Cambridge Assessment International Education

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MATHEMATICS **0580/32**

Paper 3 (Core) **May/June 2021**

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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1 Alex is building a house.

The materials cost $1\frac{1}{2}$ times the cost of the land.

The wages cost $1\frac{1}{4}$ times the cost of the land.

(a) Show that the ratio of costs, in its simplest form, is land : materials : wages = 4 : 6 : 5.

View solution

[2]

(b) The wages cost \$47 500.

Show that the total cost of land, materials and wages is \$142 500.

View solution

[2]

(c) Work out the cost of

(i) the land,

View solution

\$ ..... [2]

(ii) the materials.

View solution

\$ ..... [1]

(d) Alex borrows $28 000 for 6 years at a rate of 5.5% per year compound interest.

View solution

Calculate the amount he repays at the end of the 6 years.
Give your answer correct to the nearest dollar.

$ ..... [3]

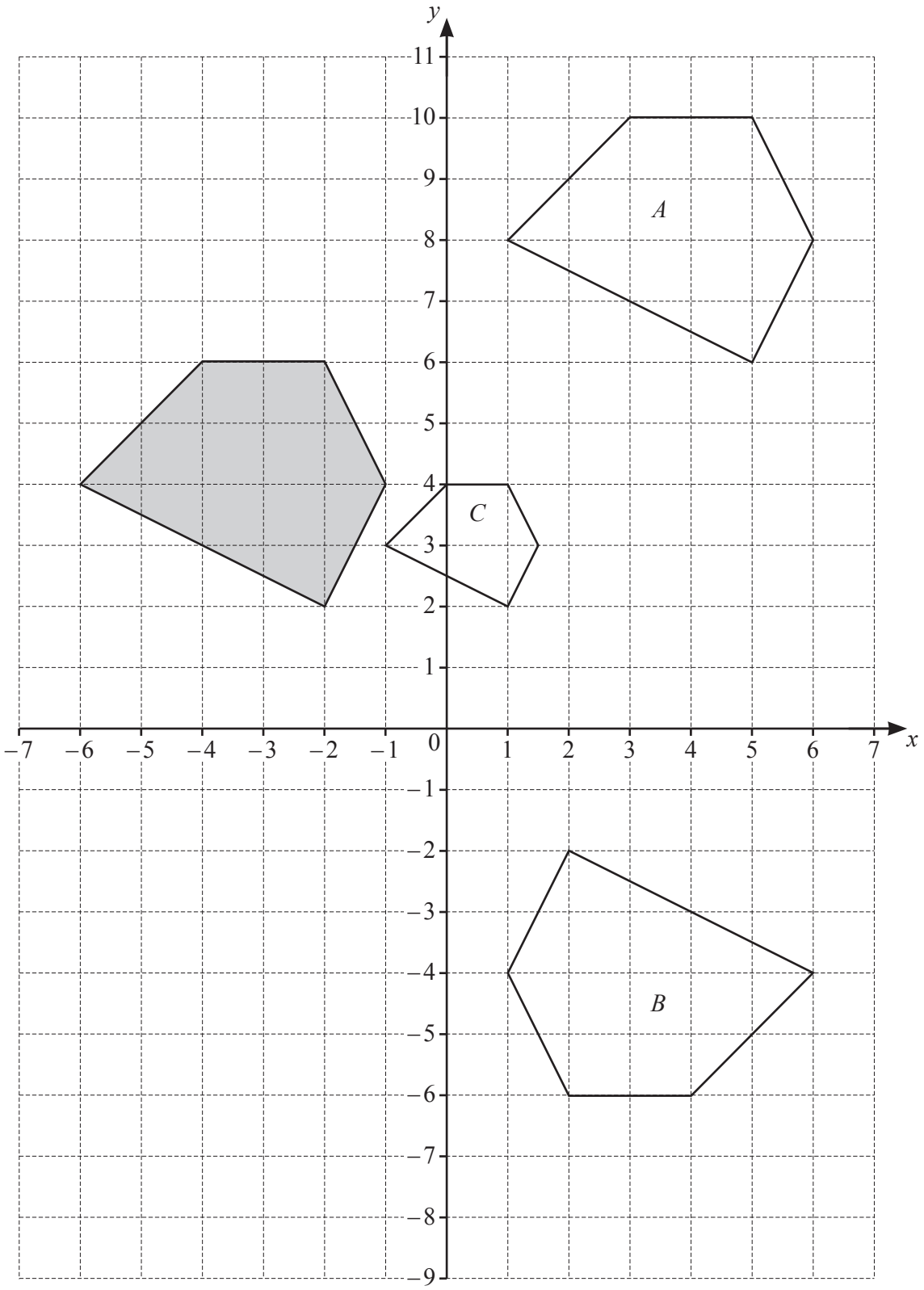
(e) When Alex sells the house, he makes a profit of 27% on the $142 500.

View solution

Calculate the selling price of the house.

$ ..... [2]

2 The diagram shows four polygons on a 1 cm^2 grid.



(a) Write down the mathematical name of the shaded polygon.

View solution

..... [1]

(b) Find the area of the shaded polygon.

View solution

..... cm^2 [2]

(c) Describe fully the **single** transformation that maps

View solution

(i) the shaded polygon onto polygon *A*,

.....

..... [2]

(ii) the shaded polygon onto polygon *B*,

View solution

.....

..... [3]

(iii) the shaded polygon onto polygon *C*.

View solution

.....

..... [3]

(d) On the grid, draw the image of the shaded polygon after a reflection in the line $y = 0$. [2]

View solution

3 Pierre travels from his home in Lyon to Singapore.

View solution

(a) He travels by train from Lyon to Paris.
The train leaves Lyon at 9.05 am and arrives in Paris at 1.30 pm.

(i) Write 1.30 pm in the 24-hour clock system.

..... [1]

View solution

(ii) Work out, in hours and minutes, the time the train journey takes.

..... h ..... min [1]

(b) He then travels by plane from Paris to Singapore.
The plane leaves Paris at 1635 on Thursday and arrives in Singapore 13 hours and 45 minutes later.
The local time in Singapore is 6 hours ahead of the local time in Paris.

View solution

Work out the day and time in Singapore when the plane arrives.

Day ..... Time ..... [3]

View solution

(c) The distance from Paris to Singapore is 10 736 kilometres.

Work out the average speed of the plane.

..... km/h [2]

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(d) Pierre buys a watch for 400 Singapore dollars.
The exchange rate is 1 Singapore dollar = 0.658 euros.

View solution

Work out the cost of the watch in euros.

..... euros [1]

(e) Pierre stays at a hotel in Singapore for 5 nights.
The cost per night of the room is $170.
His total hotel bill is $975.40 .

View solution

Calculate how much Pierre spends on other hotel items.

$ ..... [2]

4 **(a)** Put a ring around the fraction that is equivalent to $\frac{7}{12}$.

View solution

$\frac{35}{62}$ $\frac{20}{36}$ $\frac{49}{84}$ $\frac{82}{144}$ $\frac{64}{110}$

[1]

(b) Write these numbers in order, starting with the smallest.

View solution

$\frac{7}{12}$ 0.6 58% $\frac{8}{13}$ $\frac{2}{3}$

..... < ..... < ..... < ..... < ..... [2]

smallest

(c) Write 0.724 as a fraction in its simplest form.

View solution

..... [1]

(d) The mass, m grams, of a ball is 415 g, correct to the nearest 5 grams.

View solution

Complete the statement about the value of m.

..... $\leqslant m <$ ..... [2]

(e) Ruth uses three-quarters of a bag of flour to make one cake.

View solution

Work out the number of bags of flour she needs to buy to make 7 cakes.

..... [3]

(f) A tin of soup costs \$$t$ and a packet of biscuits costs \$$p$.

View solution

(i) 3 tins of soup and 2 packets of biscuits cost \$15.50 .

Complete the equation.

$3t + 2p =$ ..... [1]

View solution

(ii) 5 tins of soup and 4 packets of biscuits cost \$28.50 .

Write down another equation in terms of t and p.

..... [1]

View solution

(iii) Solve the two simultaneous equations.
You must show all your working.

$t =$ .....

$p =$ ..... [3]

5 **(a)** Complete the table of values for $y = \frac{18}{x}$.

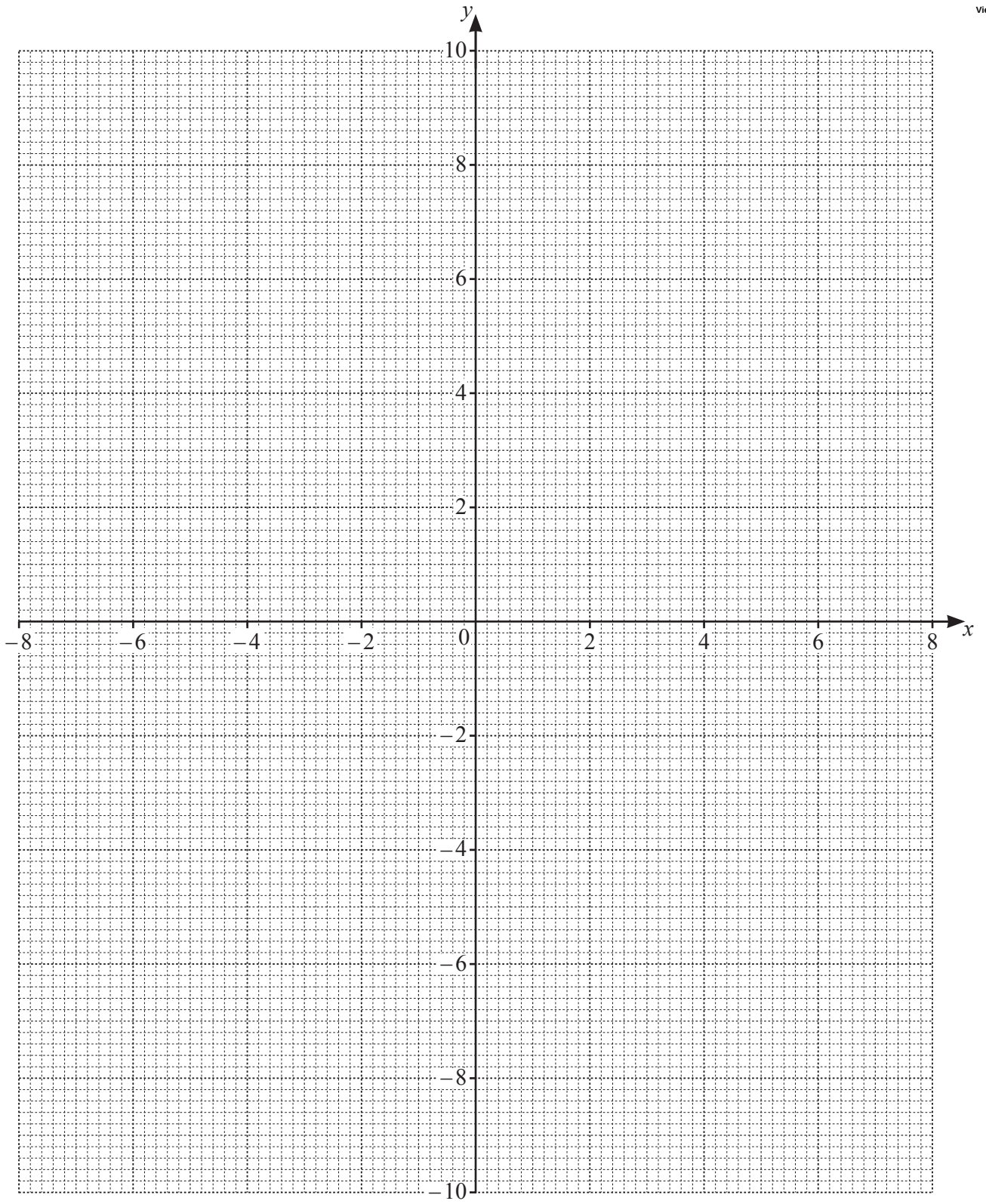
View solution

x	-8	-6	-4	-3	-2		2	3	4	6	8
y		-3		-6				6		3	

[3]

(b) On the grid, draw the graph of $y = \frac{18}{x}$ for $-8 \leqslant x \leqslant -2$ and $2 \leqslant x \leqslant 8$.

View solution



[4]

(c) Write down the order of rotational symmetry of the graph.

View solution

..... [1]

(d) **(i)** On the grid, plot and join the points $(-8, -3)$ and $(6, 4)$. [2]

(ii) Write down the values of x where this line intersects the graph of $y = \frac{18}{x}$.

View solution

$x =$ ..... and $x =$ ..... [2]

(iii) Find the equation of this line in the form $y = mx + c$.

$y =$ ..... [2]

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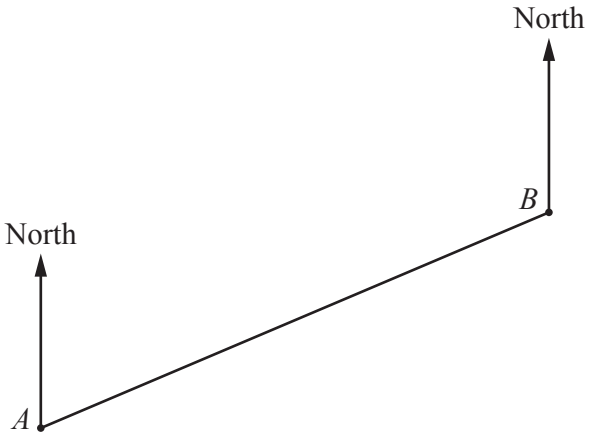
6 **(a)** The scale drawing shows the positions of house A and house B.
The scale is 1 centimetre represents 12 metres.

View solution



Scale: 1 cm to 12 m

(i) Work out the actual distance, in metres, from house A to house B.

..... m [2]

(ii) Measure the bearing of house A from house B.

View solution

..... [1]

(iii) Another house, C, is 102 metres from house B on a bearing of 157°.

On the scale drawing, mark the position of house C.

View solution

[3]

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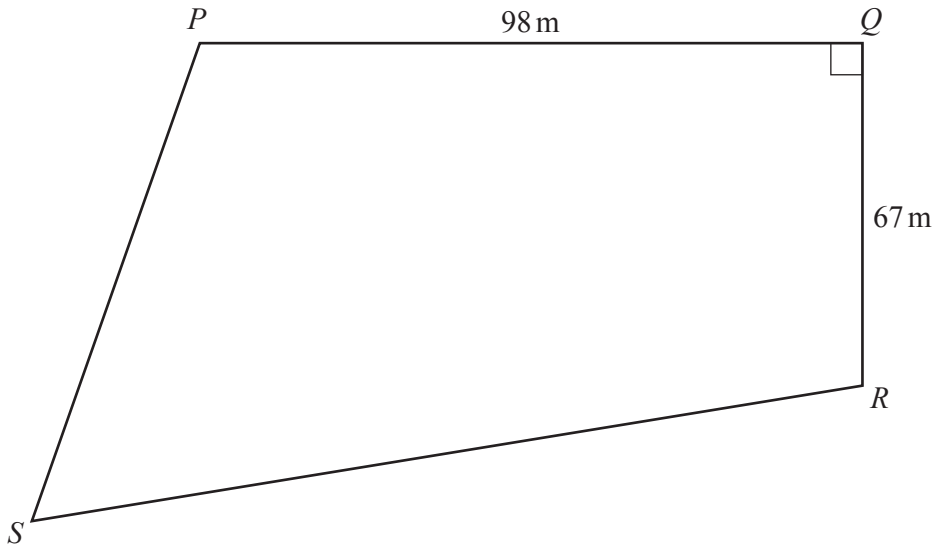
(b)



NOT TO SCALE

View solution

The diagram shows a field $PQRS$.
$PQ = 98$ m, $QR = 67$ m and angle $PQR = 90°$.
There is a straight path from P to R.

Calculate the length of this path.

..... m [2]

7 **(a)** The favourite sport of each of 135 boys is recorded in the table.

View solution

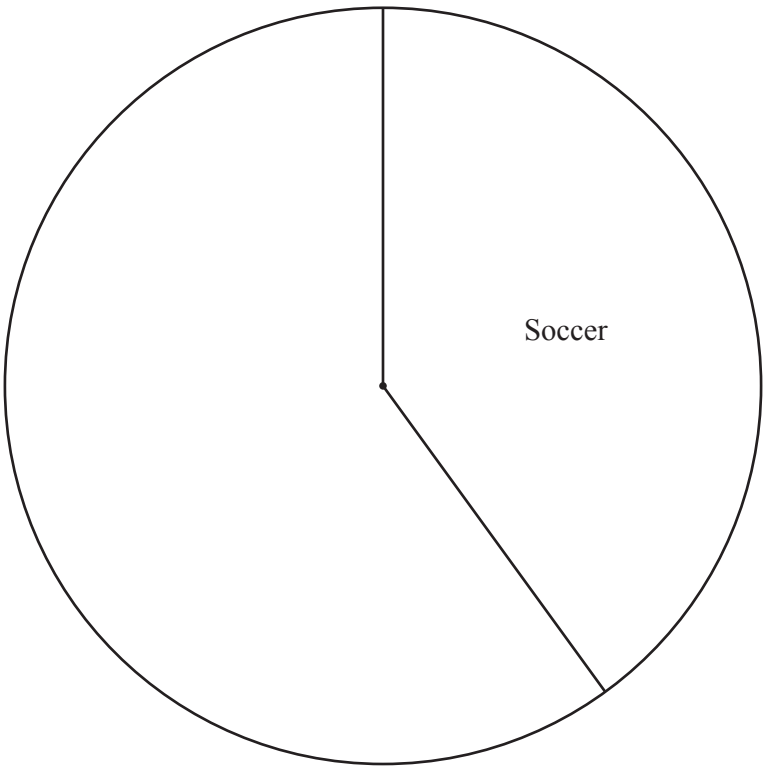
Favourite sport	Frequency	Pie chart sector angle
Soccer	54	144°
Hockey	45	
Rugby	27	
Other	9	

(i) Complete the table.

[2]

View solution

(ii) Complete the pie chart to show these results.
The sector for soccer has been drawn for you.



[2]

View solution

(iii) One of these boys is picked at random.

Find the probability that soccer is his favourite sport.

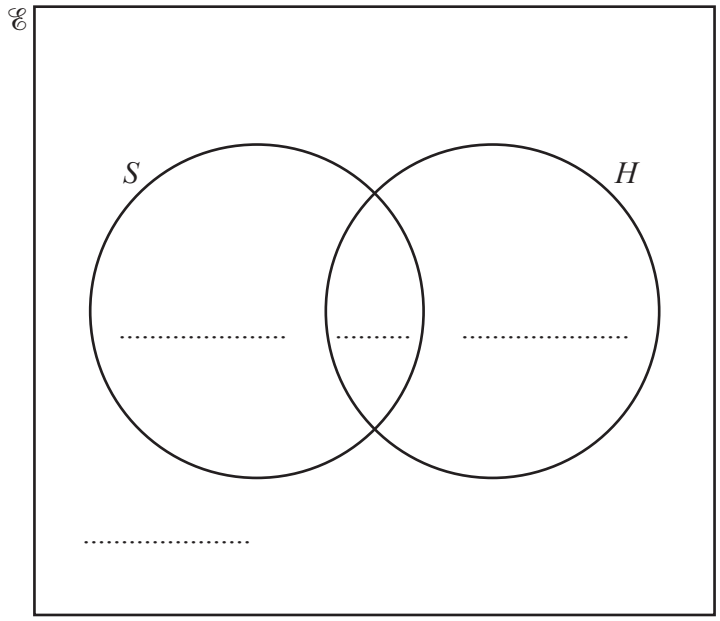
..... [1]

(b) 135 girls are asked if they like soccer (S) and if they like hockey (H).

View solution

$\mathrm{n}(S) = 53$, $\mathrm{n}(H) = 68$ and $\mathrm{n}(S \cup H) = 110$.

(i) Complete the Venn diagram.



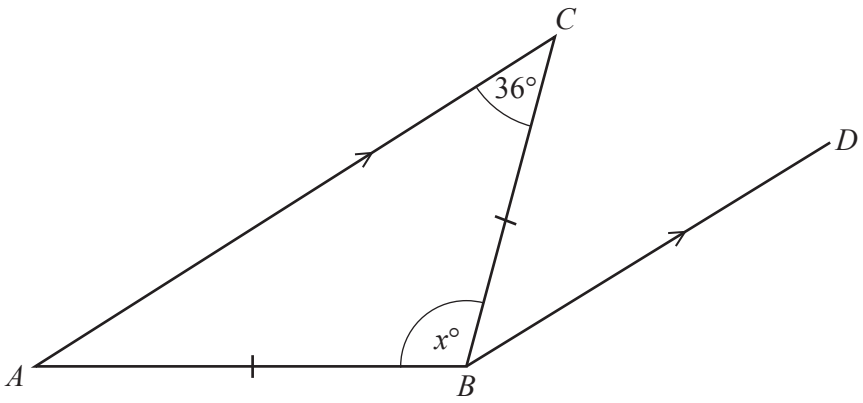
[3]

(ii) Write down $\mathrm{n}(S \cap H)$.

View solution

..... [1]

8 (a)



NOT TO SCALE

View solution

The diagram shows a triangle ABC and a line BD.
$AB = BC$ and AC is parallel to BD.

(i) Angle $ACB = 36°$.

Write down the mathematical name for this type of angle.

..... [1]

(ii) Write down the mathematical name for triangle ABC.

View solution

..... [1]

(iii) Work out the value of x.

View solution

$x =$ ..... [2]

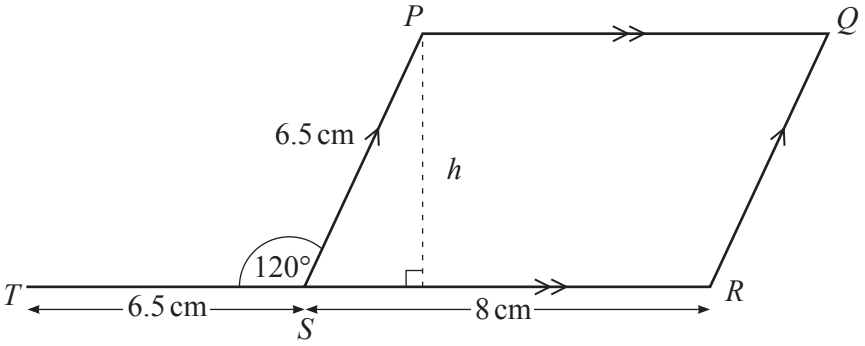
(iv) Find angle CBD.
Give a geometrical reason for your answer.

View solution

Angle $CBD =$ ..... because .....

..... [2]

(b)



NOT TO SCALE

View solution

The diagram shows a quadrilateral, *PQRS*.
PQ is parallel to *SR* and *SP* is parallel to *RQ*.
TSR is a straight line.
SR = 8 cm, *PS* = *ST* = 6.5 cm and angle *PST* = 120°.

(i) Write down the mathematical name of quadrilateral *PQRS*.

..... [1]

(ii) Work out the perimeter of quadrilateral *PQRS*.

View solution

..... cm [1]

(iii) Find angle *PSR*.
Give a reason for your answer.

View solution

Angle *PSR* = ... because .....

..... [2]

(iv) *PS* and *ST* are two sides of a regular polygon.

View solution

Work out the number of sides of this regular polygon.

..... [1]

(v) Show that the height, *h*, of the quadrilateral *PQRS* is 5.63 cm, correct to 2 decimal places.

View solution

[2]

(vi) Work out the area of quadrilateral *PQRS*.

View solution

..... cm^2 [2]

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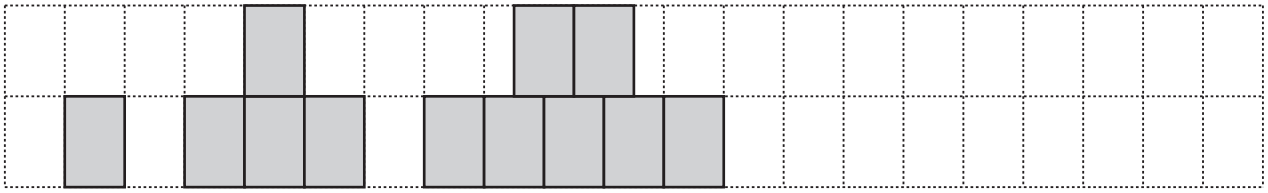
9 A sequence of patterns is made using rectangular blocks.



Pattern 1 Pattern 2 Pattern 3 Pattern 4

View solution

(a) Draw Pattern 4. [1]

(b) Complete the table.

View solution

Pattern number	1	2	3	4	5
Number of blocks	1	4	7		

[2]

(c) Find an expression, in terms of n, for the number of blocks in Pattern n.

View solution

..... [2]

(d) Tara wants to make one pattern in this sequence.
She has 84 blocks.

View solution

Work out the largest pattern number she can make and the number of blocks remaining.

Pattern number .....

Number of blocks remaining ..... [4]

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