Please check the examination details below before entering your candidate information

Candidate surname	Other names

Centre Number | Candidate Number

Pearson Edexcel International GCSE

Time 2 hours

Paper reference **4MA1/2FR**

Mathematics A

PAPER: 2FR

Foundation Tier

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.
- 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 ▶

P68790A

1/1/1/

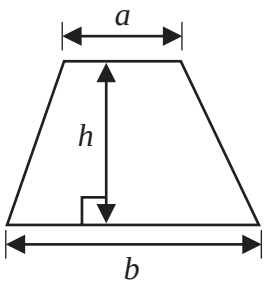
P 6 8 7 9 0 A 0 1 2 8

Pearson

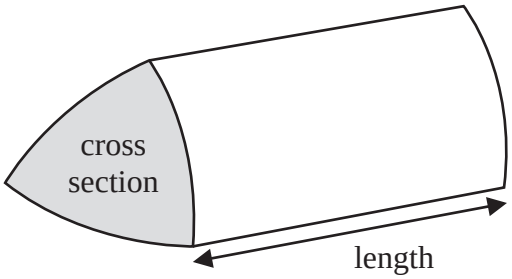
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

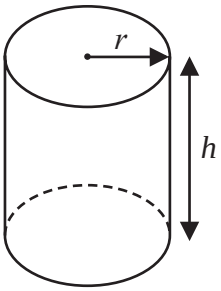


Volume of prism = area of cross section × length



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

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



Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

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

202 58 123 7 180

7, 58, 123, 180, 202 (1)

(1)

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

0.155 1.5 0.15 0.015 1.15

0.015, 0.15, 0.155, 1.15, 1.5 (1)

(1)

(c) Write in figures the number five thousand two hundred and three.

5203 (1)

(1)

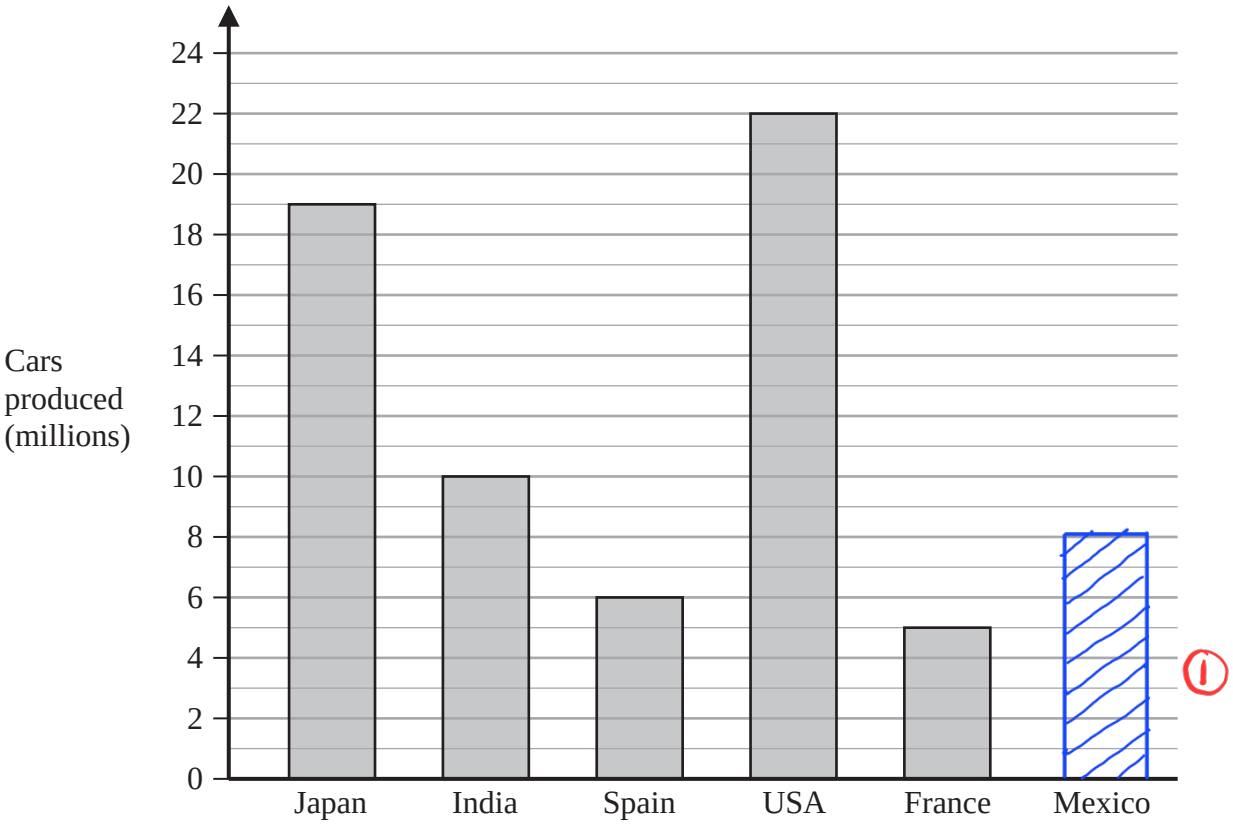
(d) Write down the value of the 6 in the number 2468

tens (1)

(1)

(Total for Question 1 is 4 marks)

2 The bar chart gives information about the total number, in millions, of cars produced in 2017 and 2018 for each of five countries.



The total number of cars produced in 2017 and 2018 in Mexico was 8 million.

(a) Draw a bar on the bar chart to show this information.

(1)

(b) Which of these six countries produced the greatest total number of cars?

USA (1)

(1)

(c) Which country produced half as many cars as India?

$\frac{1}{2} \times 10 = 5$

France (1)

(1)

(d) Work out the difference between the total number of cars produced in Japan and the total number of cars produced in Spain.

Japan = 19

Spain = 6

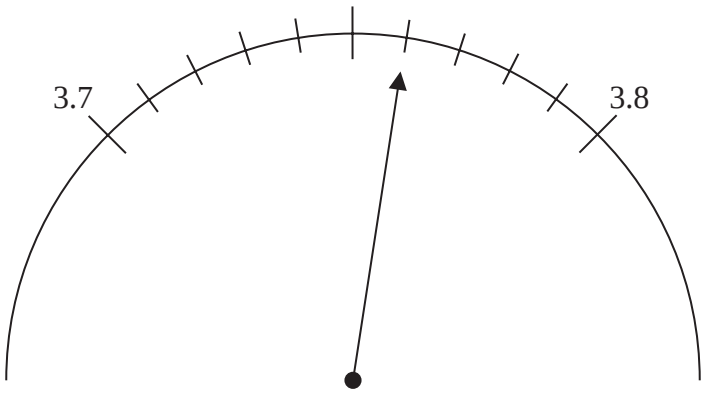
$19 - 6 = 13$

13 (1) million

(1)

(Total for Question 2 is 4 marks)

3



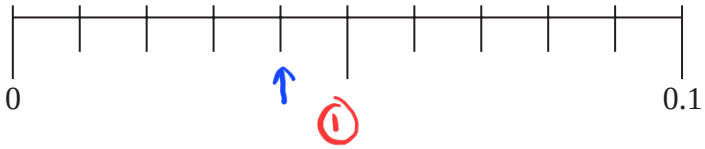
(a) Write down the number marked with the arrow on the scale above.

3.76 (1)

.....

(1)

(b) Mark with an arrow (↑) the number 0.04 on the scale below.



(1)

(1)

(c) Write the number 5.68 correct to one decimal place.

8>5. round up 6 to 7.

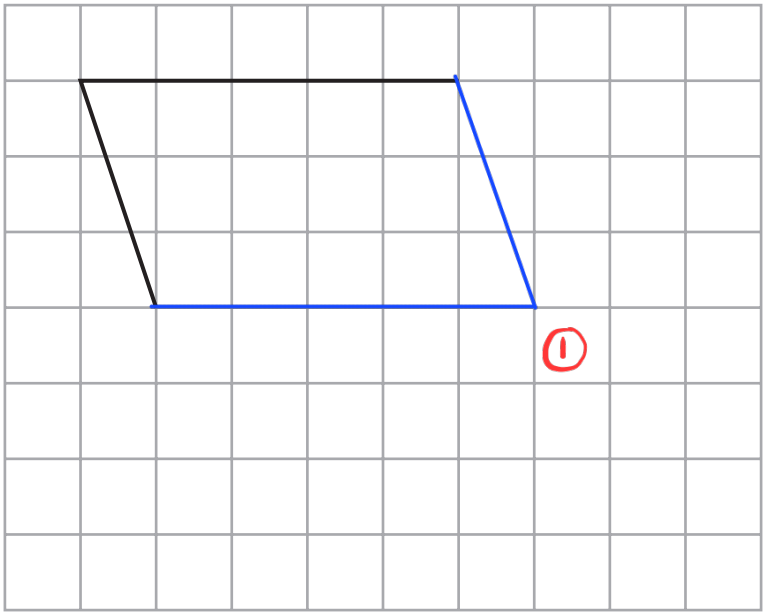
5.7 (1)

.....

(1)

(Total for Question 3 is 3 marks)

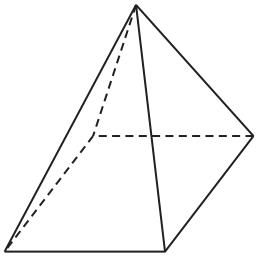
4 Here are two sides of a parallelogram.



(a) On the grid above, complete the parallelogram.

(1)

The diagram shows a 3-D shape.



(b) (i) What is the mathematical name of this 3-D shape?

Pyramid (1)

(1)

(ii) How many faces has this shape?

5 (1)

(1)

(Total for Question 4 is 3 marks)

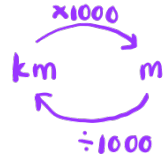
5 Brigid recorded the distance she ran on each of three days.

The table shows her results.

Day	Distance
Monday	5950 m
Tuesday	14.5 km
Wednesday	9000 m

Brigid set herself the target of running a **total** of at least 30 km on these three days.

Show that Brigid did not achieve her target.



convert to km

Total : $\left(\frac{5950}{1000}\right)$ km + 14.5 km + $\left(\frac{9000}{1000}\right)$ km (1)

= 5.95 + 14.5 + 9 (1)

= 29.45 km (shown) (1)

(Total for Question 5 is 3 marks)

6 (a) Find the value of

· use calculator to solve

(i) $\sqrt{31.36}$

5.6 (1)

(1)

(ii) 14^3

2744 (1)

(1)

(b) Write a number on each dotted line to make the calculation correct.

(i) $10 - \ldots\ldots 3 \ldots\ldots \times 2 = 4$ (1)

(1)

(ii) $(5 + \ldots\ldots 7 \ldots\ldots) \times 3 = 36$ (1)

(1)

(Total for Question 6 is 4 marks)

7 Here are the first five terms of a number sequence.

1 +6 7 +6 13 +6 19 +6 25

(a) (i) Write down the next term of the sequence.

25 + 6 = 31

31 (1)

(1)

(ii) Explain how you worked out your answer.

Add 6 to 25. (1)

(1)

(b) Explain why 188 cannot be a number in the sequence.

All terms in the sequence are odd. (1)

(1)

(Total for Question 7 is 3 marks)

8 Jordan buys 256 notebooks.

He buys the notebooks in packs of 8 notebooks.
Each pack of 8 notebooks costs £2.48

Work out how much the 256 notebooks cost Jordan.

Finding how many packs Jordan buys:

$\frac{256}{8}$ = 32 packs

Price he pays: 32 × 2.48

= 79.36

£ 79.36

(Total for Question 8 is 3 marks)

9 (a) Simplify $a \times a \times a \times a \times a$

$a^{1+1+1+1+1} = a^5$

a^5 (1)

(1)

(b) Simplify $8b \times 3c$

$(8 \times 3) \times b \times c$

$24bc$

$24bc$ (1)

(1)

(c) Expand $3(x + 4)$

$3x + 12$

$3x + 12$ (1)

(1)

$Q = 5v^2 - w$

(d) Work out the value of Q when $v = \frac{1}{2}$ and $w = \frac{1}{4}$

$Q = 5\left(\frac{1}{2}\right)^2 - \frac{1}{4}$

$= 5\left(\frac{1}{4}\right) - \frac{1}{4}$ (1)

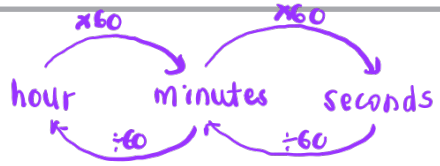
$= \frac{5}{4} - \frac{1}{4} = \frac{4}{4}$

$= 1$

$Q =$ 1 (1)

(2)

(Total for Question 9 is 5 marks)



10 It takes a machine 8 seconds to produce a bolt.

Each day, the machine starts producing bolts at 09 30
The machine produces bolts continuously every 8 seconds until it stops at 16 10 on the same day.

Work out how many bolts the machine produces each day.

Finding how long the machine works:

$$\begin{array}{r} 15\ 70 \\ \cancel{16}\ \cancel{10} \\ -\ 09\ 30 \\ \hline 6\ 40 \end{array}$$

= 6 hours 40 minutes (1)

Convert 6 hours 40 minutes to seconds:

$(6 \times 3600)s + (40 \times 60)s$

$= 21\,600 + 2400$

$= 24000$ seconds (1)

Bolts produced each day:

$\frac{24\,000}{8}$ (1) $= 3000$ (1)

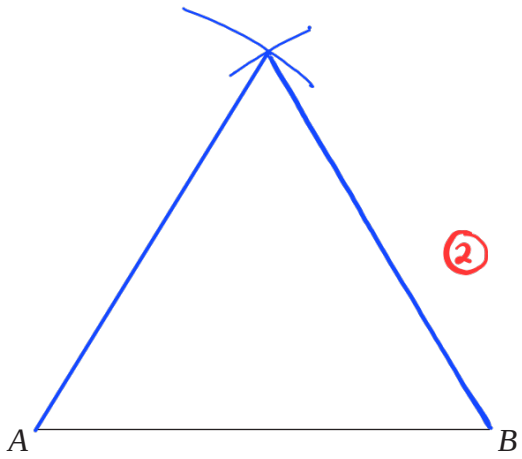
3000

(Total for Question 10 is 4 marks)

11 Triangle *ABC* is an equilateral triangle of side 6 cm.

Using a ruler and compasses only, construct triangle *ABC*
You must show all your construction lines.

Side *AB* has been drawn for you.



2

(Total for Question 11 is 2 marks)

12 Mario is going to play two games on Saturday.
He will play one game on Saturday morning and one game on Saturday afternoon.

The following table shows the games from which he is going to choose.

Morning	Afternoon
Bridge (B) Chess (C) Draughts (D)	Ludo (L) Mahjong (M) Snakes and ladders (S)

(a) Write down all the possible combinations of games that Mario can play on Saturday.

BL, Bm, BS, CL, Cm, CS, DL, DM, Ds

2

(2)

Question 12 continued

Mario asked 100 students in his school to name their favourite card game.

His results are shown in the two-way table below.

	Solitaire	Rummy	Whist	Total
Year 10	30	19	4	53
Year 11	17	18	12	47
Total	47	37	16	100

One of the students Mario asked is picked at random.

(b) Write down the probability that this student is in Year 11

$\frac{47}{100}$ (1)

.....

(1)

One of the Year 10 students is picked at random.

(c) Work out the probability that this student did **not** answer Whist.

$\frac{53-4}{53} = \frac{49}{53}$

$\frac{49}{53}$ (2)

.....

(2)

(Total for Question 12 is 5 marks)

13 The diagram shows a trapezium.

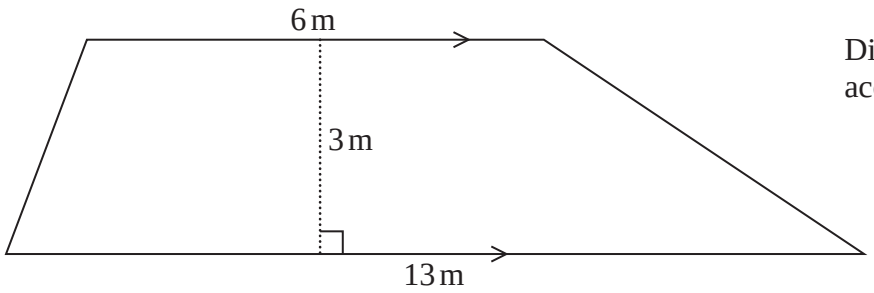


Diagram **NOT** accurately drawn

Work out the area of the trapezium.

$A = \frac{1}{2} \times (\text{sum of parallel sides}) \times \text{height}$

$A = \frac{1}{2} \times (6 + 13) \times 3$ (1)

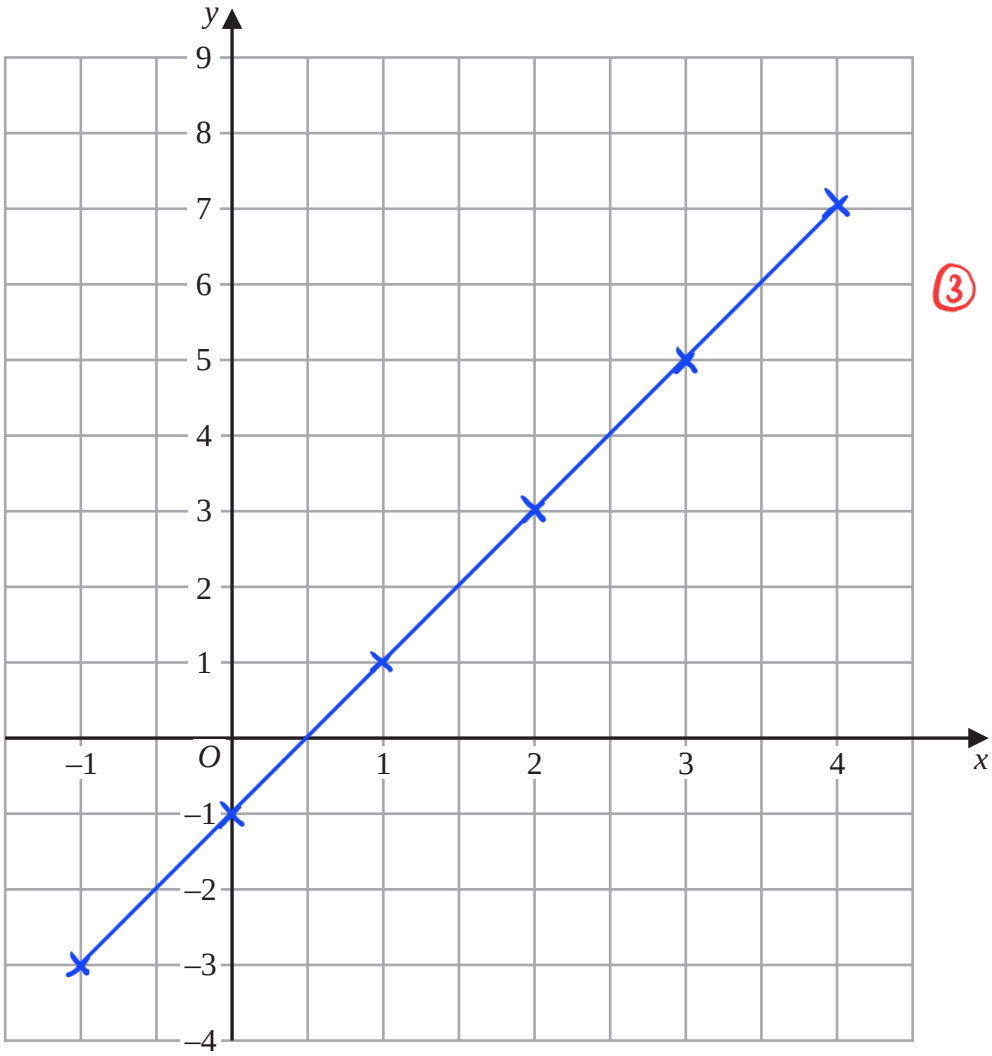
$= 28.5$ (1)

28.5 ..... m^2

(Total for Question 13 is 2 marks)

14 On the grid, draw the graph of $y = 2x - 1$ for values of x from –1 to 4

x	–1	0	1	2	3	4
y	–3	–1	1	3	5	7



③

(Total for Question 14 is 3 marks)

15 Kim spends $\$N$

Of this, she spends

40% on food

$\frac{1}{4}$ on clothes

and the rest on petrol

Kim spends $\$P$ on petrol.

Work out the ratio $P:N$ in the form $a:b$ where a and b are integers.
Give your answer in its simplest form.

Convert all to decimals :

Food : $\frac{40}{100} = 0.4$

Clothes : $\frac{1}{4} = 0.25$ (1)

Petrol : $1 - 0.4 - 0.25$
$= 0.35$ (1)

$\frac{P}{N} = \frac{0.35}{1} = \frac{7}{20}$ (1)

$\therefore \quad P : N = 7 : 20$ (1)

7 : 20

(Total for Question 15 is 4 marks)

16 The table shows information about the number of mobile phones owned by each of 40 families.

Number of mobile phones	Frequency
0	1
1	5
2	12
3	9
4	11
5	2

For the information in the table,

(a) write down the mode,

mode = class with highest frequency

2 (1)

.....

(1)

(b) work out the mean.

$$\text{mean} = \frac{(0\times1)+(1\times5)+(2\times12)+(3\times9)+(4\times11)+(5\times2)}{1+5+12+9+11+2} \quad (1)$$

$$= \frac{5+24+27+44+10}{40}$$

$$= \frac{110}{40} \quad (1)$$

$$= 2.75 \quad (1)$$

2.75

.....

(3)

(Total for Question 16 is 4 marks)

17 Molly uses this number machine to work out the amount of tax that she has to pay on the money she earns.

When Molly works n hours the amount of tax she has to pay is £T

Find a formula for T in terms of n

n = number of hours worked

T = tax to be paid

$(n \times 12 + 50) \times 0.2 = T$

$(12n + 50) \times 0.2 = T$

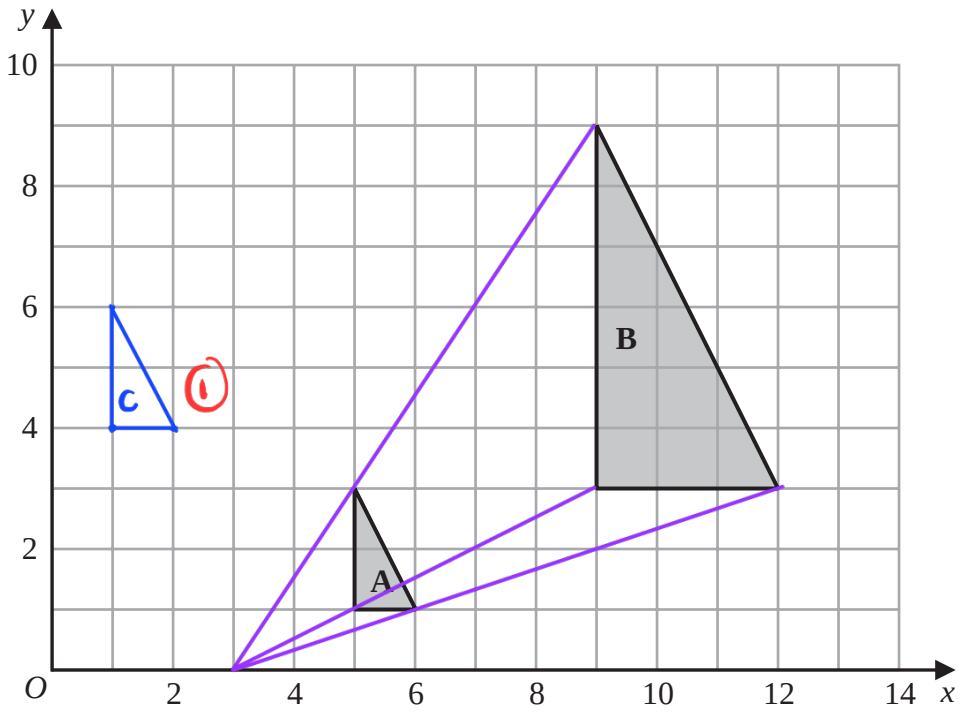
$T = 0.2 \times 12n + 0.2 \times 50$

$T = 2.4n + 10$ (3)

$T = 2.4n + 10$

(Total for Question 17 is 3 marks)

18



(a) Describe fully the single transformation that maps triangle **A** onto triangle **B**

Enlargement of scale factor 3 at centre (3,0)
(1) (1) (1)

(3)

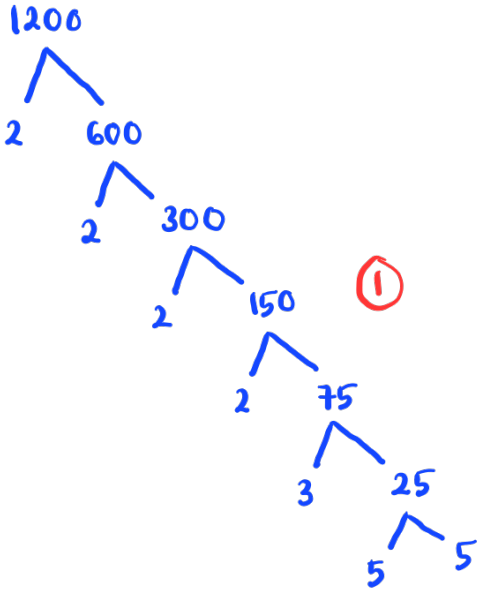
(b) On the grid above, translate triangle **A** by the vector $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$ – four positions to the left – three positions upward

Label your triangle **C**

(1)

(Total for Question 18 is 4 marks)

19 Write 1200 as a product of powers of its prime factors.
Show your working clearly.



(1)

$2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 = 2^4 \times 3 \times 5^2$

(1) (1)

$2^4 \times 3 \times 5^2$

(Total for Question 19 is 3 marks)

20 Alberto, Bill, Candela and Diana are four friends.

Here is some information about the height of each of these friends.

Alberto's height is 158 cm.
Bill's height is 175 cm.
Candela's height is greater than Diana's height.

The median height of these four friends is 160 cm.
The range of the heights of these four friends is 21 cm.

Work out Candela's height and Diana's height.

154 158 162 175
(y) (A) (x) (B)

Since median = 160 cm,

$\frac{158 + x}{2} = 160$

$x = 162$ cm (1)

Since Candela's height is higher than Diana's,

x = Candela's height = 162 cm

Since range = 21 cm,

175 − 21 = y = 154 cm = Diana's height
(1)

Candela ..... 162 (1) cm

Diana ..... 154 cm

(Total for Question 20 is 3 marks)

21 $\mathscr{E}$ = {9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20}
A = {multiples of 3}
B = {odd numbers}

(a) List the members of the set

(i) $A \cap B$ - is in Set A and Set B

9, 15 (1)

(1)

(ii) $A \cup B$ - is in Set A or Set B

9, 11, 12, 13, 15, 17, 18, 19 (1)

(1)

(b) Is it true that $24 \in A$?

Tick one of the boxes below.

Yes	No
☐	☑

Give a reason for your answer.

24 is not between 9 and 20. (1)

(1)

Set C has 4 members such that $C \cap B' = \{10, 18\}$

→ is in Set C and not in set B

(c) List the members of one possible set C

not in Set B : (10), 12, 14, 16, (18), 20

Members of C : Any 2 numbers except 12, 14, 16, 20

9, 10, 11, 18 (2)

(2)

(Total for Question 21 is 5 marks)

22 The diagram shows a shape made from a square *ABCD* and 4 identical semicircles.

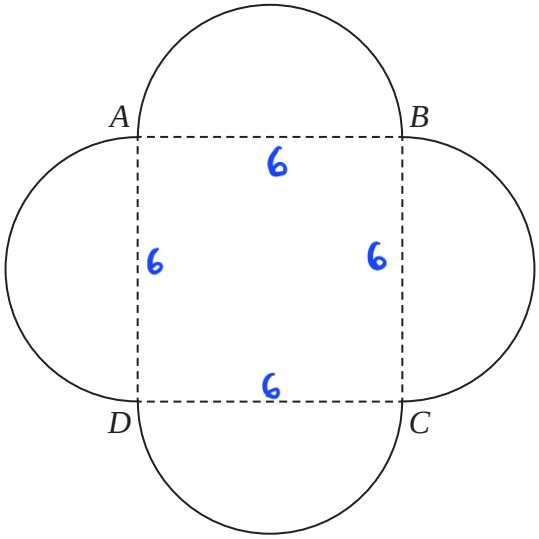


Diagram **NOT** accurately drawn

As shown in the diagram, the semicircles have *AB*, *BC*, *CD* and *DA* as diameters.

The area of the square is $36\,\text{cm}^2$

Calculate the total area of the shape.
Give your answer correct to one decimal place.

Finding length of sides of ABCD :

$x^2 = 36$

$x = 6$ cm (1)

∴ length of side of square = diameter of semicircle = 6 cm

Area of each semicircle:

$\frac{1}{2} \times \pi \times \left(\frac{6}{2}\right)^2 = \frac{9}{2}\pi$ (1)

Area of 4 semicircle : $4 \times \frac{9}{2}\pi$

$= 18\pi$

Total area: area of square + area of 4 semicircle

$= 36 + 18\pi$ (1)

$= 92.5\ \text{cm}^2$ (1)

92.5 ..... cm^2

(Total for Question 22 is 4 marks)

23 (a) Solve $p = \dfrac{3p - 5}{10}$

Show clear algebraic working.

$(10)p = 3p - 5$ (1)

$10p - 3p = -5$ (1)

$7p = -5$

$p = \dfrac{-5}{7}$ (1)

$p =$ $-\dfrac{5}{7}$

(3)

(b) Simplify a^0 where $a > 0$

1 (1)

(1)

(c) Simplify fully $\dfrac{3xy^3}{6x^2y}$

$\dfrac{3}{6} \times \dfrac{x}{x^2} \times \dfrac{y^3}{y}$

$= \dfrac{1}{2} \times \dfrac{1}{x} \times y^2$

$= \dfrac{y^2}{2x}$ (2)

$\dfrac{y^2}{2x}$

(2)

(d) Factorise fully $10c^3d^2 + 15cd^4$

$5(2c^3d^2 + 3cd^4)$

$= 5c(2c^2d^2 + 3d^4)$ (1)

$= 5cd^2(2c^2 + 3d^2)$ (1)

$5cd^2(2c^2 + 3d^2)$

(2)

(Total for Question 23 is 8 marks)

24 $\frac{2^k}{4^n} = 2^x$

Find an expression for x in terms of k and n

$\frac{2^k}{2^{2n}}$ ① $= 2^x$

$2^{k-2n} = 2^x$

$x = k - 2n$ ①

$x =$ $k - 2n$

(Total for Question 24 is 2 marks)

25 A cinema increased the cost of an adult ticket by 12%

After the increase, the cost of an adult ticket was £18.20

Work out the cost of an adult ticket before the increase.

Ticket cost after increase:

$100\% + 12\% = 112\%$ ①

Initial ticket cost : $18.20 \times \frac{100}{112}$ ①

$= 16.25$ ①

£ 16.25

(Total for Question 25 is 3 marks)

26 The table gives information about the population, correct to 2 significant figures, of each of five cities in 2018

City	Population (2018)
Ahmedabad	7.7×10^6
Barcelona	5.5×10^6
Chicago	8.8×10^6
Lagos	1.3×10^7
Tokyo	3.7×10^7

(a) Write 8.8×10^6 as an ordinary number.

8 800 000 (1)

(1)

(b) Which of these cities had the least population in 2018?

Barcelona (1)

(1)

(c) Work out the difference between the population of Tokyo and the population of Ahmedabad in 2018
Give your answer in standard form correct to 2 significant figures.

Tokyo : 3.7×10^6

Ahmedabad : 7.7×10^6

Difference : $(37 - 7.7) \times 10^6$ (1)

$= 29.3 \times 10^6$

$= 2.9 \times 10^7$ (1)

2.9×10^7

(2)

(Total for Question 26 is 4 marks)

27 The diagram shows triangle *ABP* inside the regular hexagon *ABCDEF*

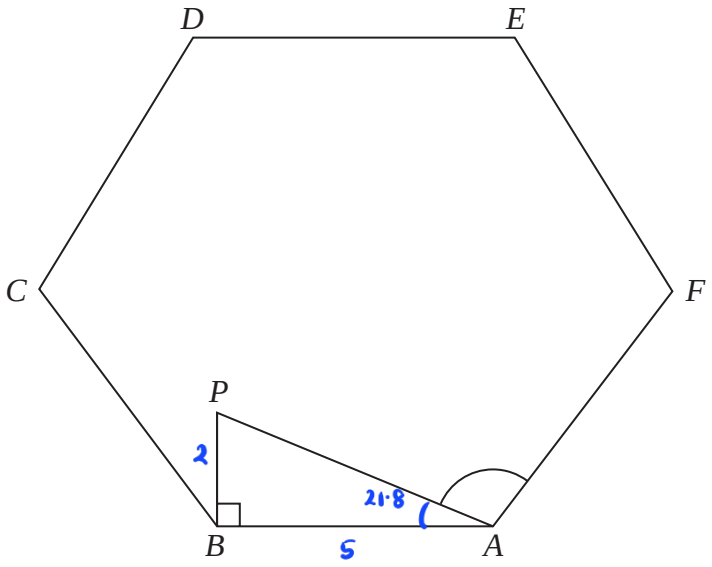


Diagram **NOT** accurately drawn

AB = 5 cm *BP* = 2 cm Angle *ABP* = 90°

Work out the size of angle *PAF*
Give your answer correct to 3 significant figures.

Internal angle of hexagon $= \frac{6-2}{6} \times 180^\circ$

$= \frac{4}{6} \times 180^\circ$

$= 120^\circ$ (1)

$\tan BAP = \frac{2}{5}$ (1)

$BAP = \tan^{-1} \frac{2}{5}$ (1)

$= 21.8^\circ$

angle $PAF = 120^\circ - 21.8^\circ$ (1)

$= 98.2^\circ$ (1)

98.2 °

(Total for Question 27 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

BLANK PAGE