Please check the examination details below before entering your candidate information

Candidate surname	Other names

Pearson Edexcel International GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Wednesday 15 January 2020

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

Mathematics A

Paper 2F

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 ▶

P59753A

1/1/1/

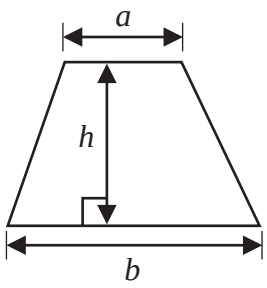
P 5 9 7 5 3 A 0 1 2 4

Pearson

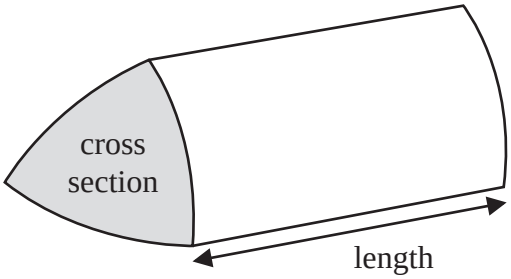
International GCSE Mathematics

Formulae sheet – Foundation Tier

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

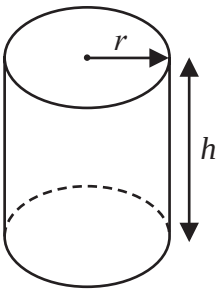


Volume of prism = area of cross section × length



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

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



Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Here is a list of numbers

13 14 18 23 30 36

From the numbers in the list, write down

(i) an odd number

13 or 23

13 (1)

.....

(1)

(ii) the multiple of 4

36 (1)

.....

(1)

(iii) the factor of 28

14 (1)

.....

(1)

(Total for Question 1 is 3 marks)

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

0.501 0.51 0.5 0.55

0.5 , 0.501 , 0.51 , 0.55 (1)

.....

(1)

(b) Write 0.3 as a fraction.

$\frac{3}{10}$ (1)

.....

(1)

(c) Write 0.46832 correct to 2 decimal places.

↳ more than 5. we round up 6 to 7.

0.47 (1)

.....

(1)

(Total for Question 2 is 3 marks)

3 Here is a rectangle made from 12 square tiles.

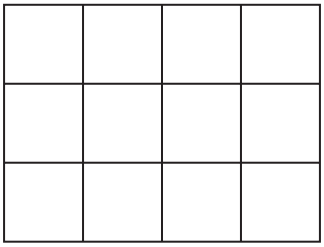


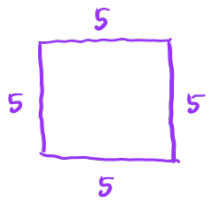
Diagram **NOT** accurately drawn

The perimeter of each tile is 20 cm.

Work out the area of the rectangle.

Perimeter of each tile = 20 cm

Each tile has 4 sides.



$\frac{20}{4} = 5$ cm (1)

Area of 1 tile = 5×5

$= 25$ cm^2

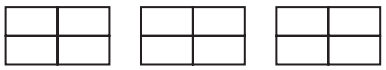
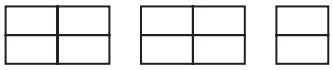
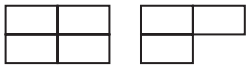
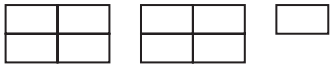
Area of 12 tiles = 25 cm$^2 \times 12$ (1)

$= 300$ cm^2 (1)

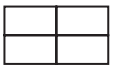
300 cm^2

(Total for Question 3 is 3 marks)

4 The pictogram gives information about the number of rickshaws sold from a garage each month from January to April.

January	
February	
March	
April	
May	 (1)

Key:



represents 12 rickshaws

36 rickshaws were sold in January.

(a) Complete the key. $\frac{36}{3} = 12$ (1)

(1)

(b) How many rickshaws were sold in February?

$12 \times 2.5 = 30$

30 (1)

(1)

15 rickshaws were sold in May from the garage.

(c) Show this information on the pictogram.  (1)

(1)

Sandeep makes a profit of 5000 rupees on each rickshaw sold from the garage.

His target profit for January was 200 000 rupees.

(d) Did Sandeep reach his target profit for January?
You must show your working.

$36 \times 5000 = 180\,000$. No. Sandeep does not reach his target. (1) (1)

(2)

(Total for Question 4 is 5 marks)

5 (a) Simplify $10a \times b$

10 ab (1)

.....

(1)

(b) Solve $n + 3 = 7$

$n + 3 = 7$

$n = 7 - 3$ (-3)

$= 4$

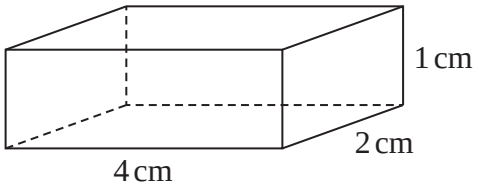
$n =$ 4 (1)

.....

(1)

(Total for Question 5 is 2 marks)

6 (a) Write down the mathematical name of this 3-D shape.

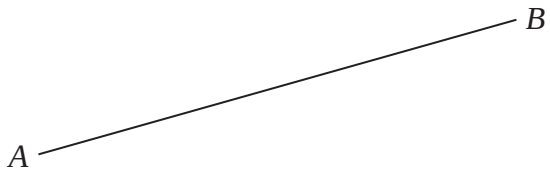


cuboid (1)

.....

(1)

(b)



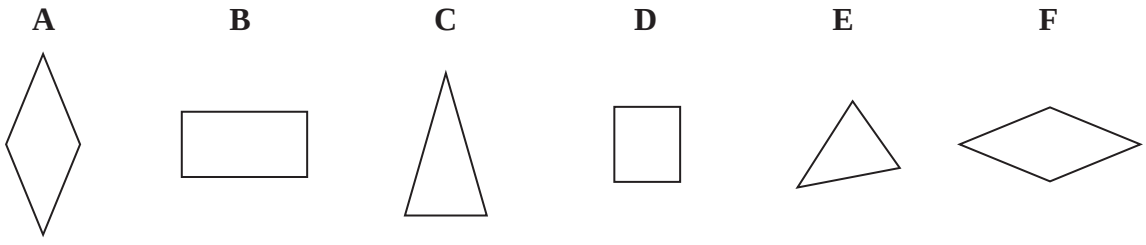
Measure the length of *AB*.

6.5 (1) cm

.....

(1)

Here are six shapes.



Two of these shapes are congruent. → have same shape and size

(c) Write down the letters of these two shapes.

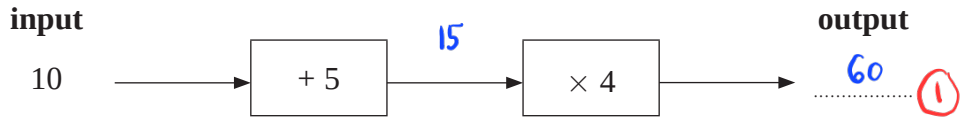
A and F (1)

.....

(1)

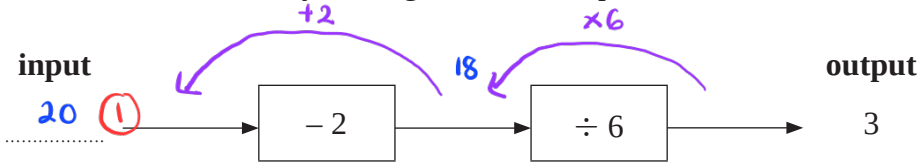
(Total for Question 6 is 3 marks)

7 (a) Complete the number machine by writing the correct output on the dotted line.



(1)

(b) Complete the number machine by writing the correct input on the dotted line.



① do the calculation from the back.

÷ becomes ×

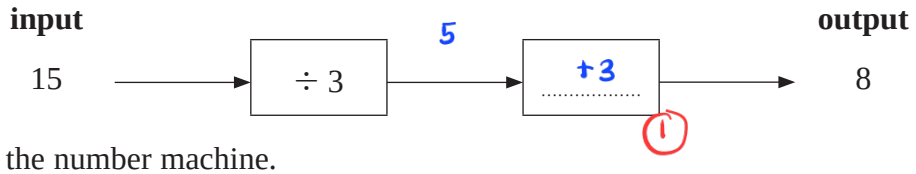
− becomes +

① 3 × 6 = 18

② 18 + 2 = 20

(2)

Here is an incomplete number machine.



(c) Complete the number machine.

(1)

(Total for Question 7 is 4 marks)

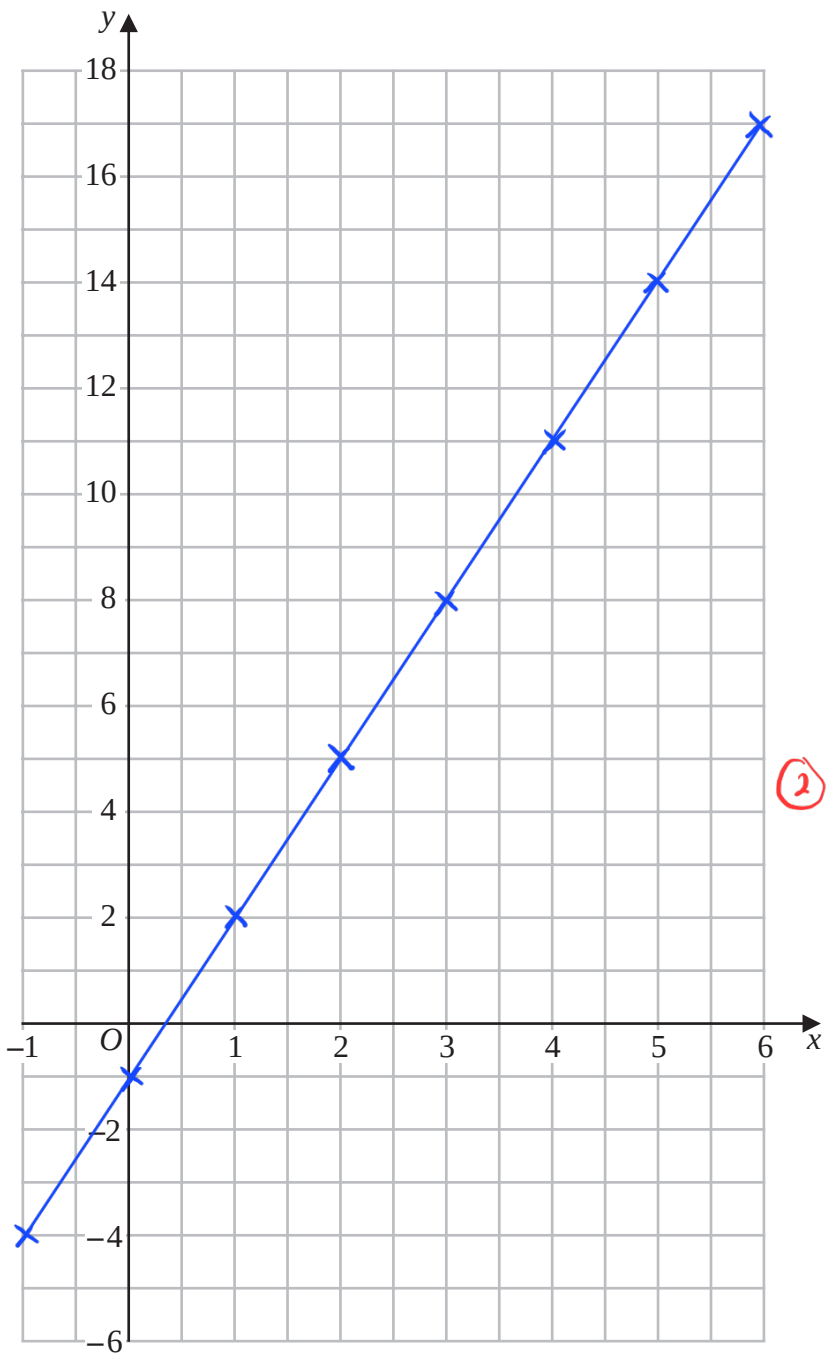
8 (a) Complete the table of values for $y = 3x - 1$

x	–1	0	1	2	3	4	5	6
y	−4	–1	2	5	8	11	14	17

2

(2)

(b) On the grid, draw the graph of $y = 3x - 1$ for values of x from –1 to 6



2

(2)

(Total for Question 8 is 4 marks)

9 There are 25 pens in a packet.

7 of the pens are green.
10 of the pens are black.
The rest of the pens are red.

Jurgen takes at random a pen from the packet.

(a) Find the probability that

(i) the pen is black,

$\frac{10}{25}$ (1)

(1)

(ii) the pen is red.

Red = 25 − 7 − 10
= 8

$\frac{8}{25}$ (1)

(1)

Heidi records the number of packets of pens sold in her shop to each customer last Friday.
The table shows information about her results.

Number of packets	Frequency
1	14
2	17
3	15
4	12
5	9

(b) Write down the mode of the number of packets.

mode = class with highest frequency

2 (1)

(1)

(c) Work out the total number of packets of pens sold last Friday.

(1 × 14) + (2 × 17) + (3 × 15) + (4 × 12) + (5 × 9)

= 14 + 34 + 45 + 48 + 45 (1)

= 186 (1)

186

(2)

(Total for Question 9 is 5 marks)

10 In a shop,

3 bottles of juice cost $5.25

2 bottles of juice and 5 bars of chocolate cost $9.75

Work out the cost of 5 bottles of juice and 3 bars of chocolate.

Finding cost for 1 bottle of juice:

$5.25 \div 3 = 1.75$ (1)

Finding cost for 1 bar of chocolate:

$2(1.75) + 5x = 9.75$ – let bar of chocolate = x

$5x = 9.75 - 3.5$

$5x = 6.25$

$x = \frac{6.25}{5} = 1.25$ (1)

∴ Total: $5(1.75) + 3(1.25)$ (1)

$= 8.75 + 3.75 = 12.50$ (1)

$ 12.50

(Total for Question 10 is 4 marks)

11 Here are five mathematical signs

+	>	=	∈	<

(a) Write one of these five signs in each box so that each of these statements is true.

(i)

4 °C	<	9 °C

(1)

(ii)

–3 °C	>	–8 °C

(1)

The table gives information about the boiling points and the freezing points of some elements.

Element	Chlorine	Mercury	Neon	Oxygen
Boiling point (°C)	–35	357	–246	–183
Freezing point (°C)	–101	–39	–249	–218

(b) Which of these elements has the lowest boiling point?

Neon (1)

.....

(1)

(c) Which of these elements has the largest difference in temperature between its boiling point and its freezing point?

Mercury (1)

.....

(1)

Dr Strauss is going to cool chlorine from its boiling point to its freezing point.
He knows that it will take 2 minutes for the temperature of the chlorine to go down 10 °C.

(d) Work out how long it will take the chlorine to cool from its boiling point to its freezing point?

Difference between boiling point and freezing point :

$-35 - (-101) = 66$ (1)

Finding scale factor :

$\frac{66\,^{\circ}C}{10\,^{\circ}C} = 6.6$

6.6×2 minutes $= 13.2$ minutes (1)

13.2 ..... minutes

(2)

(Total for Question 11 is 6 marks)

12 In 2018, Salman saved 120 riyals each month.

At the start of 2019, Salman increased 120 riyals by 7.5%
He then saved this new amount each month during 2019

Work out how much money Salman saved in total in 2019

$\frac{7.5}{100} \times 120 = 9$ (increased 9 riyals from 120) (1)

∴ Salman saved 129 each month in 2019.

Total Salman saved in 2019: $129 \times 12 = 1548$ (1) (1)

1548 ..... riyals

(Total for Question 12 is 3 marks)

13 (a) Expand $x(5 - x)$

$5x - x^2$

$5x - x^2$ (1)

(1)

(b) Factorise $3y - 21$

$3(y - 7)$

$3(y - 7)$ (1)

(1)

(c) Make p the subject of the formula $f = 3p - d$

$f = 3p - d$

$f + d = 3p$ (1) $+ d$

$\frac{f + d}{3} = p$ (1) $\div 3$

$p = \frac{f + d}{3}$

(2)

Sergio buys m boxes of seeds and n packets of seeds.

Each box contains 10 seeds.
Each packet contains 6 seeds.

The total number of seeds that Sergio buys is T.

(d) Write down a formula for T in terms of m and n.

Box $= 10 \times m = 10m$

Packet $= 6 \times n = 6n$

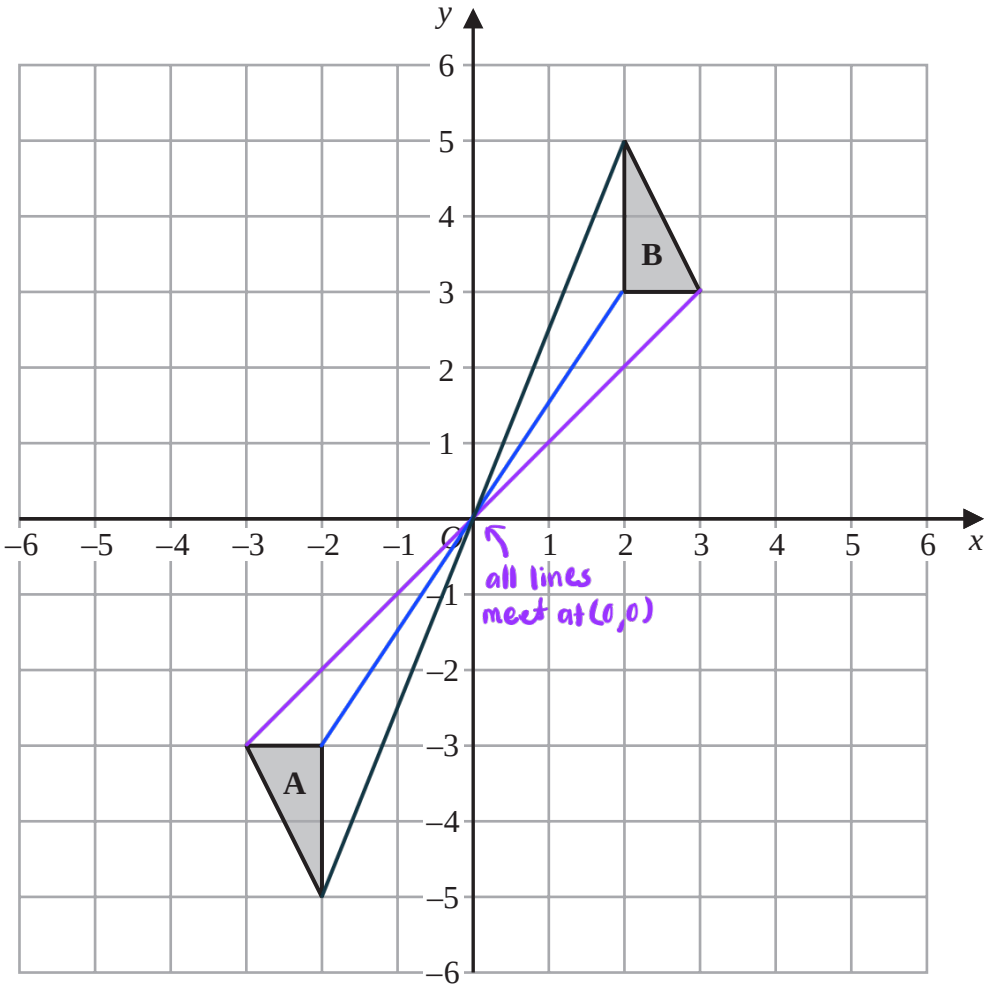
Total, $T = 10m + 6n$

$T = 10m + 6n$ (3)

(3)

(Total for Question 13 is 7 marks)

14



Describe fully the single transformation that maps triangle **A** onto triangle **B**.

Rotation of 180° at centre (0,0) (2)

(Total for Question 14 is 2 marks)

15 A regular polygon has n sides.
The size of each interior angle of the regular polygon is 140°

Work out the value of n.

By using sum of interior angle formula :

$(n-2) \times 180^\circ = 140^\circ \times n$ (1)

$180^\circ n - 360^\circ = 140^\circ n$

$180^\circ n - 140^\circ n = 360^\circ$

$40^\circ n = 360^\circ$

$n = \frac{360^\circ}{40^\circ}$ (1) $= 9$ (1)

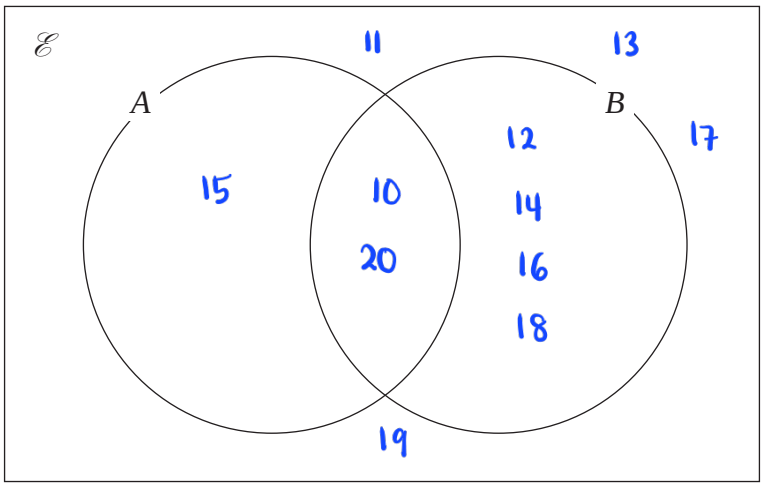
$n =$ 9

(Total for Question 15 is 3 marks)

16 $\mathscr{E} = \{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{multiples of 5}\}$
$B = \{\text{even numbers}\}$

Complete the Venn diagram for this information.



(3)

(Total for Question 16 is 3 marks)

17 (a) Simplify $\frac{x^9}{x^2}$

$x^{9-2} = x^7$

x^7 (1)

(1)

(b) Write $\frac{7^8 \times 7^4}{7^3}$ as a single power of 7

$\frac{7^{8+4}}{7^3} = \frac{7^{12}}{7^3}$ (1)

$= 7^{12-3}$

$= 7^9$ (1)

7^9

(2)

(Total for Question 17 is 3 marks)

18 Change 32.4 m^3 into cm^3

$32.4\ m^3 \times \frac{(100)^3\ cm^3}{(1)^3\ m^3} = 32\,400\,000$ (1) (1)

×100: m → cm; ÷100: cm → m

×$(100)^3$: m^3 → cm^3; ÷$(100)^3$: cm^3 → m^3

32 400 000 ..... cm^3

(Total for Question 18 is 2 marks)

19 Show that $4\frac{2}{3} + 3\frac{4}{5} = 8\frac{7}{15}$

$a\frac{b}{c} = \frac{c \times a + b}{c}$

LHS : $\frac{14 \times 5}{3 \times 5} + \frac{19 \times 3}{5 \times 3}$ (1)

$= \frac{70}{15} + \frac{57}{15}$ (1)

$= \frac{127}{15}$ (1)

$= 8\frac{7}{15}$ (shown)

$15 \overline{)127}$ 8, -120, 7

(Total for Question 19 is 3 marks)

20 The diagram shows a triangle.

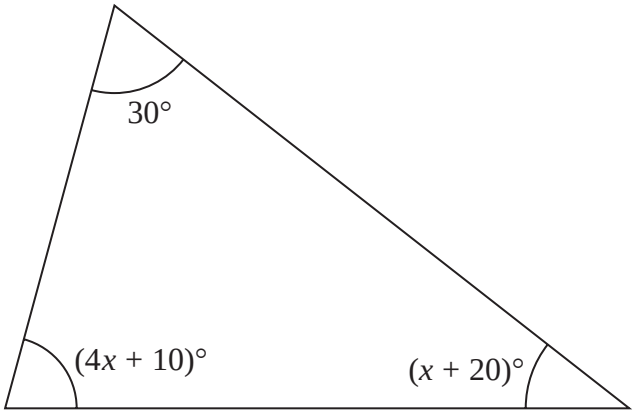


Diagram **NOT** accurately drawn

Work out the value of x. (Angles in a triangle sums up to 180°)

$30^\circ + (4x+10)^\circ + (x+20)^\circ = 180^\circ$

$5x + 30 + 30 = 180$

$5x + 60 = 180$ (1) -60

$5x = 180 - 60$ (1)

$5x = 120$ (1) $\div 5$

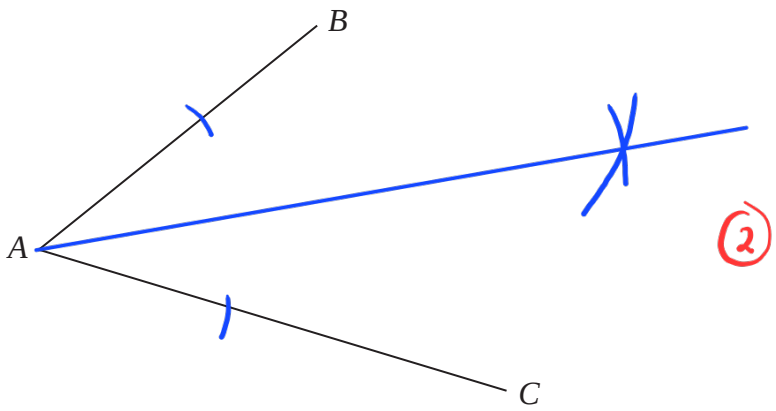
$x = \frac{120}{5}$

$= 24$ (1)

$x =$ 24

(Total for Question 20 is 4 marks)

21 Use ruler and compasses to construct the bisector of angle *BAC*.
You must show all your construction lines.



(Total for Question 21 is 2 marks)

22 A bag contains only red beads, blue beads, green beads and yellow beads.

The table gives the probabilities that, when a bead is taken at random from the bag, the bead will be blue or the bead will be yellow.

Colour	**red**	**blue**	**green**	**yellow**
Probability	0.15	0.24	0.30	0.31

The probability that the bead will be green is twice the probability that the bead will be red.

Sofia takes at random a bead from the bag.
She writes down the colour of the bead and puts the bead back into the bag.

She does this 180 times.

Work out an estimate for the number of times she takes a red bead from the bag.

Probability of red or green bead is taken :

$1 - 0.31 - 0.24 = 0.45$ (1)

Given : $P(G) = 2P(R)$

$P(G) + P(R) = 0.45$

$2P(R) + P(R) = 0.45$

$3P(R) = 0.45$

$P(R) = \frac{0.45}{3} = 0.15$ (1)

$\therefore 0.15 \times 180 = 27$ (1) (1)

27

(Total for Question 22 is 4 marks)

23 (a) Solve the inequality $2x + 7 > 4$

$2x > 4 - 7$ (1) ← -7

$2x > -3$ ← $\div 2$

$x > \frac{-3}{2}$

$x > -1.5$ (1)

$x > -1.5$

(2)

(b) Solve $x^2 - 3x - 40 = 0$

Show clear algebraic working.

By using quadratic formula:

$$x = \frac{3 \pm \sqrt{(-3)^2 - 4(1)(-40)}}{2}$$ (1)

$$x = \frac{3 \pm \sqrt{169}}{2}$$

$$= \frac{3 \pm 13}{2}$$ (1)

$x = \frac{3+13}{2}$ or $\frac{3-13}{2}$

$= 8$ or -5 (1)

$8, -5$

(3)

(Total for Question 23 is 5 marks)

24 The table shows the cost, in euros, of Brigitte's car insurance in each of the years 2016, 2017 and 2018

Year	**2016**	**2017**	**2018**
Cost of insurance (euros)	500	545	592

Brigitte says,

"The percentage increase in the cost of my car insurance from 2017 to 2018 is more than the percentage increase in the cost of my car insurance from 2016 to 2017"

(a) Is Brigitte correct?
You must show how you get your answer.

2016 to 2017 :

Difference in cost : $545 - 500$

$= 45$ (1)

Percentage increase : $\frac{45}{500} \times 100\%$

$= 9\%$ (1)

2017 to 2018 :

Difference in cost : $592 - 545$

$= 47$

Percentage increase : $\frac{47}{545} \times 100\%$

$= 8.6\%$ (1)

∴ No. percentage increase from 2016 to 2017 is higher. (1)

(4)

Henri wants to insure his car.

He gets a discount of 15% off the normal price.
Henri pays 952 euros for his car insurance after the discount.

(b) Work out the discount that Henri gets.

Normal price $- \frac{15}{100}$ (normal price) $= 952$

0.85 (normal price) $= 952$

normal price $= \frac{952}{0.85} = 1120$ (1)

∴ Discount : $1120 - 952$ (1)

$= 168$ (1)

168 ..... euros

(3)

(Total for Question 24 is 7 marks)

25 The density of gold is 19.3 g/cm^3
A gold bar has volume 150 cm^3

density = mass / volume

Work out the mass of the gold bar.

$19.3 = \frac{\text{mass}}{150}$

mass = 19.3×150 (1)

= 2895 g (1)

2895 ..... g

(Total for Question 25 is 2 marks)

26 Change a speed of 50 metres per second to a speed in kilometres per hour.

convert metres to kilometres :

$50 \text{ m/s} \times \frac{1 \text{ km}}{1000 \text{ m}} = 0.05 \text{ km/s}$ (1)

×1000 km ⇄ m ÷1000

convert second to hour :

$\frac{0.05 \text{ km}}{1 \text{ s}} \times \frac{3600 \text{ s}}{1 \text{ hour}} = 180 \text{ km/h}$ (1) (1)

×3600 hour ⇄ second ÷3600

180 ..... kilometres per hour

(Total for Question 26 is 3 marks)

27 The diagram shows a shaded shape *ABCD* made from a semicircle *ABC* and a right-angled triangle *ACD*.

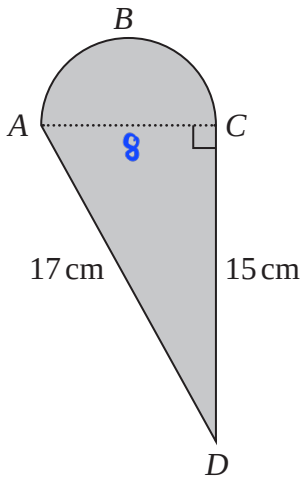


Diagram **NOT** accurately drawn

AC is the diameter of the semicircle *ABC*.

Work out the perimeter of the shaded shape.
Give your answer correct to 3 significant figures.

By using Pythagoras' Theorem:

$AC^2 = AD^2 - CD^2$

$AC^2 = 17^2 - 15^2$ (1)

$AC = \sqrt{64}$

$= 8$ cm (1)

Length ABC $= \frac{\pi \times 8}{2} = 4\pi$ (1)

Perimeter of shaded shape: $4\pi + 15 + 17$ (1)

$= 44.6$ cm (1)

44.6 cm

(Total for Question 27 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS