Chapter-10

Mensuration

2 MARKS QUESTIONS

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

Solutions:

Length of required tape = Perimeter of rectangle

= 2 (Length + Breadth)

= 2 (40 + 10)

= 2 (50)

= 100 cm

∴ The required length of tape is 100 cm.

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

Solutions:

Length of tabletop = 2 m 25 cm = 2.25 m

Breadth of tabletop = 1 m 50 cm = 1.50 m

Perimeter of tabletop = 2 (Length + Breadth)

= 2 (2.25 + 1.50)

= 2 (3.75)

= 2 × 3.75

= 7.5 m

∴ The perimeter of the table top is 7.5 m.

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

Solutions:

The required length of the wooden strip = Perimeter of the photograph

= 2 (Length + Breadth)

= 2 (32 + 21)

= 2 (53)

= 2 × 53

= 106 cm

∴ The required length of the wooden strip is 106 cm.

4. 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?

Solutions:

Perimeter of the field = 2 (Length + Breadth)

= 2 (0.7 + 0.5)

= 2 (1.2)

= 2 × 1.2

= 2.4 km

Each side is to be fenced with 4 rows = 4 × 2.4

= 9.6 km

∴ The total length of the required wire is 9.6 km.

5. 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 of 8 cm each and the third side of 6 cm.

Solutions:

(a) Perimeter of triangle = 3 + 4 + 5

= 12 cm

(b) Perimeter of an equilateral triangle = 3 × side

= 3 × 9

= 27 cm

(c) Perimeter of isosceles triangle = 8 + 8 + 6

= 22 cm

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

Solutions:

Perimeter of triangle = 10 + 14 + 15

= 39 cm

∴ The perimeter of the triangle is 39 cm.

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

Solutions:

Perimeter of hexagon = 6 × 8

= 48 m

∴ The perimeter of the regular hexagon is 48 m.

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

Solutions:

Perimeter of square = 4 × side

20 = 4 × side

Side = 20 / 4

Side = 5 m

∴ The side of the square is 5 m.

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

Solutions:

The perimeter of the regular pentagon = 100 cm

5 × side = 100 cm

Side = 100 / 5

Side = 20 cm

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

Solutions:

Let x cm be the third side

Perimeter of triangle = 36 cm

12 + 14 + x = 36

26 + x = 36

x = 36 – 26

x = 10 cm

∴ The third side is 10 cm.

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

Solutions:

Side of square = 250 m

Perimeter of square = 4 × side

= 4 × 250

= 1000 m

Cost of fencing = ₹ 20 per m

Cost of fencing for 1000 m = ₹ 20 × 1000

= ₹ 20,000

∴ The cost of fencing the square park is ₹ 20,000.

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

Solutions:

Length = 175 cm

Breadth = 125 m

Perimeter of rectangular park = 2 (Length + Breadth)

= 2 (175 + 125)

= 2 (300)

= 2 × 300

= 600 m

Cost of fencing = 12 × 600

= 7200

∴ The cost of fencing is ₹ 7,200.

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

Solutions:

Perimeter of square = 4 × side

= 4 × 75

= 300 m

∴ The distance covered by Sweety is 300 m

Perimeter of the rectangular park = 2 (Length + Breadth)

= 2 (60 + 45)

= 2 (105)

= 2 × 105

= 210 m

∴ The distance covered by Bulbul is 210 m

Hence, Bulbul covers less distance than Sweety.

14. Find the areas of the squares whose sides are:

(a) 10 cm

(b) 14 cm

(c) 5 m

Solutions:

(a) Area of square = side^2

= 10^2

= 100 cm^2

(b) Area of square = side^2

= 14^2

= 196 cm^2

(c) Area of square = side^2

= 5^2

=25 cm^2

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

Solutions:

Area of rectangle = length × width

300 = 50 × width

width = 300 / 50

width = 6 m

∴ The width of the garden is 6 m.

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

Solutions:

Area of land = length × breadth

= 500 × 200

= 1,00,000 m^2

∴ Cost of tiling 1,00,000 sq m of land = (8 × 1,00,000) / 100

= ₹ 8000

∴ The cost of tiling a rectangular plot of land is ₹ 8000.

17. A tabletop measures 2 m by 1 m 50 cm. What is its area in square metres?

Solutions:

Given

l = 2m

b = 1m 50 cm = 1.50 m

Area = l × b = 2 × 1.50

= 3 m^2

∴ The area of the tabletop is 3 m^2

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

Solutions:

Given

l = 4m

b = 3 m 50 cm = 3.50 m

Area = l × b = 4 × 3.50

= 14 m^2

∴ The carpet required to cover the floor is 14 m^2.

19. 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.

Solutions:

Area of floor = l × b = 5 × 4

= 20 m^2

Area of square carpet = 3 × 3

= 9 m^2

Area of floor that is not carpeted = 20 – 9

= 11 m^2

∴ The area of the floor that is not carpeted is 11 m^2.

20. 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?

Solutions:

Area of flower square bed = 1 × 1

= 1 m^2

Area of 5 square bed = 1 × 5

= 5 m^2

Area of land = 5 × 4

= 20 m^2

Remaining part of the land = Area of land – Area of 5 square bed

= 20 – 5 = >15 m^2

∴ The remaining part of the land is 15 m^2.

4 MARKS QUESTIONS

1. 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?

Solutions:

(a) Perimeter of square = 30 cm

4 × side = 30

Side = 30 / 4

Side = 7.5 cm

(b) Perimeter of equilateral triangle = 30 cm

3 × side = 30

Side = 30 / 3

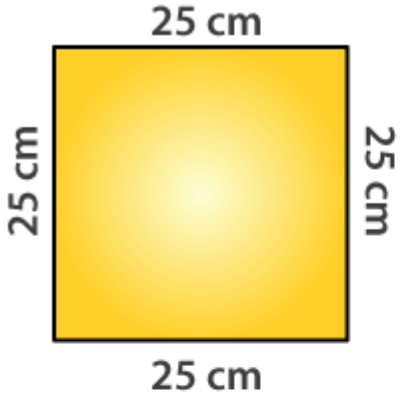
Side = 10 cm

(c) Perimeter of regular hexagon = 30 cm

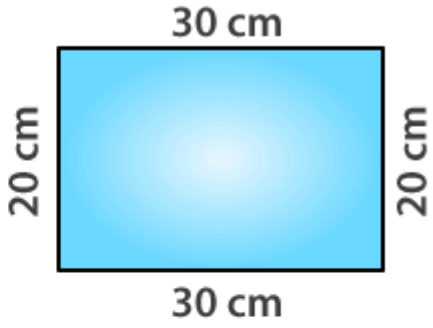
6 × side = 30

Side = 30 / 6

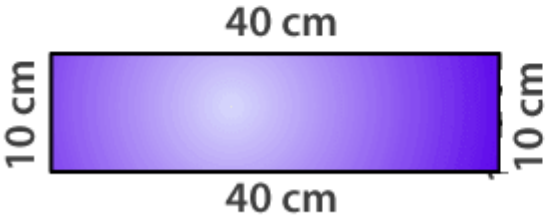
2. What is the perimeter of each of the following figures? What do you infer from the answers?



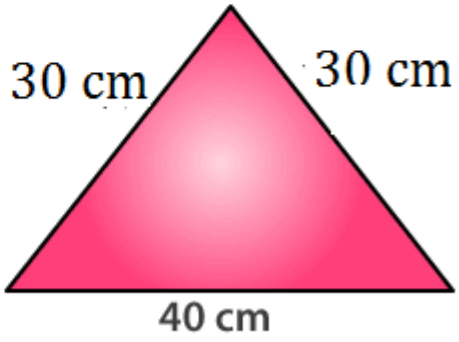
(a)



(c)



(b)



(d)

Solutions:

(a) Perimeter of square = 4 × side

= 4 × 25

= 100 cm

(b) Perimeter of rectangle = 2 (40 + 10)

= 2 × 50

= 100 cm

(c) Perimeter of rectangle = 2 (Length + Breadth)

= 2 (30 + 20)

= 2 (50)

= 2 × 50

= 100 cm

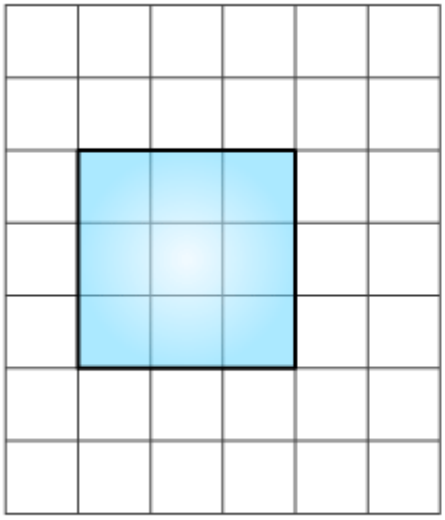
(d) Perimeter of triangle = 30 + 30 + 40

= 100 cm

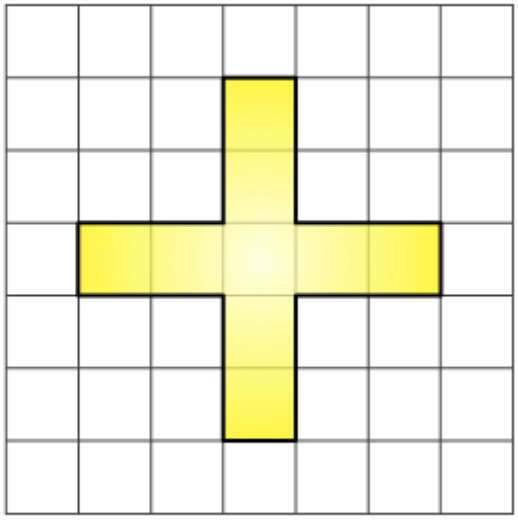
∴ All the figures have the same perimeter.

3. Avneet buys 9 square paving slabs, each with a side of 1 / 2 m. He lays them in the form of a square.

(a) What is the perimeter of his arrangement [fig 10.7(i)]?



(i)



(ii)

(b) Shari does not like his arrangement. She gets him to lay them out like a cross. What is the perimeter of her arrangement [(Fig 10.7 (ii)]?

(c) Which has a 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.)

Solutions:

(a) Side of square = 3 × side

= 3 × 1 / 2

= 3 / 2 m

Perimeter of Square = 4 × 3 / 2

= 2 × 3

= 6 m

(b) Perimeter = 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) Perimeters greater than 10 m cannot be determined.

4. Find the area 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

Solutions:

We know that

Area of rectangle = Length × Breadth

(a) l = 3 cm and b = 4 cm

Area = l × b = 3 × 4

= 12 cm^2

(b) l = 12 m and b = 21 m

Area = l × b = 12 × 21

= 252 m^2

(c) l = 2 km and b = 3 km

Area = l × b = 2 × 3

= 6 km^2

(d) l = 2 m and b = 70 cm = 0.70 m

Area = l × b = 2 × 0.70

= 1.40 m^2

5. The length and breadth of the 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?

Solutions:

(a) Area of rectangle = l × b

= 9 × 6

= 54 m^2

(b) Area of rectangle = l × b

= 17 × 3

= 51 m^2

(c) Area of rectangle = l × b

= 4 × 14

= 56 m^2

The area of rectangle 56 m^2, i.e. (c), is the largest area and the area of rectangle 51 m^2, i.e. (b), is the smallest area

6. 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?

Solutions:

(a) Area of rectangle = 100 × 144

= 14400 cm

Area of one tile = 5 × 12

= 60 cm^2

Number of tiles = (Area of rectangle) / (Area of one tile)

= 14400 / 60

= 240

Hence, 240 tiles are needed

(b) Area of rectangle = 70 × 36

= 2520 cm^2

Area of one tile = 5 × 12

= 60 cm^2

Number of tiles = (Area of rectangle) / (Area of one tile)

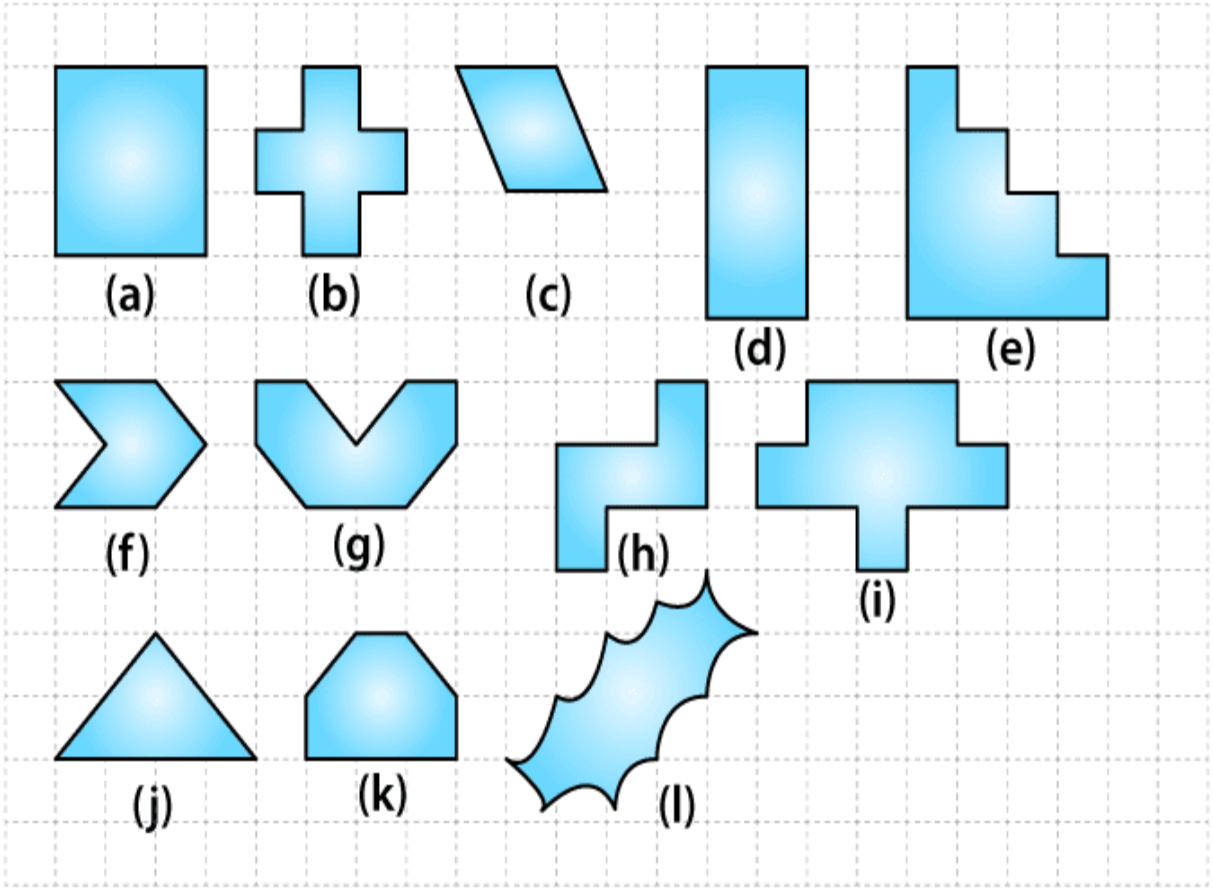
= 2520 / 60

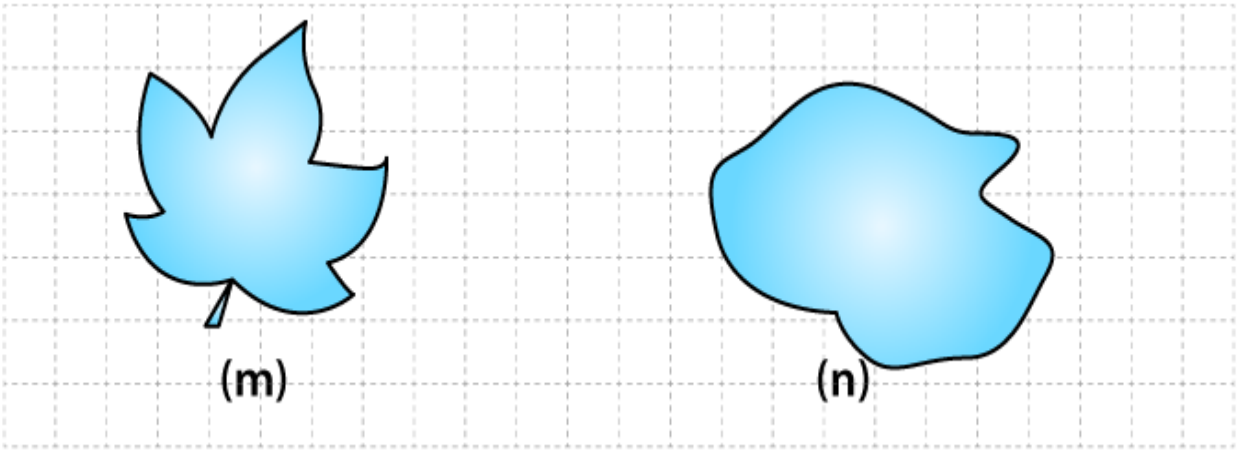
= 42

Hence, 42 tiles are needed.

7 MARKS QUESTIONS

1. Find the areas of the following figures by counting squares:





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

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

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

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

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

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

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

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

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

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

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

(l) From the given figure, we observe

Covered Area	Number	Area Estimate (square units)
Fully filled squares	2	2
Half filled squares	–	–
More than half filled squares	6	6
Less than half filled squares	6	0

Therefore total area = 2 + 6

= 8 square units.

(m) From the given figure, we observe

Covered Area	Number	Area Estimate (square units)
Fully filled squares	5	5
Half filled squares	–	–
More than half filled squares	9	9
Less than half filled squares	12	0

Therefore total area = 5 + 9

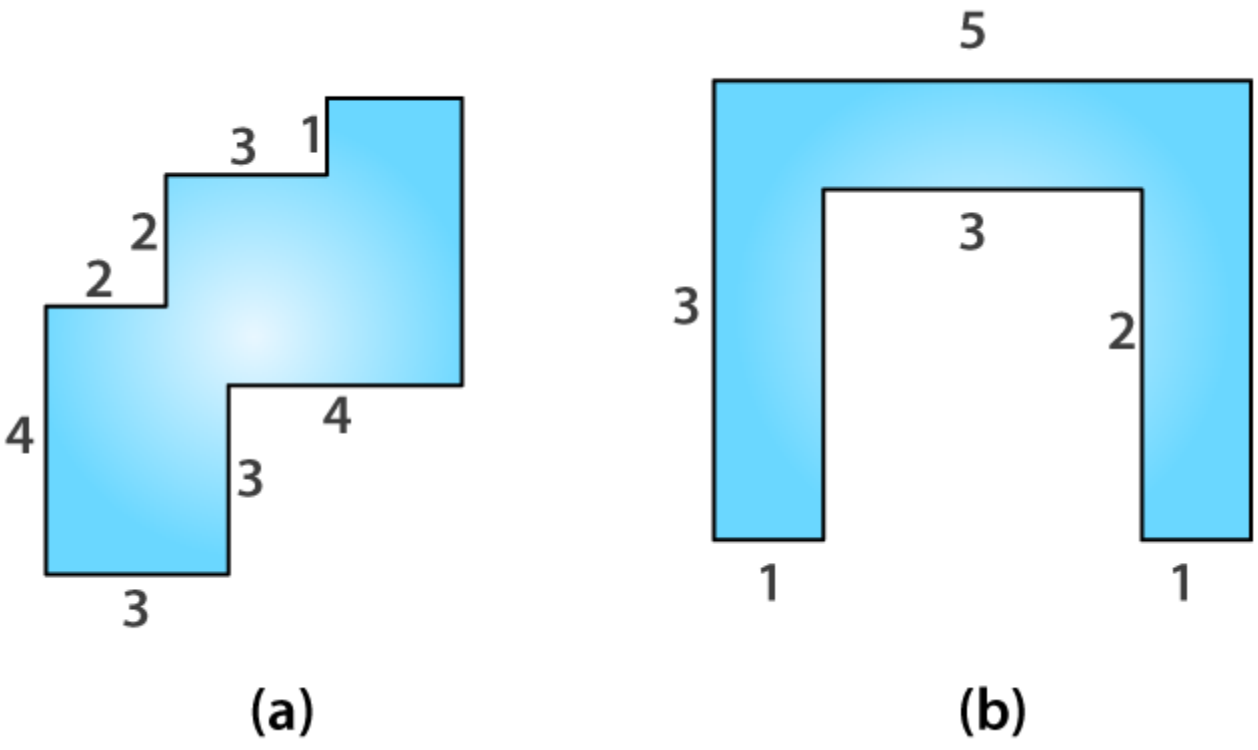
= 14 square units

(n) From the given figure, we observe

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

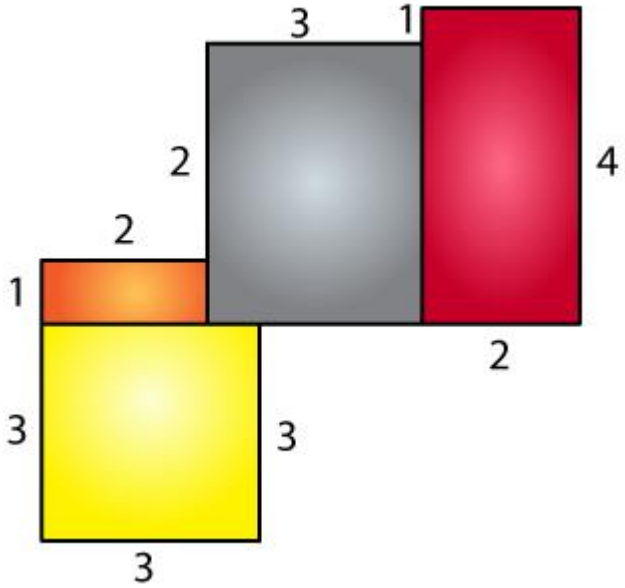
Therefore total area = 8 + 10 = 18 square units

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



Solutions:

(a)



Area of yellow region = 3 × 3

= 9 cm^2

Area of orange region = 1× 2

= 2 cm^2

Area of grey region = 3 × 3

= 9 cm^2

Area of brown region = 2 × 4

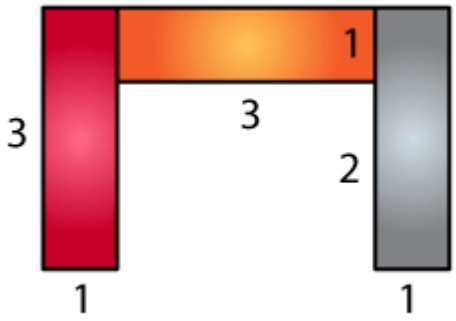
= 8 cm^2

Total area = 9 + 2 + 9 + 8

= 28 cm^2

∴ The total area is 28 cm^2.

(b)



Area of brown region = 3 × 1

= 3 cm^2

Area of orange region = 3 × 1

= 3 cm^2

Area of grey region = 3 × 1

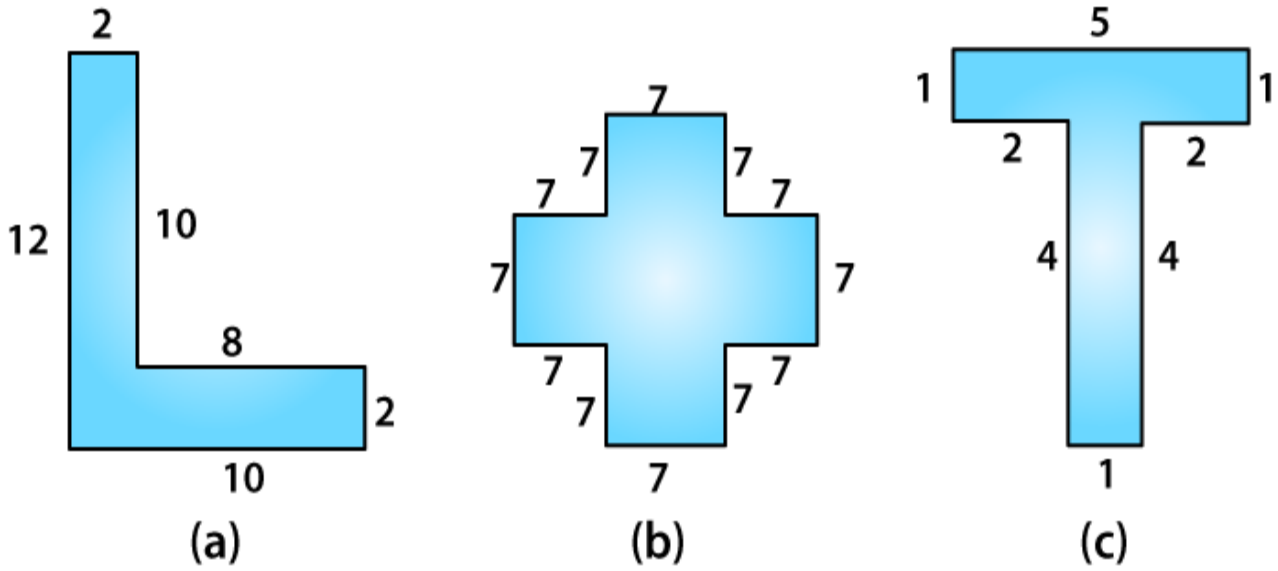
= 3 cm^2

Total area = 3 + 3 + 3

= 9 cm^2

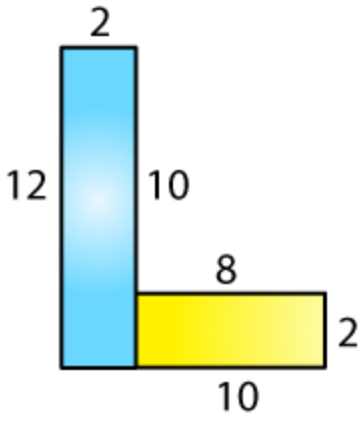
∴ The total area is 9 cm^2.

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



Solutions:

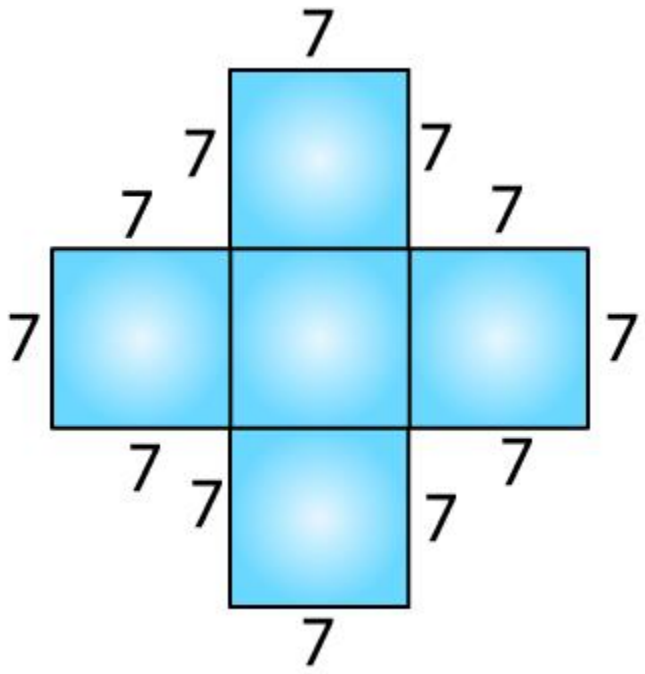
(a)



Total area of the figure = 12 × 2 + 8 × 2

= 40 cm^2

(b)

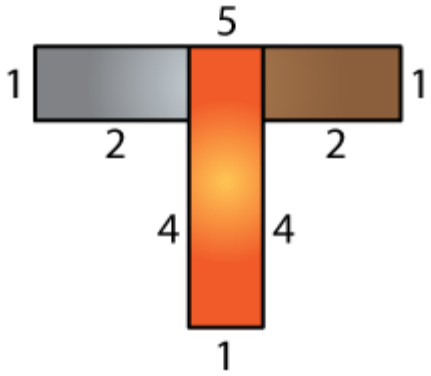


There are 5 squares, and each side is 7 cm.

Area of 5 squares = 5×7^2

= 245 cm^2

(c)



Area of grey rectangle = 2×1

= 2 cm^2

Area of brown rectangle = 2 × 1

= 2 cm^2

Area of orange rectangle = 5 × 1

= 5 cm^2

Total area = 2 + 2 + 5

= 9 cm^2