

Answer ALL TWENTY FOUR 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 in a box.

6	8	17	36	44	76	91
---	---	----	----	----	----	----

From the numbers in the list, write down

- (a) a multiple of 11

$$4 \times 11 = 44$$

44

(1)

- (b) a factor of 30

$$5 \times 6$$

30

(1)

- (c) a square number

$$6 \times 6 = 36$$

36

(1)

- (d) a prime number

17

(1)

- (e) two numbers whose sum is 84

$$76 + 8$$

76

and

8

(1)

(Total for Question 1 is 5 marks)



2 The students in class 7T were asked how they got to school one day.

Here is a list of their method of travel to school.

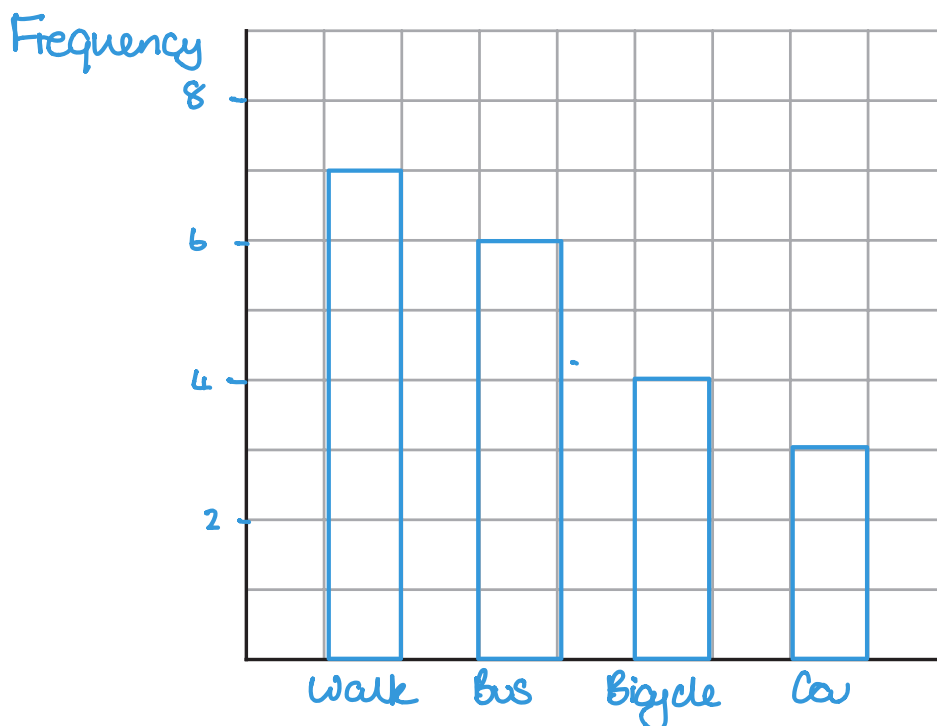
walk bus bicycle walk bus
 bicycle walk car bus bicycle
 bus bicycle bus car walk
 walk bus walk walk car

(a) Complete the frequency table for the methods of travel in the list.

Method of travel	Tally	Frequency
walk		7
bus		6
bicycle		4
car		3

(2)

(b) Draw a bar chart for the information in your table.



(3)

(Total for Question 2 is 5 marks)



3 The temperature in New York is -2°C

At the same time, the temperature in Rabat is 16°C higher than the temperature in New York.

(a) Work out the temperature in Rabat.

$$-2 + 16 = 14$$

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

Also, at the same time, the temperature in Helsinki is 17°C lower than the temperature in New York.

(b) Work out the temperature in Helsinki.

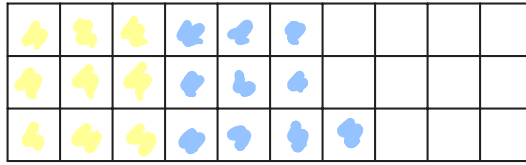
$$-2 - 17 = -19$$

.....-19..... $^{\circ}\text{C}$
(1)

(Total for Question 3 is 2 marks)



- 4 A rectangle is made from 30 small coloured square tiles.



There are yellow tiles, blue tiles and red tiles.

30% of the rectangle is made from yellow tiles.

$\frac{1}{3}$ of the rectangle is made from blue tiles.

The rest of the rectangle is made from red tiles.

- (a) Work out the number of red tiles.

$$\text{Yellow} = 30\% \quad 0.3 \times 30 = 9$$

$$\text{Blue} = \frac{1}{3} \quad 30 \div 3 = 10$$

$$\text{Red} = 30 - (10 + 9) = 11$$

11
(3)

- (b) Put the following numbers in order of size.
Start with the smallest number.

0.76

76%

25%

0.0766

7.66%

8%

0.026

2.6%

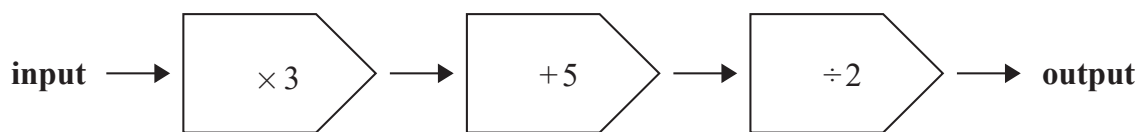
0.026 0.0766 8% 25% 0.76

(2)

(Total for Question 4 is 5 marks)



5 Here is a number machine.



(a) Work out the output when the input is 7

$$7 \times 3 = 21 \quad 21 + 5 = 26 \quad 26 \div 2 = 13$$

13

(1)

(b) Work out the input when the output is 160

$$160 \times 2 = 320 \quad 320 - 5 = 315 \quad 315 \div 3 = 105$$

105

(2)

When the input is n , the output is P .

(c) Find a formula for P in terms of n .

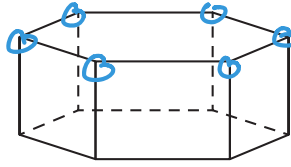
$$P = \frac{(3n + 5)}{2}$$

$$P = \frac{3n + 5}{2}$$

(Total for Question 5 is 5 marks)



6 The diagram shows a solid prism.



(a) How many vertices has the prism?

12

(1)

(b) How many faces has the prism?

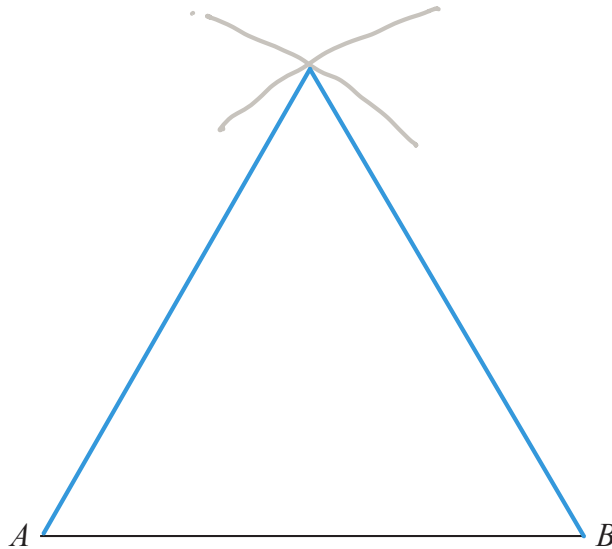
8

(1)

(c) Using ruler and compasses only, in the space below construct the equilateral triangle ABC with sides of length 7 cm.

You must show all your construction lines.

Side AB has already been drawn for you.



(2)

(Total for Question 6 is 4 marks)



7 (a) Simplify $p + p + p + p + p + p$

$$6p$$

(1)

(b) Simplify $5y^2 + 6y^2 - 3y^2$

$$8y^2$$

(1)

(c) Simplify $e \times e \times e \times e \times e$

$$e^5$$

(1)

(d) Simplify $5c \times 4d$

$$20cd$$

(1)

(e) Solve $x - 7 = 19$

$$\begin{aligned} x &= 19 + 7 \\ &= 26 \end{aligned}$$

$$x = 26$$

(1)

$$18^2 + 15^2 - 5^3 = 4n$$

(f) Work out the value of n .

$$424 = 4n$$

$$n = \frac{424}{4}$$

$$n = 106$$

(2)

(g) Factorise $9t - 6$

$$3t(3-2)$$

(1)

(Total for Question 7 is 8 marks)



- 8 Paolo has a bag of flour.
The flour in the bag has a weight of 3 kilograms.

Paolo makes 8 pies using the flour in the bag.

3 of the pies each need 150 grams of the flour.

5 of the pies each need 180 grams of the flour.

Work out the weight of flour that remains in the bag when Paolo has made these pies.
Give your answer in grams.

$$3000\text{g}$$
$$= 8 \text{ pies}$$

$$3 \times 150$$
$$= 450\text{g}$$

$$5 \times 180\text{g}$$
$$= 900\text{g}$$

$$\text{Total} = 450 + 900$$
$$= 1350$$

$$3000 - 1350$$

.....1650..... grams

(Total for Question 8 is 3 marks)

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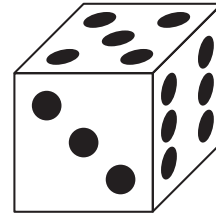
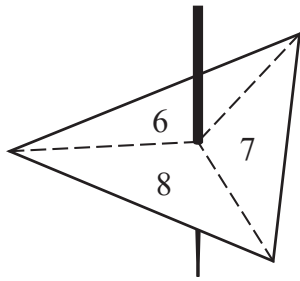
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- 9 Grace has a fair spinner and a fair dice.

The spinner is 3-sided and can land on 6, 7 or 8
The dice can land on 1, 2, 3, 4, 5 or 6



Grace spins the spinner once and throws the dice once.

Grace subtracts the number that the dice lands on from the number that the spinner lands on to get her score.

- (a) Complete the table to show all possible scores.
Eight of the scores have been done for you.

		Number on dice					
		1	2	3	4	5	6
Number on spinner	6	5	4	3	2	1	0
	7	6	5	4	3	2	1
	8	7	6	5	4	3	2

(2)

Grace spins the spinner once and throws the dice once.

- (b) Find the probability that her score is less than 6

$$\frac{15}{18}$$

(1)

- (c) Find the probability that her score is an odd number.

$$\frac{9}{18}$$

(1)

(Total for Question 9 is 4 marks)



10 The diagram shows a right-angled triangle.

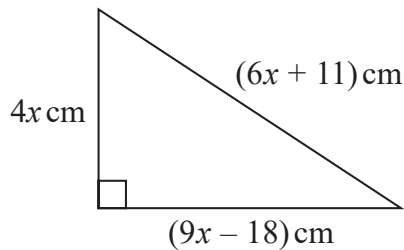


Diagram **NOT** accurately drawn

The perimeter of the triangle is 126 cm.

Work out the area of the triangle.

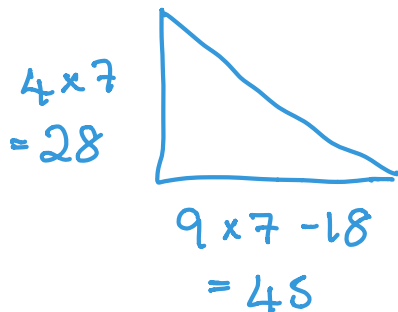
$$6x + 11 + 9x - 18 + 4x = 126$$

$$19x - 7 = 126$$

$$19x = 133$$

$$x = \frac{133}{19}$$

$$= 7$$



$$\text{Area} = \frac{1}{2} \times 45 \times 28$$
$$= 630$$

.....630..... cm^2

(Total for Question 10 is 4 marks)

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11

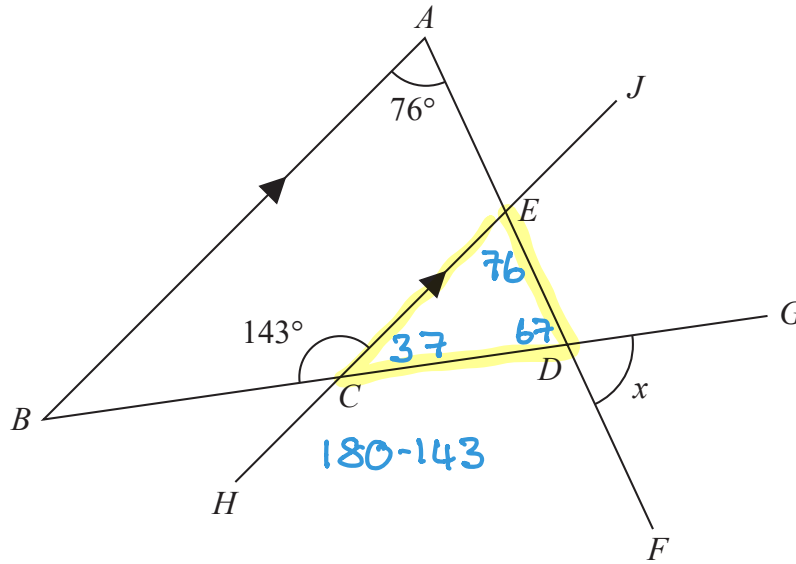


Diagram NOT accurately drawn

ABD is a triangle.

AEDF, *BCDG* and *HCEJ* are straight lines.

BA is parallel to *HCEJ*.

Work out the size of the angle marked *x*.

$$180 - (37 + 76) = 67$$

67

(Total for Question 11 is 3 marks)



P 6 6 2 9 9 A 0 1 3 2 8

12 Elvira and Anja go on holiday to Sweden and to Finland.

In Sweden, Elvira bought some trainers for 438 Swedish krona.

In Finland, Anja bought the same type of trainers for 44.39 euros.

1 Swedish krona = 0.12 dollars

1 dollar = 0.92 euros

Work out the difference in the cost of the trainers bought by Elvira and the trainers bought by Anja.

Give your answer in dollars.

Sweden

438 krona

Finland

44.39 euros

$$\begin{array}{l}
 1 \text{ krona} = 0.12 \text{ dollars} \\
 \times 438 \\
 \hline
 438 = \$52.56
 \end{array}$$

$$1 \text{ dollar} = 0.92 \text{ euros}$$

$$\begin{array}{l}
 44.39 \div 0.92 \\
 = \$48.25
 \end{array}$$

$$\text{Difference} = 52.56 - 48.25$$

..... 4.31 dollars

(Total for Question 12 is 4 marks)



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13 The diagram shows the positions of three villages, *R*, *T* and *W*.

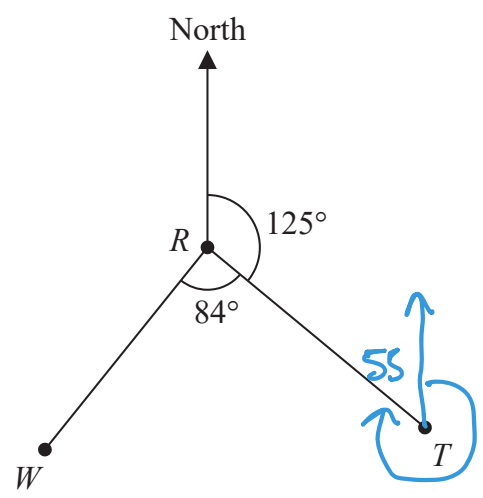


Diagram NOT accurately drawn

(a) Work out the bearing of village *W* from village *R*.

$$125 + 84 =$$

..... 209 °
 (1)

(b) Work out the bearing of village *R* from village *T*.

$$180 - 125 = 55$$

$$360 - 55$$

..... 305 °
 (2)

(Total for Question 13 is 3 marks)



14 The diagram shows a trapezium.

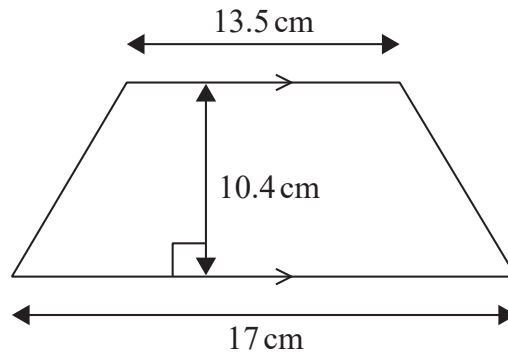


Diagram NOT accurately drawn

(a) Work out the area of the trapezium.

$$\frac{1}{2} (13.5 + 17) \times 10.4$$

..... 158.6 cm²
(2)

The diagram shows a cuboid.

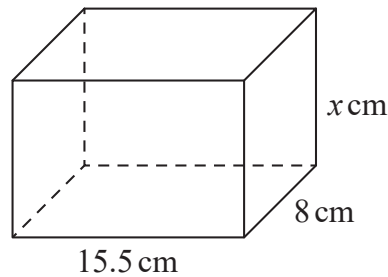


Diagram NOT accurately drawn

The volume of the cuboid is 806 cm³

(b) Work out the value of x .

$$15.5 \times 8 \times x = 806$$

$$x = \frac{806}{124}$$

$x =$ 6.5
(3)

(Total for Question 14 is 5 marks)

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- 15 A train takes 6 hours 39 minutes to travel from New Delhi to Kanpur.
The train travels a distance of 429 km.

Work out the average speed of the train.
Give your answer in km/h correct to one decimal place.

$$1 \text{ hour} = 20 \times 3 \text{ mins}$$

$$6 \text{ hours} = 120 \times 3 \text{ mins}$$

$$39 \text{ mins} = 13 \times 3 \text{ mins}$$

$$\underline{133}$$

$$\begin{array}{l} 429 \text{ km} = 6 \text{ hrs } 39 \text{ mins} \\ \div 133 \quad \downarrow 3.22\dots = 3 \text{ mins} \end{array} \quad \div 133$$

$$\begin{array}{l} \times 20 \quad \downarrow 64.511\dots = 60 \text{ mins} \\ \quad \quad \quad \uparrow \\ \quad \quad \quad (1 \text{ dp}) \end{array} \quad \times 20$$

$$\uparrow \\ (1 \text{ dp})$$

$$64.5$$

km/h

(Total for Question 15 is 3 marks)



16 Ava writes down five whole numbers.

For these five numbers

the median is 7 ✓

the mode is 8 ✓

the range is 5

Find a possible value for each of the five numbers that Ava writes down.

$$\begin{array}{cccccc} \underline{3} & \underline{\quad} & \underline{7} & \underline{8} & \underline{8} & \\ \uparrow & \uparrow & & & & \\ 8-5=3 & & & & & \\ & \text{could be } 4, 5 \text{ or } 6 & & & & \end{array}$$

3, 7, 8, 8 plus 4, 5 or 6

(Total for Question 16 is 3 marks)



17 Gladys buys a table for \$465 to sell in her shop.

She sells the table for \$520

- (a) Work out the percentage profit that Gladys makes from the sale of the table.
Give your answer correct to 3 significant figures.

$$\text{Profit} = 520 - 465 = 55$$

$$\% = \frac{55}{465} \times 100$$

$$= 11.8279\dots$$

↑
(3sf.)

..... 11.8 %
(3)

Gladys has a sale in her shop.

She decreases all the normal prices by 12%
The normal price of an armchair was \$550

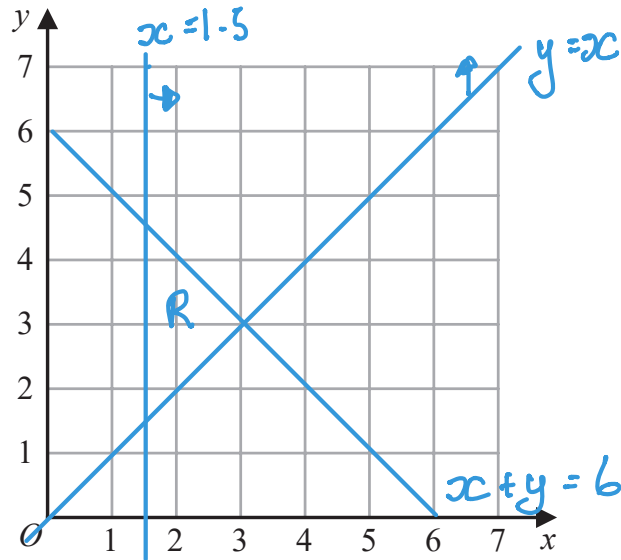
- (b) Work out the sale price of the armchair.

$$550 \times 0.88$$

\$ 484
(3)

(Total for Question 17 is 6 marks)





(a) On the grid, draw and **label** the straight line with equation

(i) $x = 1.5$

(ii) $y = x$

(iii) $x + y = 6$

(3)

(b) Show, by shading on the grid, the region that satisfies **all three** of the inequalities

$x \geq 1.5$ $y \geq x$ $x + y \leq 6$

Label the region **R**.

(1)

(Total for Question 18 is 4 marks)



19 (a) Expand and simplify $4x(2x + 5) - 3x(2x - 3)$

$$8x^2 + 20x - 6x^2 + 9x$$

$$2x^2 + 29x$$

$$\underline{2x^2 + 29x}$$

(2)

Given that $\frac{y^5 \times y^n}{y^6} = y^{13}$

(b) work out the value of n .

$$(5+n) - 6 = 13$$

$$5+n = 19$$

$$n = 14$$

$$n = \underline{14}$$

(2)

(c) (i) Solve the inequality $7t - 8 < 2t + 7$

$$5t - 8 < 7$$

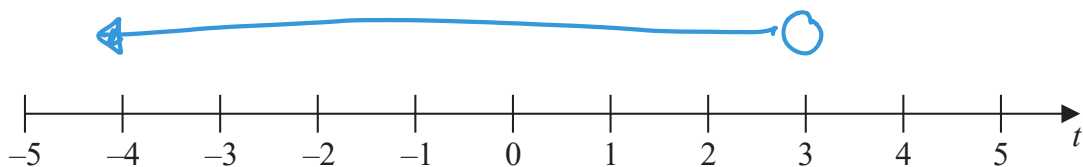
$$5t < 15$$

$$t < 3$$

$$\underline{t < 3}$$

(2)

(ii) On the number line below, represent the solution set of the inequality solved in part (c)(i)



(1)

(Total for Question 19 is 7 marks)



20 (a) Write down the value of y^0

1

(1)

(b) Work out $\frac{9.6 \times 10^{141} + 6.4 \times 10^{140}}{3.2 \times 10^{16}}$

Give your answer in standard form.

$$\begin{array}{r} 9.6 \times 10^{141} \\ 0.64 \times 10^{141} \\ \hline 10.24 \times 10^{141} \end{array}$$

$$\begin{array}{r} \downarrow \\ 6.4 \times 10^{140} \uparrow \\ 0.64 \times 10^{141} \end{array}$$

$$\begin{array}{r} \downarrow \\ 10.24 \times 10^{141} \uparrow \\ 1.024 \times 10^{142} \end{array}$$

$$\begin{array}{r} 1.024 \times 10^{142} \\ \hline 3.2 \times 10^{16} \end{array} = 0.32 \times 10^{126}$$

$$= 3.2 \times 10^{125}$$

$$\underline{3.2 \times 10^{125}}$$

(3)

(Total for Question 20 is 4 marks)

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- 21 There are 5 cocoa pods in a bag.
The mean weight of the 5 cocoa pods is 398 grams.

A sixth cocoa pod is put into the bag.
The mean weight of the 6 cocoa pods is 401 grams.

Work out the weight of the sixth cocoa pod that is put into the bag.

$$\begin{array}{l} 5 \text{ pods} \quad \text{mean} = 398 \text{ g} \\ \text{total} = 5 \times 398 \\ = 1990 \text{ g} \end{array}$$

$$\begin{array}{l} 6 \text{ pods} \quad \text{mean} = 401 \text{ g} \\ \text{total} = 6 \times 401 \\ = 2406 \text{ g} \end{array}$$

$$\begin{array}{l} 6\text{th pod} = 2406 - 1990 \\ = 416 \end{array}$$

..... 416 grams

(Total for Question 21 is 3 marks)



22 A , B and C are points on a circle with centre O .

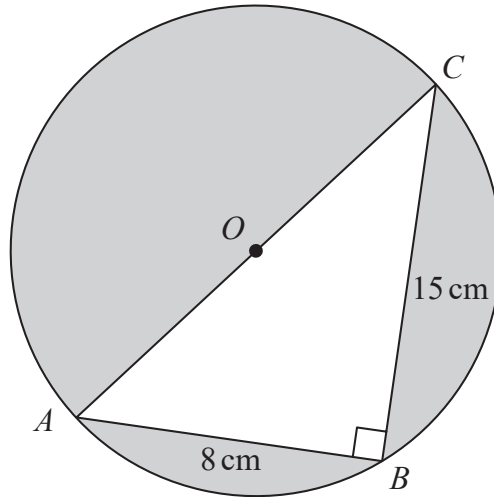


Diagram **NOT** accurately drawn

AOC is a diameter of the circle.

$AB = 8 \text{ cm}$ $BC = 15 \text{ cm}$

Angle $ABC = 90^\circ$

Work out the total area of the regions shown shaded in the diagram.
Give your answer correct to 3 significant figures.

$$AC^2 = 15^2 + 8^2 = 225 + 64 = 289$$

$$AC = \sqrt{289} = 17$$

$$\text{diameter} = 17 \quad \text{so radius} = 8.5$$

$$\begin{aligned} \text{Area of circle} &= \pi \times 8.5^2 \\ &= 226.9800\dots \end{aligned}$$

$$\text{Area of triangle} = \frac{1}{2} \times 8 \times 15 = 60$$

$$\begin{aligned} \text{Shaded area} &= 226.9800\dots - 60 \\ &= 166.98 \\ &\quad \uparrow \\ &\quad (3\text{sf}) \end{aligned}$$

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.....167..... cm²

(Total for Question 22 is 5 marks)

23

$$A = 2^3 \times 3^2 \times 5^2 \times 11$$

$$B = 2^4 \times 3 \times 5^4 \times 13$$

Find the lowest common multiple (LCM) of A and B .

Give your answer as a product of powers of prime numbers.

$$A = 2^3 \times 3^2 \times 5^2 \times 11$$

$$B = 2^4 \times 3 \times 5^4 \times 13$$

$$\text{LCM} = 2^4 \times 3^2 \times 5^4 \times 11 \times 13$$

$$2^4 \times 3^2 \times 5^4 \times 11 \times 13$$

(Total for Question 23 is 2 marks)



24 The people working for a company work in Team A or in Team B.

number of people in Team A : number of people in Team B = 3 : 4

$\frac{4}{5}$ of Team A work full time.

24% of Team B work full time.

Work out what fraction of the people working for the company work full time.

Give your fraction in its simplest form.

$$\begin{array}{ccc} & A & B \\ & 3 & 4 \\ \text{so} & \frac{3}{7} & \frac{4}{7} \end{array}$$

FULL
TIME :-

$$\frac{4}{5}$$

$$24\% \text{ so } \frac{24}{100} = \frac{12}{50} = \frac{6}{25}$$

$$\underline{\text{ALL}} \quad \frac{4}{5} \text{ of } \frac{3}{7} \quad + \quad \frac{6}{25} \text{ of } \frac{4}{7}$$

$$= \frac{4}{5} \times \frac{3}{7} \quad + \quad \frac{6}{25} \times \frac{4}{7}$$

$$= \frac{12}{35} \quad + \quad \frac{24}{175}$$

$$= \frac{12}{25}$$

$$\frac{12}{25}$$

(Total for Question 24 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS

