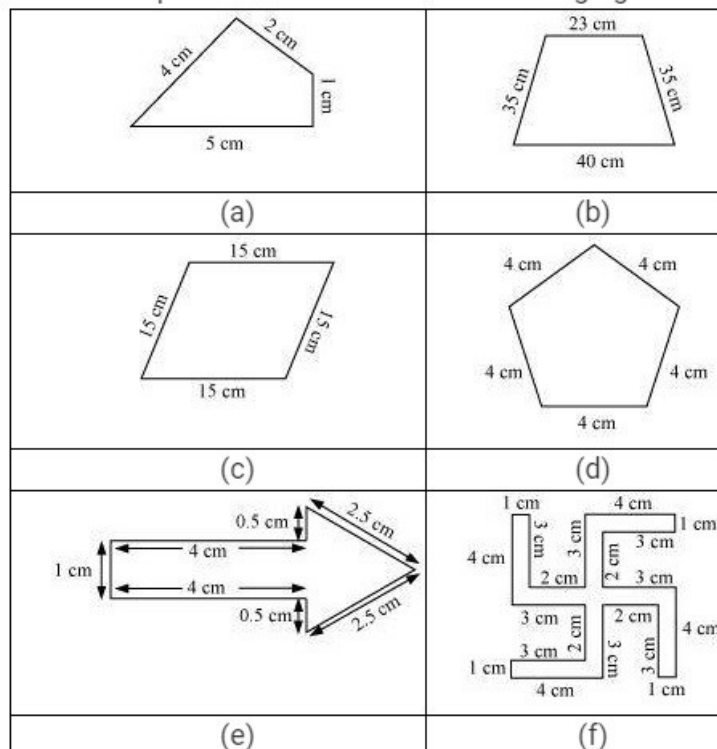MATHS -6 (CH-10- MENSURATION)

MATHS -6 (CH-10- 10.1-MENSURATION)

Question 1:

Find the perimeter of each of the following figures:

(a)

(b)

(c)

(d)

(e)

(f)

Answer 1:

Perimeter of a polygon is equal to the sum of the lengths of all sides of that polygon.

(a) Perimeter = (4 + 2 + 1 + 5) cm = 12 cm

(b) Perimeter = (23 + 35 + 40 + 35) cm = 133 cm

(c) Perimeter = (15 + 15 + 15 + 15) cm = 60 cm

(d) Perimeter = (4 + 4 + 4 + 4 + 4) cm = 20 cm

(e) Perimeter = (1 + 4 + 0.5 + 2.5 + 2.5 + 0.5 + 4) cm = 15 cm

(f) Perimeter = (1 + 3 + 2 + 3 + 4 + 1 + 3 + 2 + 3 + 4 + 1 + 3 + 2 + 3 + 4 + 1 + 3 + 2 + 3 + 4) = 52 cm

Question 2:

The lid of a rectangular box of sides 40 cm by 10 cm is sealed all round with tape. What is the length of the tape required?

Answer 2:

Length (l) of rectangular box = 40 cm
Breadth (b) of rectangular box = 10 cm
Length of tape required = Perimeter of rectangular box
= 2 ($l + b$) = 2(40 + 10) = 100 cm

Question 3:

A table-top measures 2 m 25 cm by 1 m 50 cm. What is the perimeter of the table-top?

Answer 3:

Length (l) of table-top = 2 m 25 cm = 2 + 0.25 = 2.25 m
Breadth (b) of table-top = 1 m 50 cm = 1 + 0.50 = 1 .50 m
Perimeter of table-top = 2 ($l + b$)
= 2 × (2.25 + 1.50)
= 2 × 3.75 = 7.5 m

Question 4:

What is the length of the wooden strip required to frame a photograph of length and breadth 32 cm and 21 cm respectively?

Answer 4:

Length (l) of photograph = 32 cm
Breadth (b) of photograph = 21 cm
Length of wooden strip required = Perimeter of Photograph
= 2 × ($l + b$)
= 2 × (32 + 21) = 2 × 53 = 106 cm

Question 5:

A rectangular piece of land measures 0.7 km by 0.5 km. Each side is to be fenced with 4 rows of wires. What is the length of the wire needed?

Answer 5:

Length (l) of land = 0.7 km
Breadth (b) of land = 0.5 km
Perimeter = $2 \times (l + b)$
$= 2 \times (0.7 + 0.5) = 2 \times 1.2 = 2.4$ km
Length of wire required = $4 \times 2.4 = 9.6$ km

Question 6:

Find the perimeter of each of the following shapes:
(a) A triangle of sides 3 cm, 4 cm and 5 cm.
(b) An equilateral triangle of side 9 cm.
(c) An isosceles triangle with equal sides 8 cm each and third side 6 cm.

Answer 6:

(a) Perimeter = (3 + 4 + 5) cm = 12 cm
(b) Perimeter of an equilateral triangle = 3 × Side of triangle
= (3 × 9) cm = 27 cm
(c) Perimeter = (2 × 8) + 6 = 22 cm

Question 7:

Find the perimeter of a triangle with sides measuring 10 cm, 14 cm and 15 cm.

Answer 7:

Perimeter of triangle = Sum of the lengths of all sides of the triangle
Perimeter = 10 + 14 + 15 = 39 cm

Question 8:

Find the perimeter of a regular hexagon with each side measuring 8 m.

Answer 8:

Perimeter of regular hexagon = 6 × Side of regular hexagon
Perimeter of regular hexagon = 6 × 8 = 48 m

Question 9:

Find the side of the square whose perimeter is 20 m.

Answer 9:

Perimeter of square = 4 × Side
20 = 4 × Side
Side $= \dfrac{20}{4} = 5$ m

Question 10:

The perimeter of a regular pentagon is 100 cm. How long is its each side?

Answer 10:

Perimeter of regular pentagon = 5 × Length of side
100 = 5 × Side
Side $= \dfrac{100}{5} = 20$ cm

Question 11:

A piece of string is 30 cm long. What will be the length of each side if the string is used to form:
(a) a square?
(b) an equilateral triangle?
(c) a regular hexagon?

Answer 11:

(a) Perimeter = 4 × Side
30 = 4 × Side
Side = $\frac{30}{4}$ = 7.5 cm

(b) Perimeter = 3 × Side
30 = 3 × Side
Side = $\frac{30}{3}$ = 10 cm

(c) Perimeter = 6 × Side
30 = 6 × Side
Side = $\frac{30}{6}$ = 5 cm

Question 12:

Two sides of a triangle are 12 cm and 14 cm. The perimeter of the triangle is 36 cm. What is its third side?

Answer 12:

Perimeter of triangle = Sum of all sides of the triangle
36 = 12 + 14 + Side
36 = 26 + Side
Side = 36 – 26 = 10 cm
Hence, the third side of the triangle is 10 cm.

Question 13:

Find the cost of fencing a square park of side 250 m at the rate of Rs 20 per metre.

Answer 13:

Length of fence required = Perimeter of the square park
= 4 × Side
= 4 × 250 = 1000 m
Cost for fencing 1 m of square park = Rs 20
Cost for fencing 1000 m of square park = 1000 × 20
= Rs 20000

Question 14:

Find the cost of fencing a rectangular park of length 175 m and breadth 125 m at the rate of Rs 12 per metre.

Answer 14:

Length (l) of rectangular park = 175 m
Breadth (b) of rectangular park = 125 m
Length of wire required for fencing the park = Perimeter of the park
= 2 × ($l + b$)
= 2 × (175 + 125)
= 2 × 300
= 600 m
Cost for fencing 1 m of the park = Rs 12
Cost for fencing 600 m of the square park = 600 × 12
= Rs 7200

Question 15:

Sweety runs around a square park of side 75 m. Bulbul runs around a rectangular park with length 60 m and breadth 45 m. Who covers less distance?

Answer 15:

Distance covered by Sweety = 4 × Side of square park
= 4 × 75 = 300 m
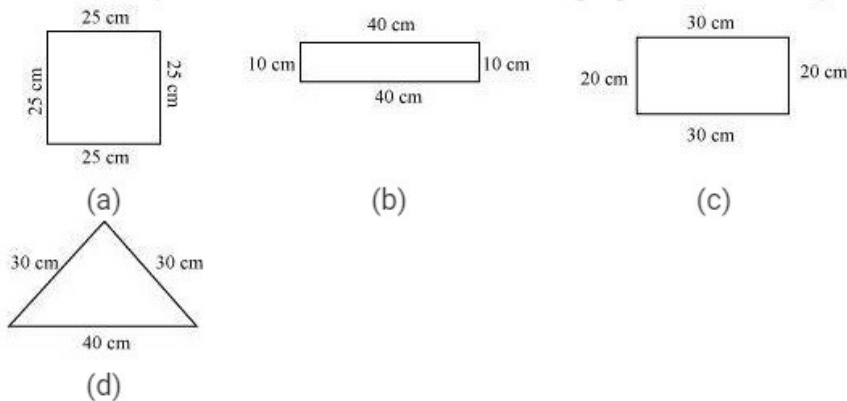Distance covered by Bulbul = 2 × (60 + 45)
= 2 × 105 = 210 m
Therefore, Bulbul covers less distance.

Question 16:

What is the perimeter of each of the following figures? What do you infer from the answers?

(a)   (b)   (c)

(d)

Answer 16:

(a) Perimeter of square = 4 × 25 = 100 cm
(b) Perimeter of rectangle = 2 × (10 + 40) = 100 cm
(c) Perimeter of rectangle = 2 × (20 + 30) = 100 cm
(d) Perimeter of triangle = 30 + 30 + 40 = 100 cm
It can be inferred that all the figures have the same perimeter.

Question 17:

Avneet buys 9 square paving slabs, each with a side of $\frac{1}{2}$ m. He lays them in the form of a square.
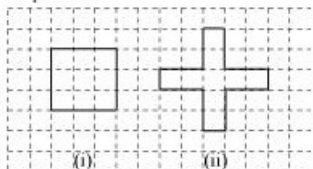
(a) What is the perimeter of his arrangement [figure (i)]?

(b) Shari does not like his arrangement. She gets him to lay them out like a cross. What is the perimeter of her arrangement [figure (ii)]?

(c) Which has greater perimeter?

(d) Avneet wonders if there is a way of getting an even greater perimeter. Can you find a way of doing this? (The paving slabs must meet along complete edges i.e. they cannot be broken.)

Answer 17:

(a) Side of square $= \left(3 \times \frac{1}{2}\right)$ m $= \frac{3}{2}$ m

Perimeter of square $= 4 \times \frac{3}{2} = 6$ m

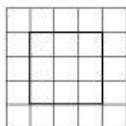(b) Perimeter of cross $= 0.5 + 1 + 1 + 0.5 + 1 + 1 + 0.5 + 1 + 1 + 0.5 + 1 + 1 = 10$ m
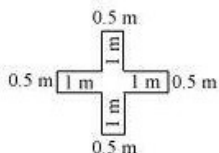
(c) The arrangement in the form of a cross has a greater perimeter.

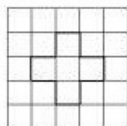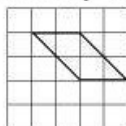(d) Arrangements with perimeters greater than 10 m cannot be determined.

Question 1:

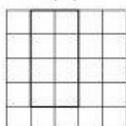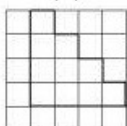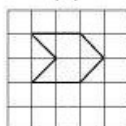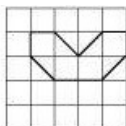Find the areas of the following figures by counting square:

(a)   (b)   (c)

(d)   (e)   (f)
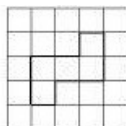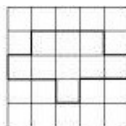
(g)   (h)   (i)

(j)   (k)   (l)

(m)   (n)

Answer 1:

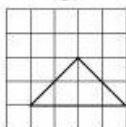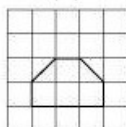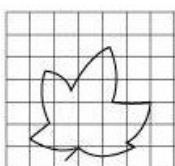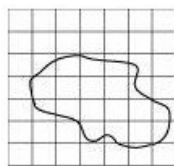(a) The figure contains 9 fully filled squares only. Therefore, the area of this figure will be 9 square units.

(b) The figure contains 5 fully filled squares only. Therefore, the area of this figure will be 5 square units.

(c) The figure contains 2 fully filled squares and 4 half-filled squares. Therefore, the area of this figure will be 4 square units.

(d) The figure contains 8 fully filled squares only. Therefore, the area of this figure will be 8 square units.

(e) The figure contains 10 fully filled squares only. Therefore, the area of this figure will be 10 square units.

(f) The figure contains 2 fully filled squares and 4 half-filled squares. Therefore, the area of this figure will be 4 square units.

(g) The figure contains 4 fully filled squares and 4 half-filled squares. Therefore, the area of this figure will be 6 square units.

(h) The figure contains 5 fully filled squares only. Therefore, the area of this figure will be 5 square units.

(i) The figure contains 9 fully filled squares only. Therefore, the area of this figure will be 9 square units.

(j) The figure contains 2 fully filled squares and 4 half-filled squares. Therefore, the area of this figure will be 4 square units.

(k) The figure contains 4 fully filled squares and 2 half-filled squares. Therefore, the area of this figure will be 5 square units.

(l) From the given figure, it can be observed that,

Covered Area	Number	Area estimate (sq units)
Fully filled squares	2	2
Half filled squares	–	–
More than half - filled squares	6	6
Less than half - filled squares	6	0

Total area = 2 + 6 = 8 square units

(m) From the given figure, it can be observed that,

Covered Area	Number	Area estimate (sq units)
Fully filled squares	5	5
Half-filled squares	–	–
More than half-filled squares	9	9
Less than half-filled squares	12	0

Total area = 5 + 9 = 14 square units

(n) From the given figure, it can be observed that,

Covered Area	Number	Area estimate (sq units)
Fully filled squares	8	8
Half-filled squares	–	–
More than half-filled squares	10	10
Less than half-filled squares	9	0

Total area = 8 + 10 = 18 square units

Question 1:

Find the areas of the rectangles whose sides are:
(a) 3 cm and 4 cm (b) 12 m and 21 m
(c) 2 km and 3 km (d) 2 m and 70 cm

Answer 1:

It is known that,
Area of rectangle = Length × Breadth
(a) l = 3 cm
b = 4 cm
Area = $l \times b$ = 3 × 4 = 12 cm^2
(b) l = 12 m
b = 21 m
Area = $l \times b$ = 12 × 21 = 252 m^2
(c) l = 2 km
b = 3 km
Area = $l \times b$ = 2 × 3 = 6 km^2
(d) l = 2 m
b = 70 cm = 0.70 m
Area = $l \times b$ = 2 × 0.70 = 1.40 m^2

Question 2:

Find the areas of the squares whose sides are:
(a) 10 cm (b) 14 cm (c) 5 m

Answer 2:

It is known that,
Area of square = (Side)^2
(a) Side = 10 cm
Area = $(10)^2$ =100 cm^2
(b) Side = 14 cm
Area = $(14)^2$ = 196 cm^2
(c) Side = 5 m
Area = $(5)^2$ = 25 m^2

Question 3:

The length and breadth of three rectangles are as given below:
(a) 9 m and 6 m (b) 17 m and 3 m (c) 4 m and 14 m
Which one has the largest area and which one has the smallest?

Answer 3:

It is known that,
Area of rectangle = Length × Breadth
(a) l = 9 m
b = 6 m
Area = $l \times b$ = 9 × 6 = 54 m^2
(b) l = 17 m
b = 3 m
Area = $l \times b$ = 17 × 3 = 51 m^2
(c) l = 4 m
b = 14 m
Area = $l \times b$ = 4 × 14 = 56 m^2
It can be seen that rectangle (c) has the largest area and rectangle (b) has the smallest area.

Question 4:

The area of a rectangular garden 50 m long is 300 sq m. Find the width of the garden.

Answer 4:

Let the breadth of the rectangular garden be b.
l = 50 m
Area = $l \times b$ = 300 square m
50 × b = 300
$b = \dfrac{300}{50} = 6$ m

Question 5:

What is the cost of tiling a rectangular plot of land 500 m long and 200 m wide at the rate of Rs 8 per hundred sq m?

Answer 5:

Area of rectangular plot = 500 × 200 = 100000 m^2
Cost of tiling per 100 m^2 = Rs 8
Cost of tiling per 100000 m^2 = $\frac{8}{100} \times 100000$ = Rs 8000

Question 6:

A table-top measures 2 m by 1 m 50 cm. What is its area in square metres?

Answer 6:

Length (l) = 2 m
Breadth (b) = 1 m 50 cm = $\left(1 + \frac{50}{100}\right)$ m = 1.5 m
Area = $l \times b$ = 2 × 1.5 = 3 m^2

Question 7:

A room is 4 m long and 3 m 50 cm wide. How many square metres of carpet is needed to cover the floor of the room?

Answer 7:

Length (l) = 4 m
Breadth (b) = 3 m 50 cm = 3.5 m
Area = $l \times b$ = 4 × 3.5 = 14 m^2

Question 8:

A floor is 5 m long and 4 m wide. A square carpet of sides 3 m is laid on the floor. Find the area of the floor that is not carpeted.

Answer 8:

Length (l) = 5 m
Breadth (b) = 4 m
Area of floor = $l \times b$ = 5 × 4 = 20 m^2
Area covered by the carpet = $(Side)^2$ = $(3)^2$ = 9 m^2
Area not covered by the carpet = 20 – 9 = 11 m^2

Question 9:

Five square flower beds each of sides 1 m are dug on a piece of land 5 m long and 4 m wide. What is the area of the remaining part of the land?

Answer 9:

Area of the land = 5 × 4 = 20 m^2
Area occupied by 5 flower beds = 5 × $(Side)^2$ = 5 × $(1)^2$ = 5 m^2
∴ Area of the remaining part = 20 – 5 = 15 m^2

Question 10:

By splitting the following figures into rectangles, find their areas (The measures are given in centimetres).
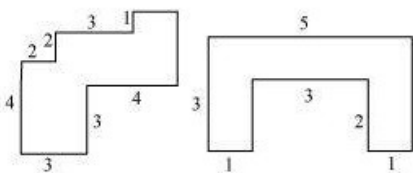
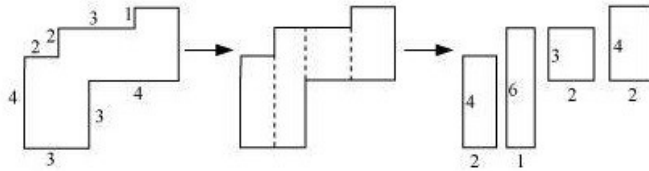(a) (b)

Answer 10:

(a) The given figure can be broken into rectangles as follows.

Area of 1st rectangle = 4 × 2 = 8 cm^2
Area of 2nd rectangle = 6 × 1 = 6 cm^2
Area of 3rd rectangle = 3 × 2 = 6 cm^2
Area of 4th rectangle = 4 × 2 = 8 cm^2
Total area of the complete figure = 8 + 6 + 6 + 8 = 28 cm^2

(b) The given figure can be broken into rectangles as follows.
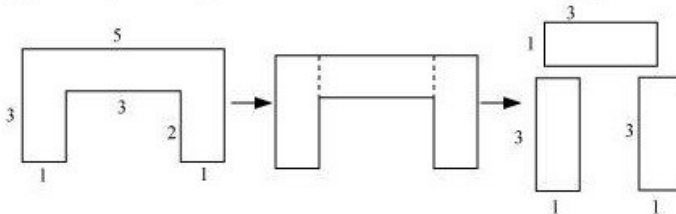
Area of 1st rectangle = 3 × 1 = 3 cm^2
Area of 2nd rectangle = 3 × 1 = 3 cm^2
Area of 3rd rectangle = 3 × 1 = 3 cm^2
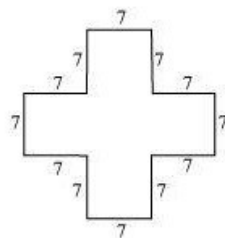Total area of the complete figure = 3 + 3 + 3 = 9 cm^2

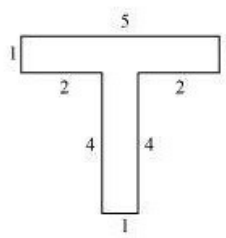## Question 11:

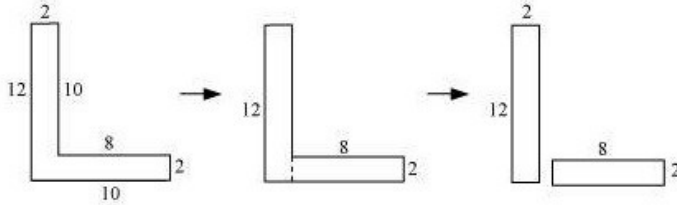Split the following shapes into rectangles and find their areas. (The measures are given in centimetres)
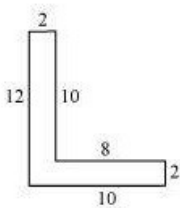
(a)   (b)   (c)

Answer 11:

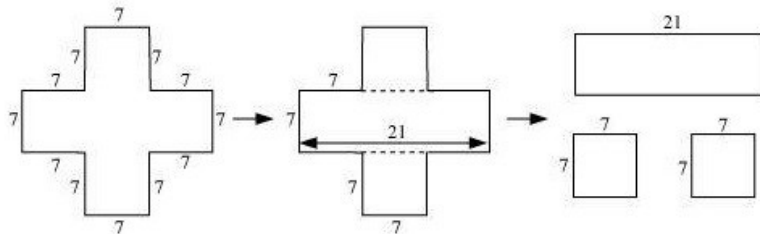(a) The given figure can be broken into rectangles as follows.

Area of 1st rectangle = 12 × 2 = 24 cm^2

Area of 2nd rectangle = 8 × 2 = 16 cm^2

Total area of the complete figure = 24 + 16 = 40 cm^2

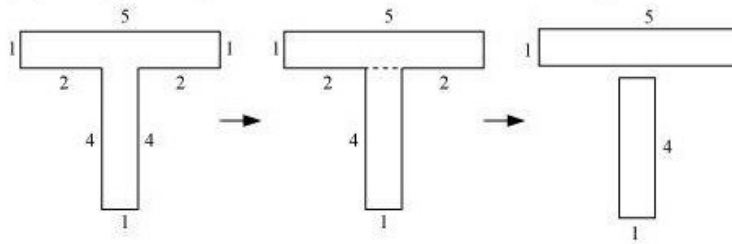(b) The given figure can be broken into rectangles as follows.

Area of 1st rectangle = 21 × 7 = 147 cm^2

Area of 2nd square = 7 × 7 = 49 cm^2

Area of 3rd square = 7 × 7 = 49 cm^2

Total area of the complete figure = 147 + 49 + 49 = 245 cm^2

(c) The given figure can be broken into rectangles as follows.

Area of 1st rectangle = 5 × 1 = 5 cm^2
Area of 2nd rectangle = 4 × 1 = 4 cm^2
Total area of the complete figure = 5 + 4 = 9 cm^2

Question 12:

How many tiles whose length and breadth are 12 cm and 5 cm respectively will be needed to fit in a rectangular region whose length and breadth are respectively:
(a) 100 cm and 144 cm
(b) 70 cm and 36 cm

Answer 12:

(a) Total area of the region = 100 × 144 = 14400 cm^2
Area of one tile = 12 × 5 = 60 cm^2

Number of tiles required $=\dfrac{14400}{60}=240$

Therefore, 240 tiles are required.
(b) Total area of the region = 70 × 36 = 2520 cm^2
Area of one tile = 60 cm^2

Number of tiles required $=\dfrac{2520}{60}=42$

Therefore, 42 tiles are required.