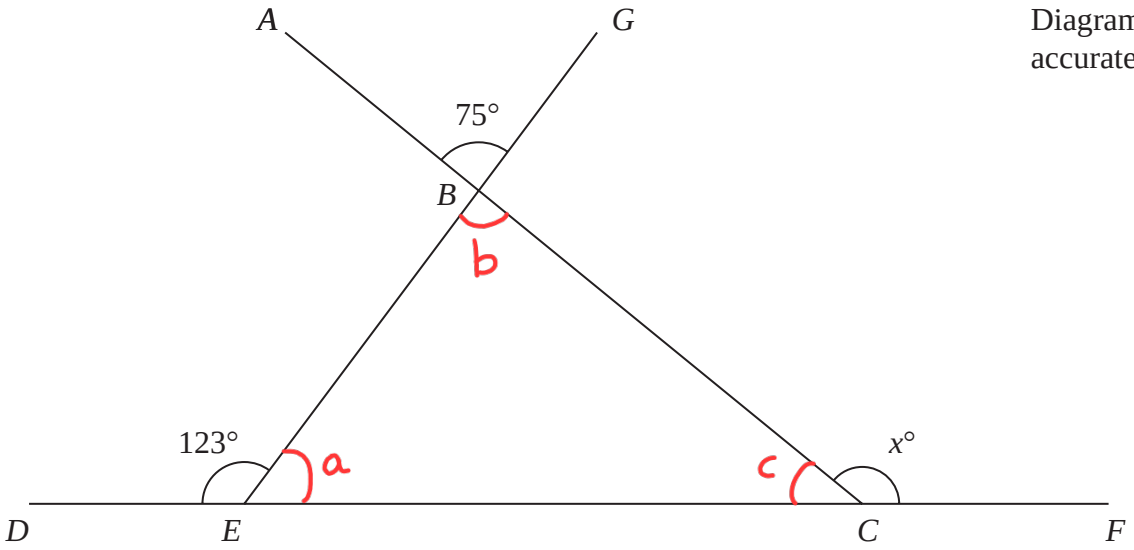


Diagram **NOT** accurately drawn

ABC, *DECF* and *EBG* are straight lines.

Work out the value of x.
Give a reason for each stage of your working.

Angles on a straight line add to 180° → $123 + a = 180$

$a = 180 - 123$

$= 57°$

Vertically opposite angles are equal → $b = 75°$

All angles in a △ add to 180° → $57 + 75 + c = 180$

$132 + c = 180$

$c = 180 - 132$

$= 48°$

Angles on a straight line add to 180° → $c + x = 180°$

$48 + x = 180$

$x = 180 - 48 = 132°$

$x = 132°$

(Total for Question 14 is 4 marks)

15 The table gives information about the number of days that 100 cars were in an airport car park.

class

Number of days (d)	Frequency
$0 < d \leqslant 4$	16
$4 < d \leqslant 8$	18
$8 < d \leqslant 12$	19
$12 < d \leqslant 16$	27
$16 < d \leqslant 20$	20

(a) Write down the modal class.

↳ class with highest freq ⇒ 27 ⇒ $12 < d \leqslant 16$

(1)

(b) Work out an estimate for the mean number of days.

mid no of days	Freq	mid x freq
2	16	32
6	18	108
10	19	190
14	27	378
18	20	360
		total = 1068

$$\frac{\text{Total}}{\text{total cars}} = \frac{1068}{100} = 10.68$$

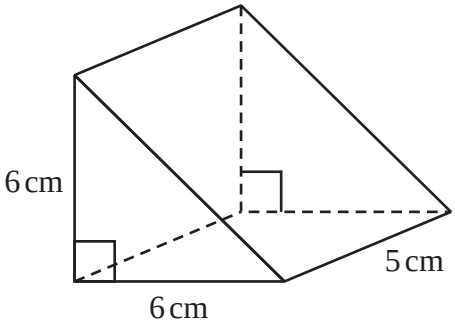
↳ given in Question

days

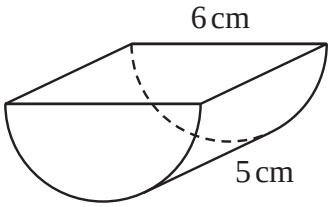
(4)

(Total for Question 15 is 5 marks)

16 The diagram shows two solid toy bricks, Brick **A** and Brick **B**.



Brick **A**



Brick **B**

Diagram **NOT** accurately drawn

Brick **A** is a triangular prism of length 5 cm.
The cross section of Brick **A** is an isosceles right-angled triangle with equal sides of length 6 cm.

Brick **B** is half a cylinder of length 5 cm.
The semicircular cross section of Brick **B** has diameter 6 cm.

The volume of Brick **A** is greater than the volume of Brick **B**.

How much greater?
Give your answer correct to 1 decimal place.

Brick A

↳ Volume = cross sectional area × length

cross sectional ⇒ area

$= \frac{1}{2} \times \text{base} \times \text{height}$

$= \frac{1}{2} \times 6 \times 6 = 18$

$18 \times 5 = 90 \text{ cm}^3$

Brick B

$r = \frac{6}{2} = 3$

Volume of cylinder $= \pi r^2 h$

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

$= 45\pi$

$\frac{1}{2}$ cylinder → $\frac{1}{2}(45\pi) \text{ cm}^3$

$90 - \frac{45\pi}{2}$

$= 19.3 \text{ cm}^3$

19.3 cm^3

(Total for Question 16 is 4 marks)

17 Here are the first five terms of a number sequence *S*.

10 16 22 28 34

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

10 16 22 28 34

Difference: 6 6 6 6

$6n + 4$

$6n \Rightarrow$ when $n=1 \Rightarrow 6 + 4 = 10$

(2)

The *n*th term of a sequence *T* is given by $n^2 - 3$

There are numbers that are terms in both the sequence *S* and the sequence *T*.

(b) Find one of these numbers.

n	$n^2 - 3$	$6n + 4$
1	-2	10
2	1	16
3	6	22
4	13	
5	22	

22

(2)

(Total for Question 17 is 4 marks)

18 On Saturday, Jacob walked 10 800 steps.
On Sunday, he walked 7% more steps than on Saturday.

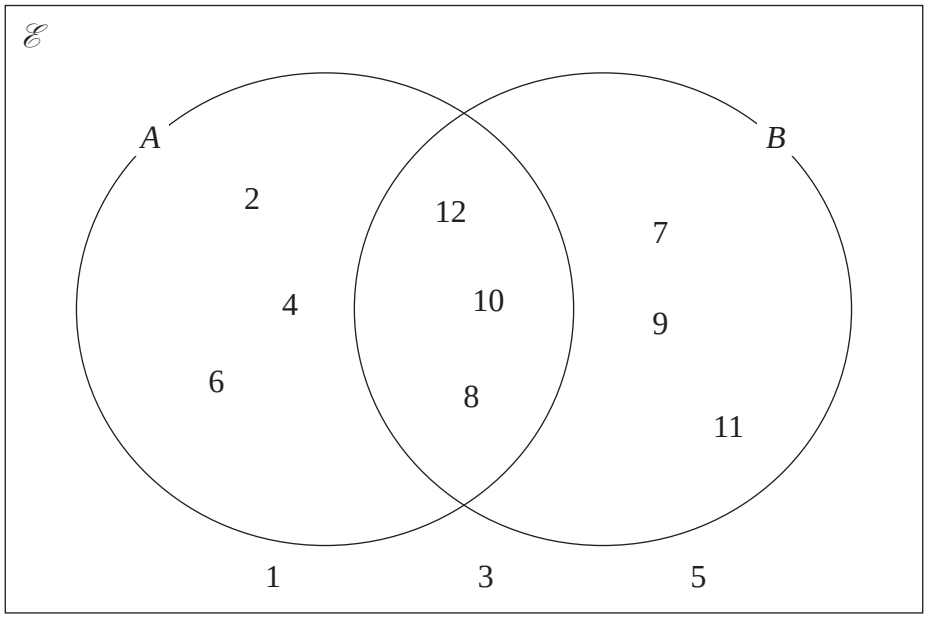
Work out how many steps Jacob walked on Sunday.

$\frac{7}{100} \times 10800 = 756$

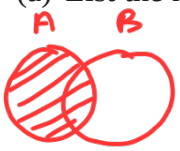
$756 + 10800 = 11556$

(Total for Question 18 is 3 marks)

19 Here is a Venn diagram with $\mathscr{E}$ = {whole numbers from 1 to 12}



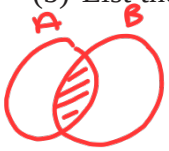
(a) List the numbers that are in set A



2, 4, 6, 8, 10, 12

(1)

(b) List the numbers that are in set $A \cap B$ A AND B



8, 10, 12

(1)

(c) List the numbers that are in set $(A \cup B)'$

$(A \cup B)'$ → NOT (A OR B)

1, 3, 5

(1)

One of the numbers in the Venn diagram is chosen at random.

(d) Find the probability that this number is in set $A \cup B$ → A OR B [Both A, B] => Total numbers = 9

Probability = number of events / total possible outcomes

Total ALL possible numbers = 12

Probability = $\frac{9}{12}$

(2)

(Total for Question 19 is 5 marks)

20 The length of a line is 12.3 cm, correct to 1 decimal place.

(a) Write down the upper bound of the length of the line.

decimal places
→ 1
→ 0.1
$\frac{0.1}{2} = 0.05$

upper bound $= 12.3 + 0.05$
$= 12.35$

cm

(1)

(b) Write down the lower bound of the length of the line.

$12.3 - 0.05$

$= 12.25$

cm

(1)

(Total for Question 20 is 2 marks)

21 Omar invests 6000 dirham for 4 years in a savings account.
He will get 1.5% per year compound interest.

Work out the total amount of interest Omar will have received by the end of 4 years.
Give your answer correct to the nearest dirham.

end of year 1

$6000 \times \frac{1.5}{100} = 90$

end of year 2

$(6000 + 90) \times \frac{1.5}{100} = 91.35$

end of year 3

$(6090 + 91.35) \times \frac{1.5}{100} = 92.72$

end of year 4

$(6090 + 91.35 + 92.72) \times \frac{1.5}{100} = 94.11$

Total interest
→ $90 + 91.35 + 92.72 + 94.11$
$= 368.18$

dirham

(Total for Question 21 is 3 marks)

22 The diagram shows a trapezium.

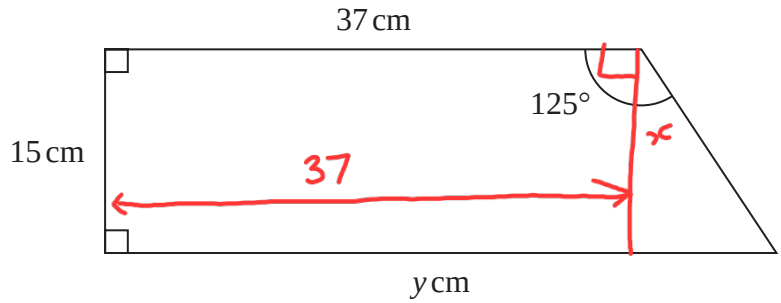
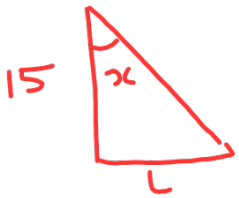
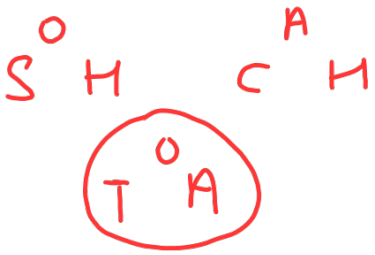


Diagram **NOT** accurately drawn

Work out the value of y.
Give your answer correct to 1 decimal place.

$x = 125 - 90$
$= 35$





$\tan(35) = \frac{L}{15}$

$\tan(35) \times 15 = L \Rightarrow 10.5$

$y = 37 + 10.5$
$= 47.5$

$y = 47.5$

(Total for Question 22 is 4 marks)

23

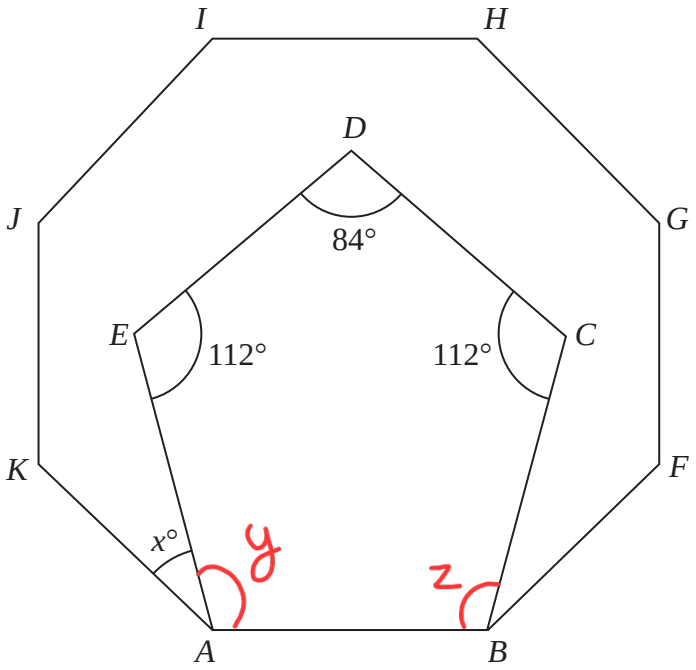


Diagram **NOT** accurately drawn

Pentagon *ABCDE* is drawn inside the regular octagon *ABFGHIJK*.
The pentagon has exactly one line of symmetry.

Work out the value of *x*.

Octagon

→ 8 triangles

Sum of all angles in a Δ = 180

total angles → 180 × 6 = 1080

regular means all angles are the same

↳ $\frac{1080}{8} = 135°$

$\therefore x + y = 135$

Pentagon

↳ line of symmetry → $\therefore y = z$

$y + z = 2y$

sum of all angles in a Pentagon = 540°

$2y = 540 - 112 - 112 - 84$

$y = \frac{232}{2} = 116°$

$x + 116 = 135$

$x = 135 - 116$

$= 19°$

$x =$ 19°

(Total for Question 23 is 4 marks)

C F T

24 Carlos, Flavia and Tazia shared £861 between themselves.

The amount of money Flavia got is 65% of the amount of money Carlos got.
The amount of money Tazia got is 22% **more** than the amount of money Carlos got.

Work out how much money Carlos got.

$F = 65\%$ of C

$\hookrightarrow \frac{65}{100} C$

$T = 22\% + C$

$\hookrightarrow \frac{22}{100} C + C$

$\frac{65}{100} C + \frac{22}{100} C + C + C = 861$

$\frac{87}{100} C + 2C = 861$

$C\left[\frac{87}{100} + 2\right] = 861$

$\frac{287}{100} C = 861$

$C = \frac{861 \times 100}{287}$

$= 300$

£ 300

(Total for Question 24 is 3 marks)

25 (a) Factorise fully $12d^2e + 16d^2e^2$

Common : $4, d^2, e$

$\frac{12d^2e}{4d^2e} = 3$ $\quad \frac{16d^2e^2}{4d^2e} = 4e$

$\rightarrow 4d^2e(3+4e)$

(2)

(b) Simplify fully $\frac{15k^4m^3}{5km^2}$

$\frac{3}{15 \times k \times k \times k \times k \times m \times m \times m}$
$\frac{}{5 \times k \times m \times m}$

$\rightarrow 3k^3m$

(2)

(Total for Question 25 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS