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.

9 11 25 27 33 40

(a) From the numbers in the list, write down

(i) an even number

40

(1)

(ii) a cube number

1 8 27

27

(1)

Here are the temperatures, in °C, in Paris at midnight for one week.

−3 −7 −2 −6 −9 −1 −5

(b) Write down the lowest temperature.

-9 °C

(1)

(c) Find the square root of 441

21

(1)

Hassan says,

"the sum of two prime numbers is always even"

(d) Give an example to show that Hassan is **not** correct.

2 + 3 = 5 5 is odd.

(1)

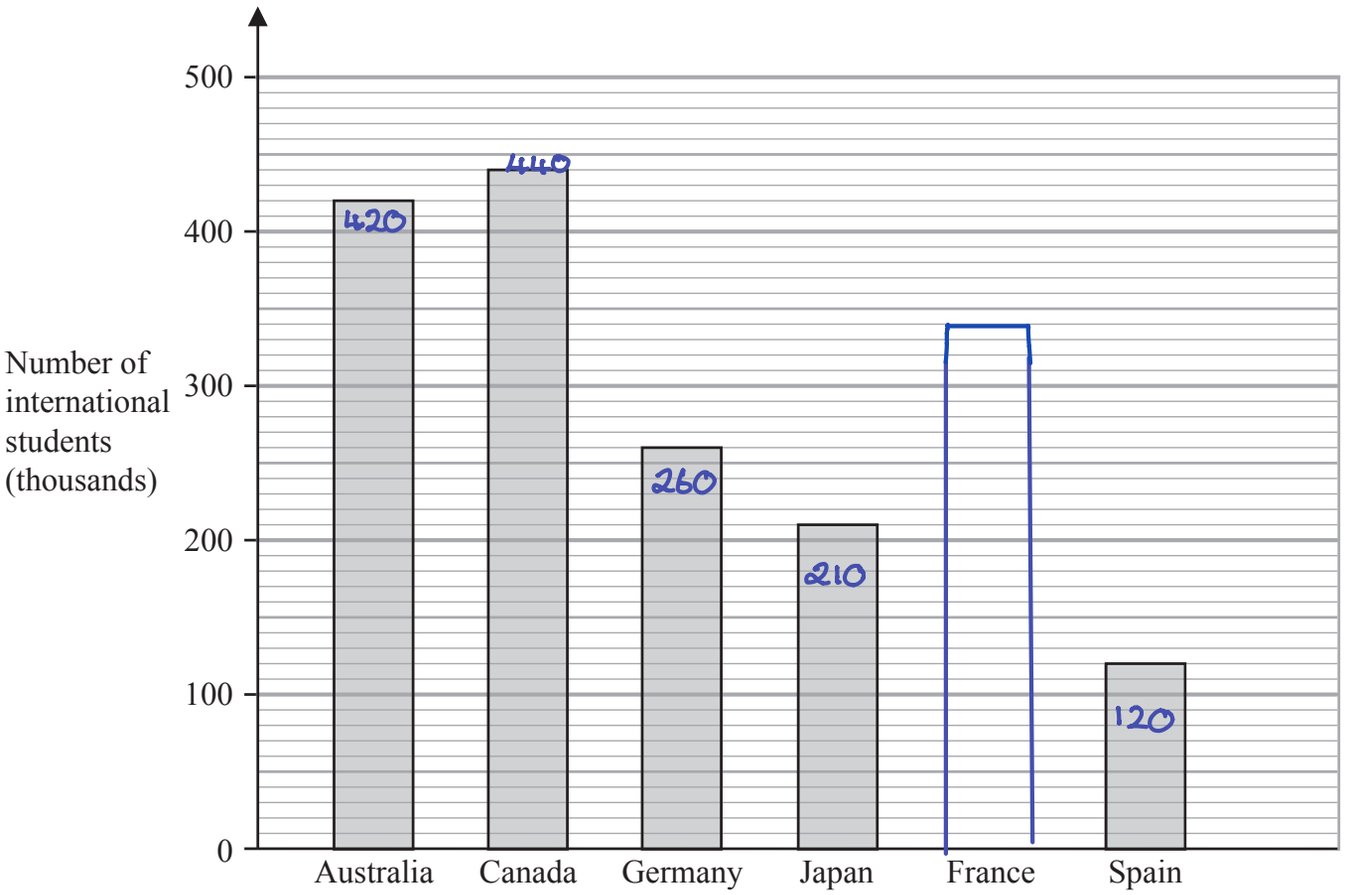
(Total for Question 1 is 5 marks)

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2 The bar chart shows information about the number of international students who studied in each of five countries in 2019



(a) In which of these five countries did the greatest number of international students study?

Canada

(1)

(b) Write down the number of international students who studied in Australia.

420 thousand

(1)

210

The number of international students who studied in Japan was more than the number of international students who studied in Spain.

120

(c) How many more?

210 - 120

90 thousand

(1)

In 2019, the number of international students who studied in France was 340 thousand.

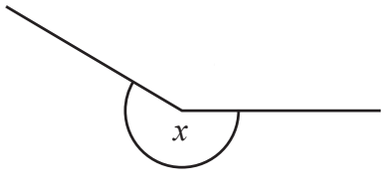
(d) Draw a bar on the bar chart to show this information. ✓

(1)

(Total for Question 2 is 4 marks)

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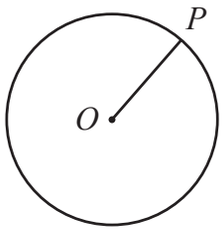
3 (a)



Write down the mathematical name of the angle marked x

reflex

(1)



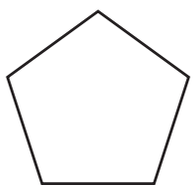
P is a point on a circle with centre O

(b) Write down the mathematical name of the line OP

radius

(1)

Here is a polygon.

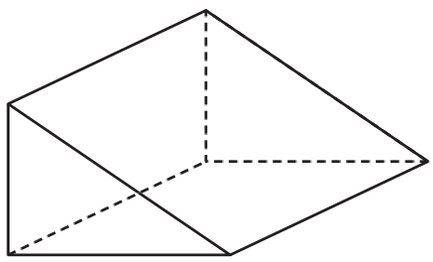


(c) Write down the mathematical name of this polygon.

pentagon

(1)

Here is a solid prism.



(d) Write down the number of edges of this solid prism.

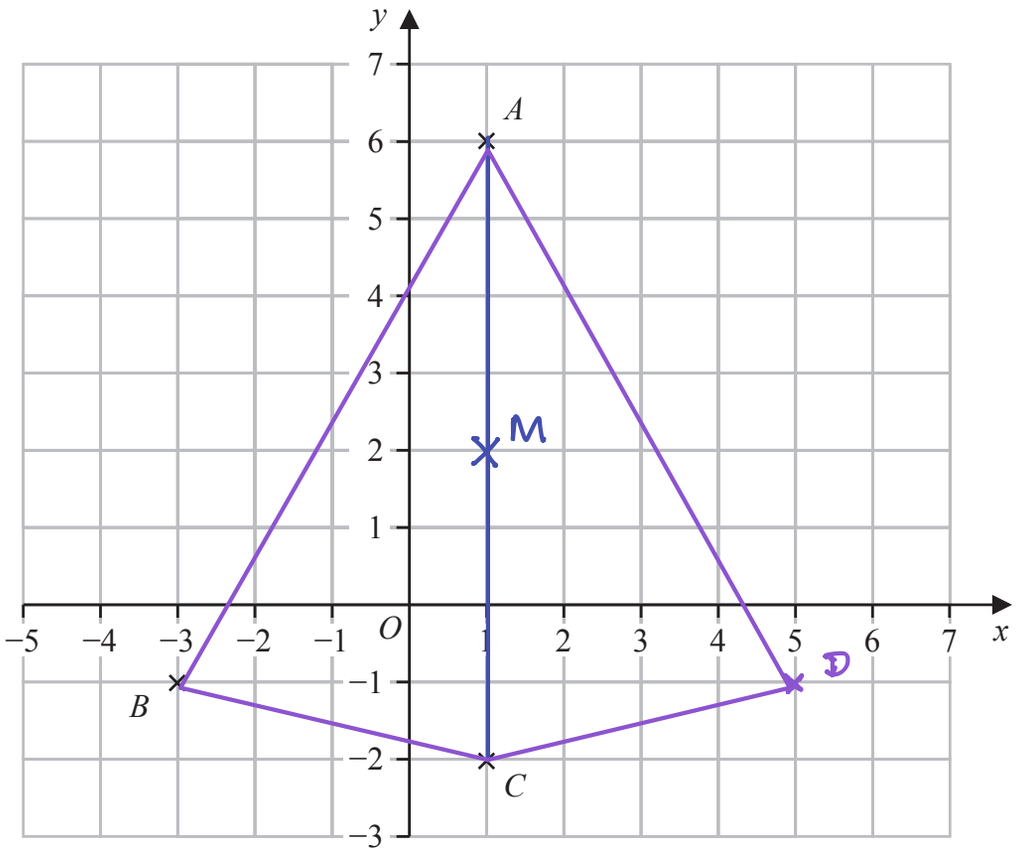
9

(1)

(Total for Question 3 is 4 marks)

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4 The diagram shows three points, A, B and C, marked on a grid.



(a) Write down the coordinates of point A

(1 , 6)

(1)

(b) Write down the coordinates of point B

(-3 , -1)

(1)

M is the midpoint of the line AC

(c) On the grid, mark with a cross (×) the point M
Label the point M

(1)

The point D is such that the shape $ABCD$ is a kite.

(d) On the grid, mark with a cross (×) the point D
Label the point D

(1)

(e) How many lines of symmetry has kite $ABCD$?

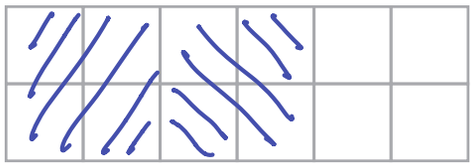
1

(1)

(Total for Question 4 is 5 marks)

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5 Here is a shape made of squares.



(a) Shade $\frac{2}{3}$ of the shape.

(1)

(b) Write $\frac{3}{10}$ as a percentage.

30 %

(1)

(c) Write $\frac{48}{150}$ as a fraction in its simplest form.

$\frac{8}{25}$

(1)

(d) Write $\frac{46}{7}$ as a mixed number.

$6\frac{4}{7}$

(1)

(Total for Question 5 is 4 marks)

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6 Akbar goes to a restaurant with his friends.
They have a total of 1000 dirhams to spend on food.

They order

2 dishes of chicken makhani at 145.50 dirhams each
3 dishes of vegetable korma at 110 dirhams each
some naans at 30 dirhams each

They order as many naans as they can.

They pay with a 1000 dirham note.

Work out how much change they should receive.

$2 \times 145.50 = 291$
$3 \times 110 = 330$
621

$1000 - 621 = 379$

$379 \div 30 = 12.6\dot{3}$
so 12 naans

$12 \times 30 = 360$

$379 - 360 = 19$

19 dirhams

(Total for Question 6 is 4 marks)

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7 (a) Simplify $9d \times 5c$

45cd

(1)

(b) Simplify $7p + 5n - 9p + 3n$

$7p - 9p + 5n + 3n$

$-2p + 8n$

$-2p + 8n$

(2)

$T = 8e - 6f$

(c) Work out the value of T when $e = 9$ and $f = 5$

$T = 8 \times 9 - 6 \times 5$

$= 72 - 30$

$T =$ 42

(2)

(d) Solve $5m - 6 = 17$

$5m - 6 = 17$

$+6 \quad +6$

$5m = 23$

$m = \frac{23}{5}$

$m =$ 4·6 $\left(\frac{23}{5}\right)$

(2)

(Total for Question 7 is 7 marks)

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8 There are four teams in a cricket competition.

The teams are

Australia (*A*)	England (*E*)	Pakistan (*P*)	West Indies (*W*)

Each team will play every other team once.

Write down all the matches that will take place.

AE EP PW

AP EW

AW

(Total for Question 8 is 2 marks)

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9 The diagram shows two triangles ABE and ECD

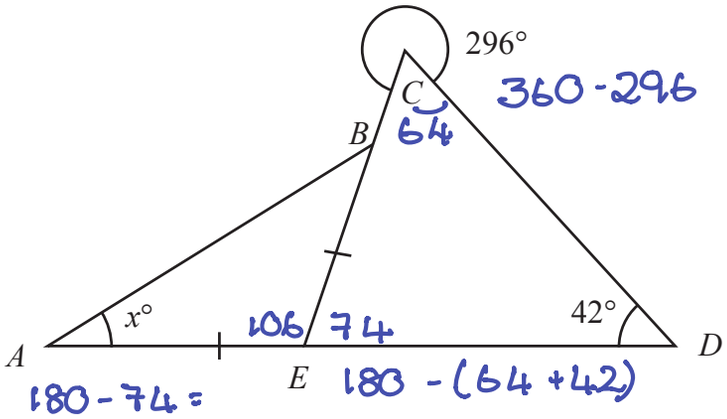


Diagram **NOT** accurately drawn

Triangle ABE is isosceles with $AE = EB$
AED and EBC are straight lines.

Angle $CDE = 42°$
The reflex angle $ECD = 296°$
Angle $BAE = x°$

180 - 106 = 74
74 ÷ 2 = 37

Work out the value of x

$x =$ 37

(Total for Question 9 is 4 marks)

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10 The table gives information about the number of rewards gained by each of 50 students last term.

Number of rewards	Frequency	
0	3	0
1	9	9
2	15	30
3	18	54
4	4	16
5	1	5
	50	114

(a) Write down the mode of the number of rewards.

3

(1)

(b) Work out the mean number of rewards.

114 ÷ 50 = 2.28

2.28

(3)

One of these students is chosen at random.

(c) Find the probability that this student gained more than 2 rewards.

18 + 4 + 1 = 23

$\frac{23}{50}$

(2)

(Total for Question 10 is 6 marks)

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11 A rental company has 360 cars and some vans.

← read this carefully!

The ratio of the number of cars to the number of vans is 3 : 5

$\frac{4}{9}$ of the cars are electric.

36% of the vans are electric.

The company has more electric vans than electric cars.

Work out how many more.
Show your working clearly.

cars : vans

360

x120 ↑ 3 : 5

x120

360 : 600

1

$\frac{4}{9} \times 360$ 36% 0.36×600

$= 160$ $= 216$

$216 - 160$

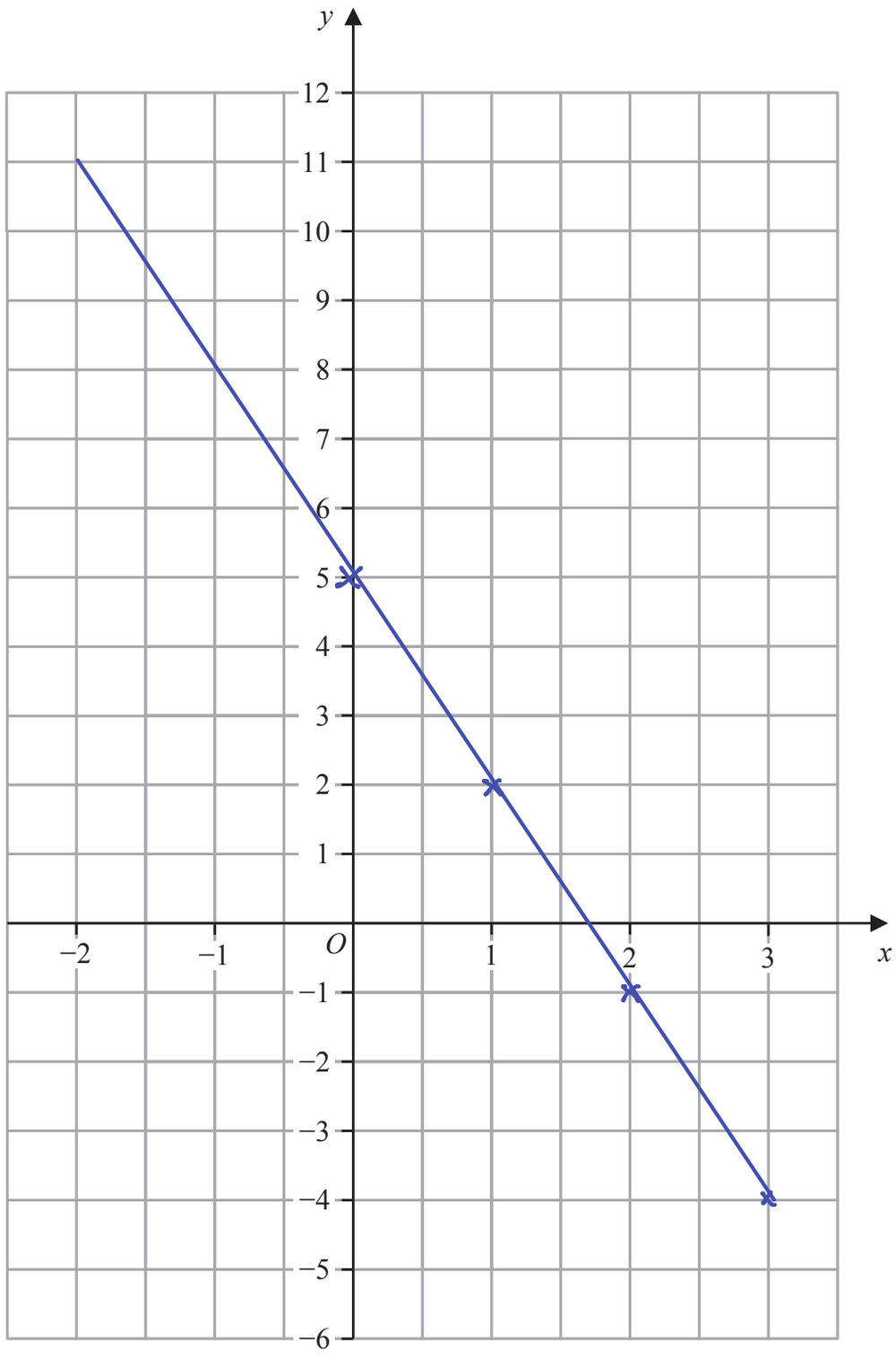
56

(Total for Question 11 is 5 marks)

12 On the grid below, draw the graph of $y = 5 - 3x$ for values of x from -2 to 3

$x = 0 \quad y = 5 \qquad (0, 5)$

$x = 1 \quad y = 5 - 3 \qquad (1, 2)$
$\quad\quad\;\; = 2$



(Total for Question 12 is 3 marks)

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13 A wheel on a tractor has a diameter of 160 cm. = 1·6

The tractor travels 1750 metres.

Work out the number of complete turns made by the wheel.
Show your working clearly.

C = π × 1·6

= 5·02... metres

1750 ÷ 5·02...

= 348·15...

so 348

348

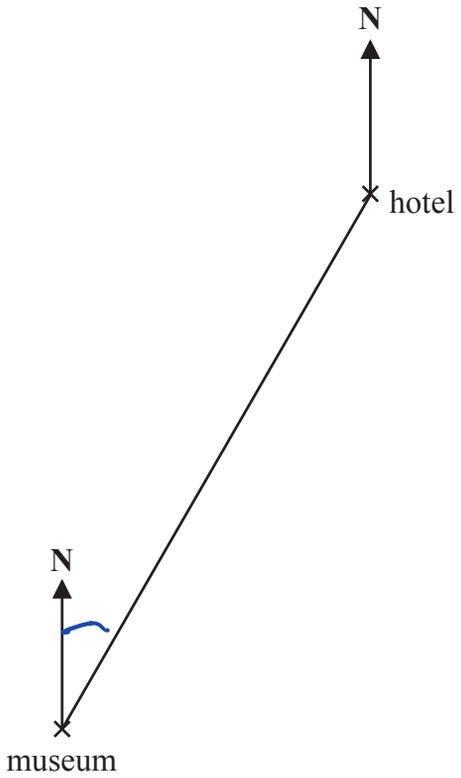
(Total for Question 13 is 4 marks)

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14 Here is an accurate scale drawing showing the positions of a hotel and a museum.



Scale: 1 cm represents 4.5 km

(a) Find, by measuring, the bearing of the hotel from the museum.

030 .....°

allow 28 - 32 **(1)**

(b) Work out the real distance between the hotel and the museum.

8 x 4·5

36 ..... km

allow 35 - 37 **(2)**

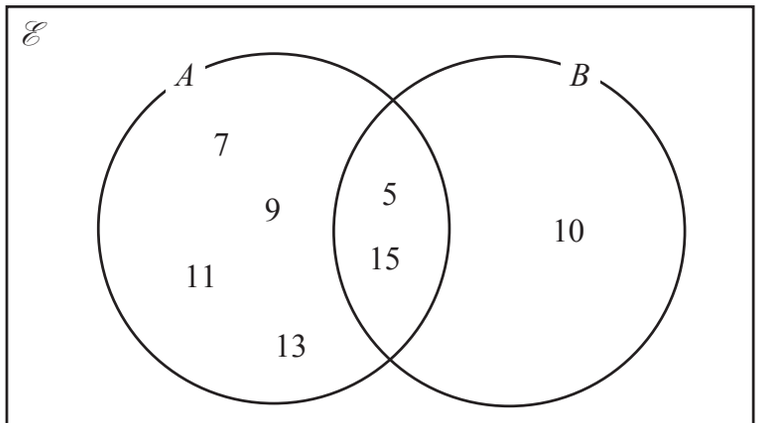
(Total for Question 14 is 3 marks)

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15 Here is a Venn diagram.



List the members of the set

(a) A

5, 7, 9, 11, 13, 15

(1)

(b) $A \cap B$

5, 15

(1)

(c) $(A \cup B)'$

6, 8, 12, 14, 16

(1)

(Total for Question 15 is 3 marks)

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16 (a) Factorise fully $12pq - 18p$

$6p(2q - 3)$

(2)

There are 56 metal bars in a box.
Each metal bar is gold or silver or zinc.

y metal bars are gold.
$(3y + 7)$ metal bars are silver.
$(2y - 5)$ metal bars are zinc.

(b) Work out the number of metal bars that are zinc.
Show clear algebraic working.

$y + 3y + 7 + 2y - 5 = 56$

$6y + 2 = 56$

$6y = 54$

$y = 9$

gold = 9

silver = $27 + 7 = 34$

zinc = $18 - 5 = 13$

check $9 + 34 + 13 = 56$

13

(4)

(Total for Question 16 is 6 marks)

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17 Joshua buys a car for $12 500

He sells the car to Nina.

Nina pays

- a deposit of $1500
- followed by 36 monthly payments of $450

Work out Joshua's percentage profit.

Nina

$1500 + 36 \times 450 = 17700$

Profit $= 17700 - 12500 = 5200$

$\% = \frac{5200}{12500} \times 100$

$= 41.6$

41.6 %

(Total for Question 17 is 4 marks)

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18 A biased spinner has three sections each of a different colour.

The table shows the probability that, when the spinner is spun once, it will land on blue or on orange or on white.

Colour	blue	orange	white
Probability	0.58	$2x$	x

(a) Work out the value of x

$1 - 0.58 = 0.42$

$0.42 \div 3 = 0.14$

$x =$ 0.14

(2)

The spinner is spun 250 times.

(b) Work out an estimate for the number of times the spinner will land on blue.

250×0.58

$= 145$

145

(2)

(Total for Question 18 is 4 marks)

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19 The diagram shows a shaded shape made from three identical semicircles, ***X***, ***Y*** and ***Z***

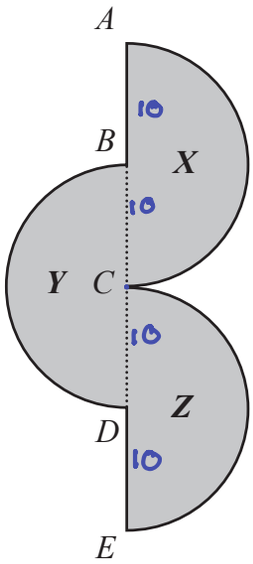


Diagram **NOT** accurately drawn

ABCDE is a straight line.

AC is the diameter of semicircle ***X*** and *B* is the centre of semicircle ***X***
BD is the diameter of semicircle ***Y*** and *C* is the centre of semicircle ***Y***
CE is the diameter of semicircle ***Z*** and *D* is the centre of semicircle ***Z***

AC = *BD* = *CE* = 20 cm

Work out the perimeter of the shaded shape.
Give your answer correct to the nearest whole number.

1 and ½ circles + 10 + 10

1.5 × π × 20 + 20

= 114.247...

114 cm

(Total for Question 19 is 3 marks)

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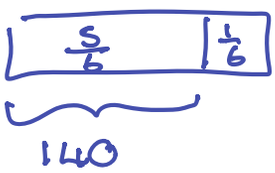
20 Juan wants to buy a ticket to fly from Madrid to Berlin.

He finds two different types of ticket he can buy in a sale, ticket **A** and ticket **B**

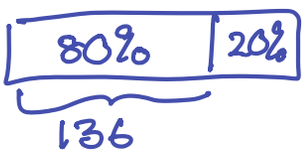
ticket **A**	ticket **B**
$\frac{1}{6}$ off normal price	20% off normal price

The sale price of ticket **A** is 140 euros.
The sale price of ticket **B** is 136 euros.

Work out the difference between the normal price of ticket **A** and the normal price of ticket **B**



$\frac{5}{6} = 140$
$\div 5$
$\frac{1}{6} = 28$
$\times 6$
$\frac{6}{6} = 168$



80% = 136
÷80
1% = 1.7
×100
100% = 170

Difference = 170 − 168

2 ..... euros

(Total for Question 20 is 4 marks)

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21 $A = 5^3 \times 7^3 \times 11^6$ and $B = 5^6 \times 7^2 \times 11^4$

Find the highest common factor (HCF) of A and B
Give your answer as a product of powers of its prime factors.

$A = 5^3 \times 7^3 \times 11^6$

$B = 5^6 \times 7^2 \times 11^4$

HCF $= 5^3 \times 7^2 \times 11^4$

$5^3 \times 7^2 \times 11^4$

(Total for Question 21 is 2 marks)

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22 (a) Solve the inequality $8x - 4 \geqslant 3x - 10$

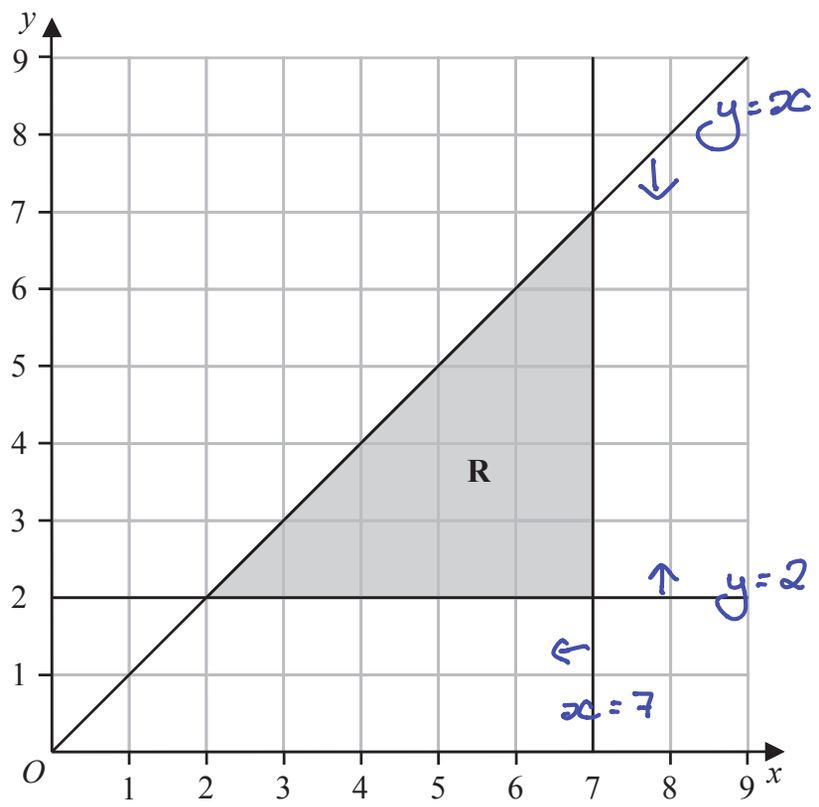
$5x \geqslant -6$

$x \geqslant \frac{-6}{5}$

$x \geqslant -1.2$

(2)

The region **R**, shown shaded in the diagram, is bounded by three straight lines.



(b) Write down the three inequalities that define the region **R**

$y \geqslant 2$

$x \leqslant 7$

$y \leqslant x$

(3)

(Total for Question 22 is 5 marks)

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23 (a) Write 5.87×10^{-4} as an ordinary number.

0·000587

(1)

(b) Write 84 000 000 in standard form.

$8 \cdot 4 \times 10^{7}$

(1)

The number of neurons in a human brain is 8.5×10^{10}
The number of neurons in a monkey brain is 1.47×10^{9}

The number of neurons in a human brain is K × the number of neurons in a monkey brain.

(c) Work out the value of K
Give your answer correct to one decimal place.

$8 \cdot 5 \times 10^{10} = K \times 1 \cdot 47 \times 10^{9}$

$K = \dfrac{8 \cdot 5 \times 10^{10}}{1 \cdot 47 \times 10^{9}}$

$= 57 \cdot 823\ldots$

$K =$ 57·8

(2)

(Total for Question 23 is 4 marks)

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24 Here is triangle ABC

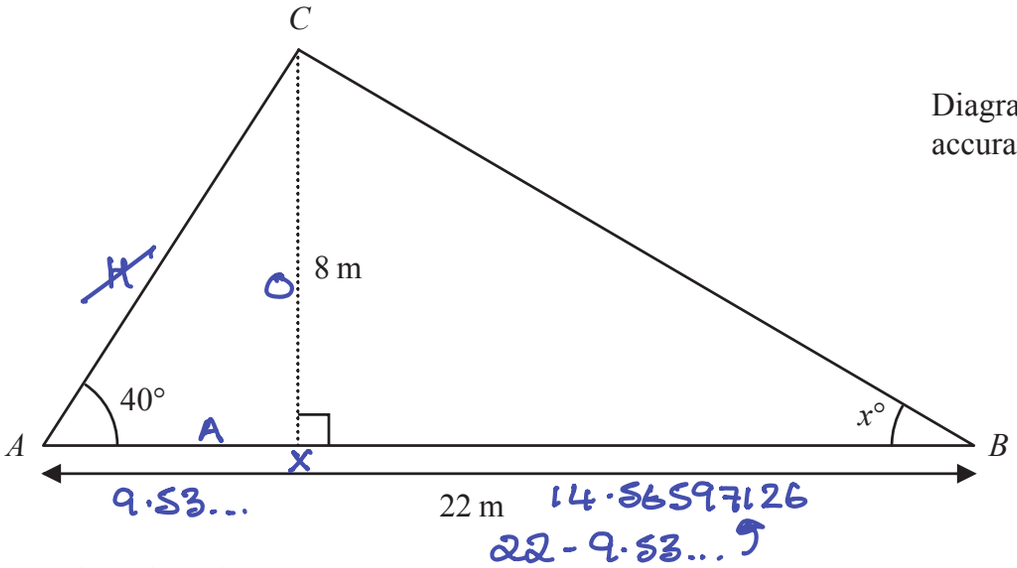


Diagram **NOT** accurately drawn

Work out the value of x
Give your answer correct to one decimal place.
Show your working clearly.

$\triangle ACX$ $\quad \tan 40 = \frac{8}{AX}$

$AX = \frac{8}{\tan 40} = 9.5340...$

$\triangle CBX$ $\quad \tan x = \frac{8}{14.565..}$

$x = \tan^{-1} \frac{8}{14.565..}$

$= 32.690..$

$x =$ 32.7

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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