

Perimeter and Area

Learning objectives

6.1 Perimeter

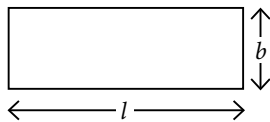
6.2 Area

6.1 PERIMETER

Perimeter is the total distance around the edges of a figure or the sum of lengths of the boundary of a figure is called the perimeter of the figure.

Perimeter of Shapes

► Rectangle



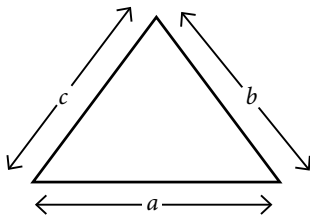
$$\begin{aligned}\text{Perimeter} &= l + b + l + b \\ &= 2(l + b) \text{ units}\end{aligned}$$

► Square



$$\begin{aligned}\text{Perimeter} &= a + a + a + a \\ &= 4a \text{ units}\end{aligned}$$

► Triangle



$$\text{Perimeter} = (a + b + c) \text{ units}$$

6.2 AREA

Area of any shape is the amount of space inside that shape.



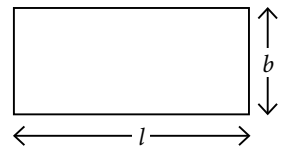
Olympiad Bite

Area can only be found for flat shapes or 2D shapes.

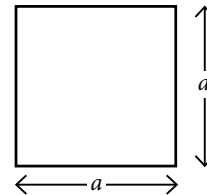
Area of Shapes

► Rectangle

$$\begin{aligned}\text{Area} &= \text{Length} \times \text{Breadth} \\ &= (l \times b) \text{ sq. units}\end{aligned}$$

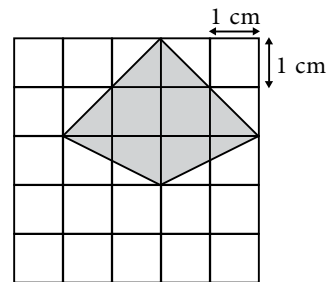


► Square



$$\begin{aligned}\text{Area} &= \text{Side} \times \text{Side} \\ &= (a \times a) \text{ sq. units}\end{aligned}$$

Area of Figures by Counting the Number of Squares



$$\begin{aligned}\text{Area of whole shaded square} &= 1 \text{ sq. cm}\end{aligned}$$

$$\text{Area of half shaded square}$$

$$= \left(\frac{1}{2} \times 1\right) \text{ sq. cm} = \frac{1}{2} \text{ sq. cm}$$

$$\begin{aligned}\text{Area of more than half} \\ \text{shaded square} &= 1 \text{ sq. cm}\end{aligned}$$

$$\text{Area of less than half shaded square} = 0 \text{ sq. cm}$$

There are 2 whole shaded squares, 2 more than half shaded squares, 4 half shaded squares and 2 less than half shaded squares.

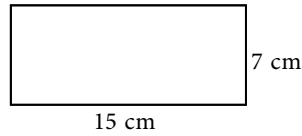
So, area of the given figure

$$\begin{aligned}&= (2 \times 1) + (2 \times 1) + \left(4 \times \frac{1}{2}\right) + (2 \times 0) \\ &= 2 + 2 + 2 + 0 = 6 \text{ sq. cm}\end{aligned}$$

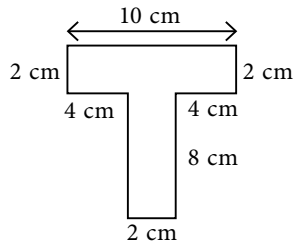
SELF TEST - 1

1. Find the area of the given rectangle.

- (A) 110 sq. cm
- (B) 44 sq. cm
- (C) 105 sq. cm
- (D) 80 sq. cm



2. Find the perimeter of the given figure.

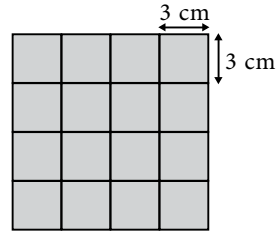


- (A) 37 cm
- (B) 35 cm
- (C) 38 cm
- (D) 40 cm

3. If area of a square is 81 sq. cm, then find the side of the square.

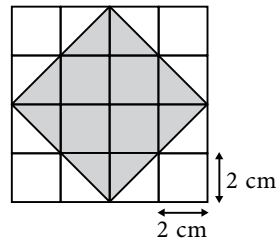
- (A) 8 cm
- (B) 7 cm
- (C) 9 cm
- (D) 6 cm

4. Find the perimeter of the shaded figure.



- (A) 60 cm
- (B) 66 cm
- (C) 50 cm
- (D) 48 cm

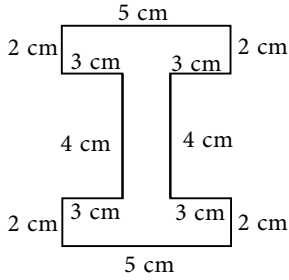
5. Find the area of the shaded part of the given figure.



- (A) 48 sq. cm
- (B) 40 sq. cm
- (C) 30 sq. cm
- (D) 32 sq. cm

EXERCISE

1. Find the perimeter of the given figure.

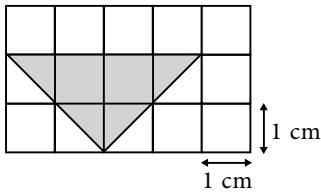


- (A) 40 cm (B) 42 cm
(C) 30 cm (D) 38 cm

2. Breadth of a board is $\left(\frac{2}{5}\right)^{\text{th}}$ of its length. If length of the board is 75 cm, then find its perimeter.

- (A) 180 cm (B) 240 cm
(C) 210 cm (D) 270 cm

3. What is the shaded area of the given figure?

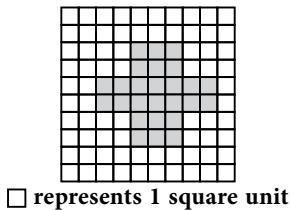


- (A) 4 sq. cm (B) 8 sq. cm
(C) 7 sq. cm (D) 6 sq. cm

4. Area of a rectangular field is 1512 sq. m. If breadth of the field is 28 m, then find the length of the field.

- (A) 52 m (B) 56 m
(C) 54 m (D) 64 m

5. What is the area of the shaded figure?

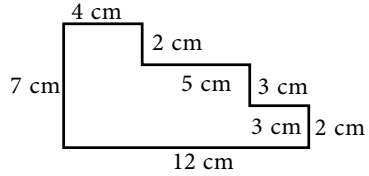


- (A) 20 sq. units (B) 22 sq. units
(C) 26 sq. units (D) 28 sq. units

6. Length of a rectangle is thrice its breadth. If its length is 96 cm, then find its area.

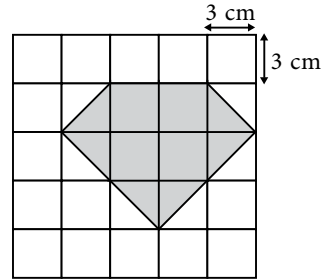
- (A) 3186 sq. cm (B) 3072 sq. cm
(C) 3224 sq. cm (D) 3196 sq. cm

7. Find the perimeter of the given shaded figure.



- (A) 36 cm (B) 38 cm
(C) 40 cm (D) 32 cm

8. Find the area of the given shaded figure.

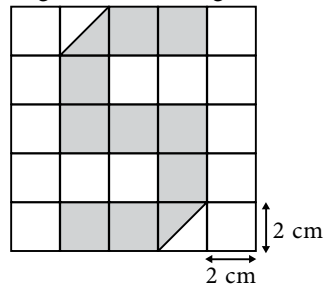


- (A) 63 sq. cm (B) 65 sq. cm
(C) 70 sq. cm (D) 68 sq. cm

9. Kapil walks around a square park whose side is 40 m. On a particular day, he walked around the park 6 times. How much did he walk in all ?

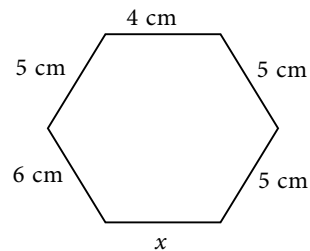
- (A) 820 m (B) 960 m
(C) 840 m (D) 900 m

10. The area of given shaded figure is _____.



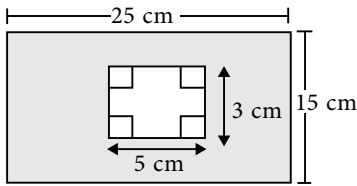
- (A) 40 sq.cm (B) 60 sq.cm
(C) 70 sq.cm (D) 80 sq.cm

11. If the perimeter of the given figure is 30 cm, then find the value of x.



- (A) 8 cm (B) 5 cm
(C) 7 cm (D) 6 cm

12. Find the area of the shaded part in the given figure.

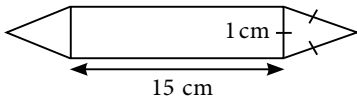


- (A) 360 sq. cm (B) 380 sq. cm
(C) 315 sq. cm (D) 320 sq. cm

13. Ritik ran along a square field and covered 576 m in 2 rounds. What was the area of the field?

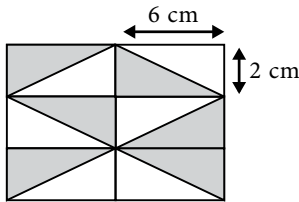
- (A) 5184 sq. m (B) 5230 sq. m
(C) 5146 sq. m (D) 5460 sq. m

14. The given figure is made up of two triangles having equal sides and a rectangle. Find the perimeter of the whole figure.



- (A) 30 cm (B) 34 cm
(C) 36 cm (D) 38 cm

15. The given figure is made up of 6 identical rectangles. Find the total area of the shaded figure.

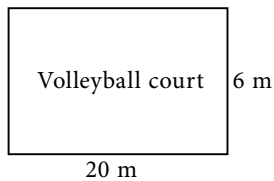


- (A) 48 sq. cm (B) 38 sq. cm
(C) 36 sq. cm (D) 50 sq. cm

16. A boy wants to frame 6 pictures, each of length 8 cm and breadth 3 cm. What length of wood will he need to make the frames?

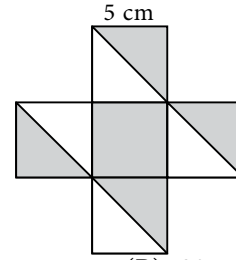
- (A) 130 cm (B) 180 cm
(C) 132 cm (D) 144 cm

17. Find the perimeter of the given volleyball court.



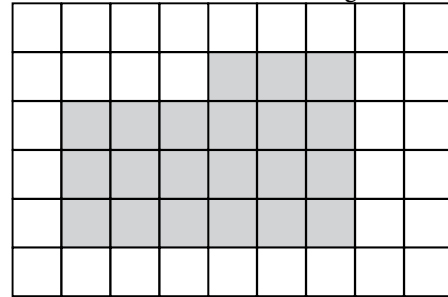
- (A) 48 m (B) 52 m
(C) 50 m (D) 60 m

18. The given figure is made up of 5 identical squares. What is the area of the shaded part?



- (A) 90 sq. cm (B) 80 sq. cm
(C) 65 sq. cm (D) 75 sq. cm

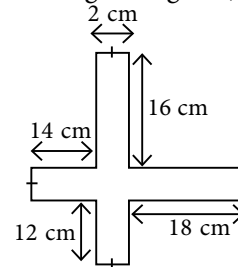
19. What is the area of the shaded figure?



Key : = 2 sq. units

- (A) 48 sq. units (B) 42 sq. units
(C) 80 sq. units (D) 30 sq. units

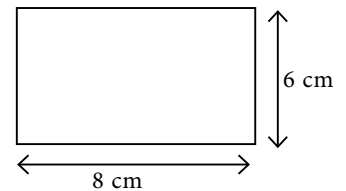
20. Find the area of the given figure (not drawn to scale).



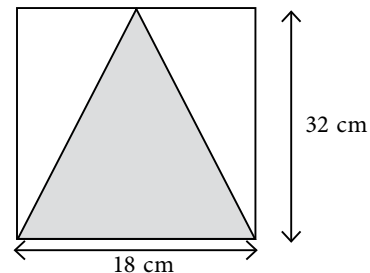
- (A) 120 sq. cm (B) 124 sq. cm
(C) 122 sq. cm (D) 138 sq. cm

21. If breadth of the given rectangle is decreased by 2 cm, then what is its new length, if its area remains unchanged?

- (A) 14 cm (B) 16 cm
(C) 10 cm (D) 12 cm

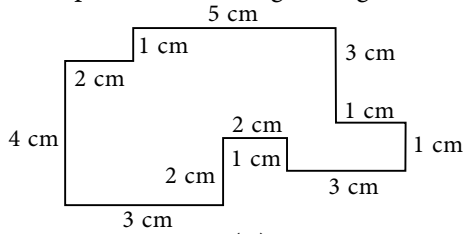


22. Find the area of the shaded region.



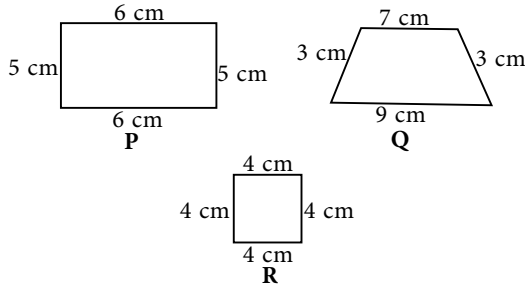
- (A) 288 sq. cm (B) 270 sq. cm
(C) 580 sq. cm (D) 380 sq. cm

23. Find the perimeter of the given figure.



- (A) 28 cm (B) 25 cm
(C) 30 cm (D) 32 cm

24. Which of the following two figures have equal perimeter ?



- (A) P and R (B) P and Q
(C) Q and R (D) None of these

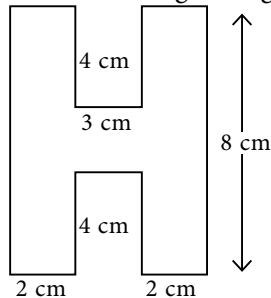
25. Find the area of the rectangle, whose length is 35 cm and perimeter is 90 cm.

- (A) 450 sq. cm (B) 350 sq. cm
(C) 310 sq. cm (D) 400 sq. cm

26. A farmer has to wire around his rectangular field 5 times. How much wire is required, if the length of the field is 175 m and the breadth of the field is 85 m ?

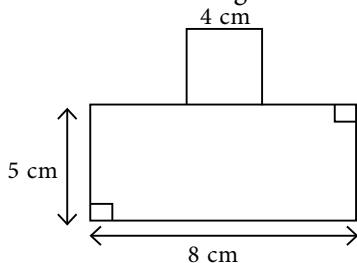
- (A) 2000 m (B) 2800 m
(C) 1800 m (D) 2600 m

27. Find the perimeter of the given figure.



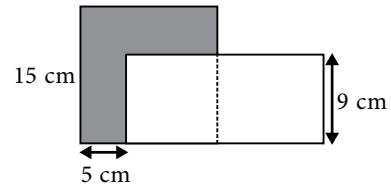
- (A) 46 cm (B) 48 cm
(C) 45 cm (D) 40 cm

28. The given figure is made up of a square and a rectangle. Find the area of the figure.



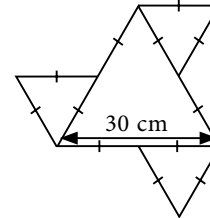
- (A) 50 sq. cm (B) 56 sq. cm
(C) 72 sq. cm (D) None of these

29. The figure below is formed by placing a rectangle on top of a square. If the square and the rectangle have same area, then what is the perimeter of the figure?



- (A) 95 cm (B) 90 cm
(C) 101 cm (D) 110 cm

30. The given figure is made up of three identical equilateral triangles and one big equilateral triangle. Find the perimeter of the given figure.

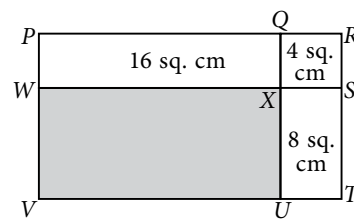


- (A) 135 cm (B) 190 cm
(C) 155 cm (D) 145 cm

31. Simran has to put a lace around square shaped cloth, where sides of each cloth measures 32 cm. Find the total length of the lace required, if she has to put the lace around 20 such clothes.

- (A) 1250 cm (B) 1280 cm
(C) 2560 m (D) 2050 cm

32. Rectangle $PRTV$ below is divided into 4 parts. $QRSX$ is a square. What is the area of the shaded part?

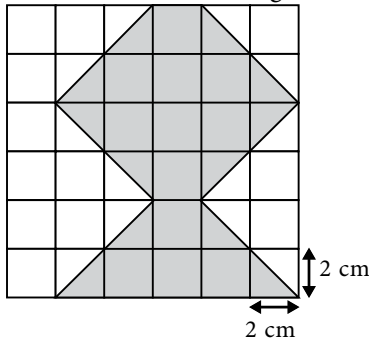


- (A) 28 sq. cm (B) 32 sq. cm
(C) 48 sq. cm (D) 64 sq. cm

33. A rectangular garden has length 24 m and breadth 15 m. Find the cost of manuring the garden at ₹ 8 per sq. m.

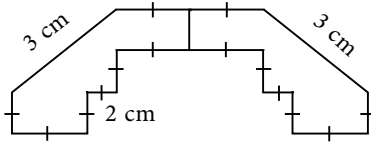
- (A) ₹ 2840 (B) ₹ 3220
(C) ₹ 2880 (D) ₹ 2860

34. Find the area of the shaded region.



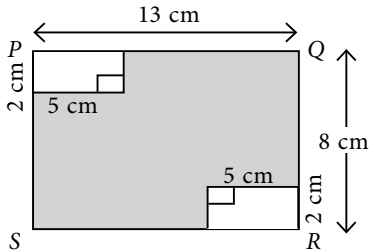
- (A) 64 sq. cm (B) 70 sq. cm
(C) 72 sq. cm (D) 60 sq. cm

35. Find the perimeter of the given figure (not drawn to scale).



- (A) 34 cm (B) 30 cm
(C) 38 cm (D) 32 cm

36. In the given figure (not drawn to scale), find the shaded area of the given figure.



- (A) 76 sq. cm (B) 80 sq. cm
(C) 84 sq. cm (D) 78 sq. cm

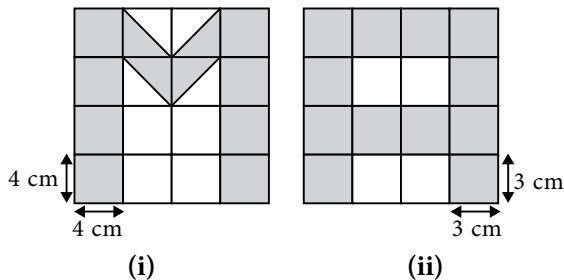
37. The perimeter of a rectangular floor is 82 cm. Find the area of the floor, if its length is 26 cm.

- (A) 390 sq. cm (B) 280 sq. cm
(C) 315 sq. cm (D) 295 sq. cm

38. Sohan jogs 8 times around a square park of side 75 m. Find the total distance he jogged.

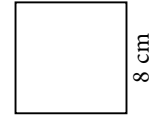
- (A) 1700 m (B) 1800 m
(C) 3600 m (D) 2400 m

39. Find the difference between the shaded area of two figures.



- (A) 65 sq. cm (B) 60 sq. cm
(C) 52 sq. cm (D) 80 sq. cm

40. If the side of the given square is double, then find its new area.

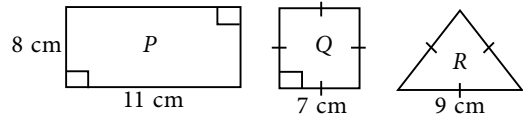


- (A) 280 sq. cm (B) 256 sq. cm
(C) 216 sq. cm (D) 220 sq. cm

41. A square park is fenced by a rope of length 32 m. Find the side of the park.

- (A) 6 m (B) 7 m
(C) 8 m (D) None of these

42. Which of the following figures has maximum perimeter?



- (A) P (B) Q
(C) R (D) Can't be determined

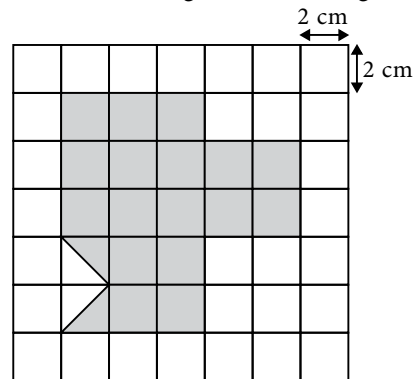
43. Priya wants to put a wooden border around a table. If the length of the table is 60 cm and its breadth is 30 cm, then what will be the cost of putting the border at ₹ 2 per cm?

- (A) ₹ 360 (B) ₹ 180
(C) ₹ 380 (D) None of these

44. A rectangular field measures 300 m by 50 m and square field measure 250 m each side. Which of the two fields has more area and by how much?

- (A) Square, 47500 sq. m
(B) Rectangle, 48000 sq. m
(C) Rectangle, 47500 sq. m
(D) Square, 48000 sq. m

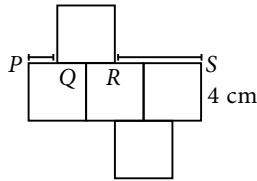
45. Find the area of the given shaded figure.



- (A) 68 sq. cm (B) 84 sq. cm
(C) 62 sq. cm (D) 72 sq. cm

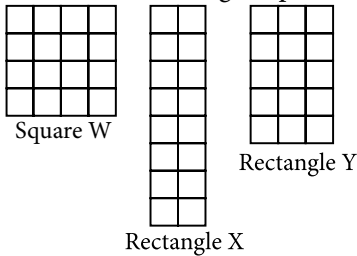
Achievers Section (HOTS)

46. The figure is made up of 5 identical squares. Find the perimeter of the given figure.



- (A) 48 cm (B) 38 cm
(C) 52 cm (D) 60 cm

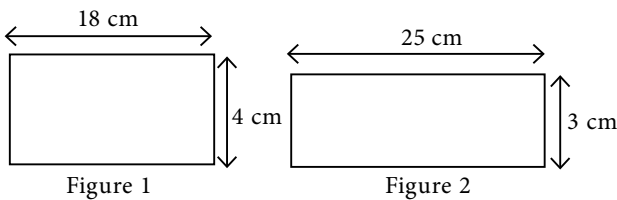
47. Sanjana drew the following shapes.



Which of the following statement is true about the shapes Sanjana drew ?

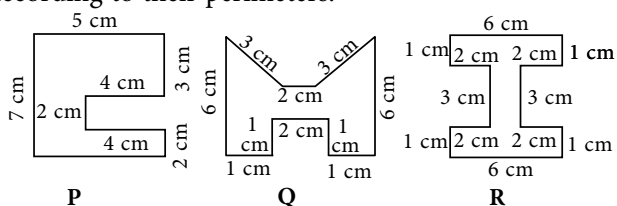
- (A) The area of square W is greater than the area of rectangle X.
(B) The area of rectangle X is half the area of rectangle Y.
(C) The area of square W is equal to the area of rectangle X.
(D) The area of rectangle Y is greater than the area of rectangle X.

48. Which of the following statements about the given figures (not drawn to scale) is correct?



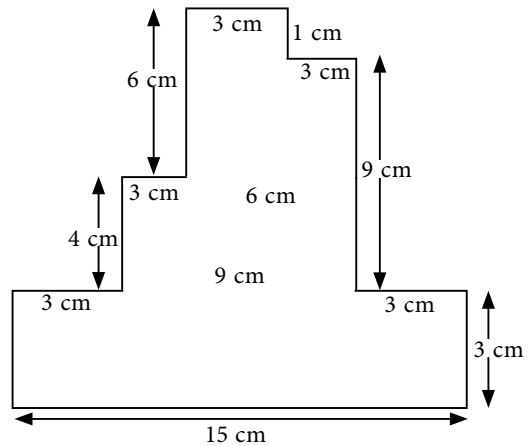
- (A) Perimeter of both the figures is same.
(B) Area of figure 2 is more than figure 1.
(C) Area of both the figures is same.
(D) None of these

49. Arrange the following figures in ascending order according to their perimeters.



- (A) Q, R, P (B) R, P, Q
(C) P, Q, R (D) Q, P, R

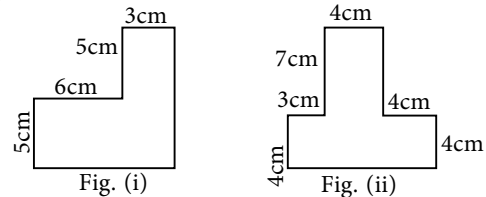
50. Find the area of the given figure.



- (A) 140 sq.cm (B) 120 sq.cm
(C) 138 sq.cm (D) None of these

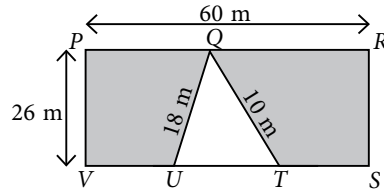
SOF IMO 2019 QUESTIONS

1. Find the difference between the areas of the given two figures (not drawn to scale).



- (A) 45 sq. cm (B) 26 sq. cm
(C) 18 sq. cm (D) 12 sq. cm (Level-1)

2. In the given figure (not drawn to scale), QR is $\frac{3}{5}$ as long as PR and $ST = TU = UV$.

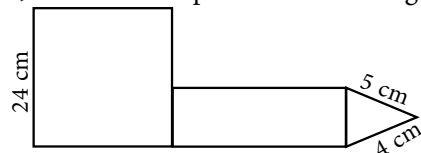


What is the perimeter of $PQUV$?

- (A) 48 m (B) 76 m
(C) 52 m (D) 88 m (Level-1)

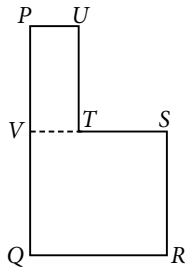
3. The given figure (not drawn to scale) is made up of a square, a triangle and a rectangle. The breadth of the rectangle is $\left(\frac{1}{4}\right)^{\text{th}}$ the length of the edge of the square.

If the sum of the area of the square and the rectangle is 732 sq. cm, then find the perimeter of the figure.



- (A) 112 cm (B) 118 cm
 (C) 210 cm (D) 151 cm (Level-1)

4. In the given figure, $VSRQ$ is a square and $PUTV$ is a rectangle. The area of the square $VSRQ$ is 400 cm^2 and the perimeter of the complete figure is 150 cm. Find the length of PQ .



- (A) 24 cm (B) 41 cm
 (C) 55 cm (D) 30 cm (Level-1)

5. Read the given statements carefully and select the correct option.

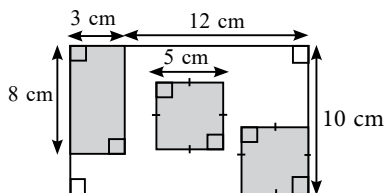
Statement-I : If the dimensions of a rectangle having length 16 m and breadth 13 m are doubled, then its new perimeter is 106 m.

Statement-II : The sum of all sides of a square field is 144 m, then the sum of opposite two sides of the field is 72 m.

- (A) Both Statement-I and Statement-II are true.
 (B) Both Statement-I and Statement-II are false.
 (C) Statement-I is true but Statement-II is false.
 (D) Statement-I is false but Statement-II is true.

(Level-1)

6. In the given figure (not drawn to scale), what fraction of the total area is shaded?



- (A) $\frac{34}{75}$ (B) $\frac{37}{75}$
 (C) $\frac{34}{150}$ (D) $\frac{37}{150}$ (Level-2)

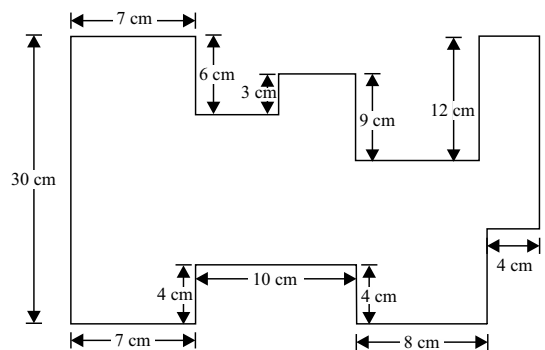
7. If area of 12 identical squares is 768 sq. cm , then find the perimeter of a square.

- (A) 35 cm (B) 21 cm
 (C) 28 cm (D) 32 cm (Level-2)

8. Kunal cut a wire and bent it to form 6 similar rectangles. The breadth of each rectangle is 4 cm less than the half of its length. If the breadth of a rectangle is 18 cm, then what is the original length of the wire?

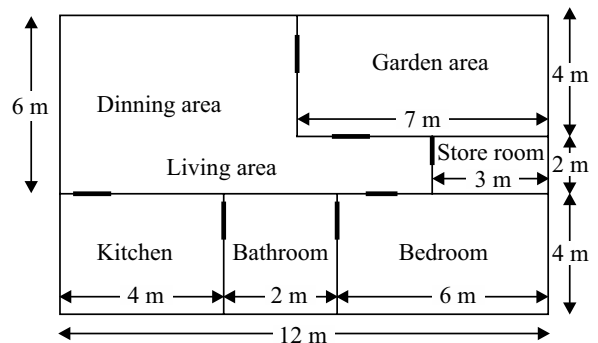
- (A) 656 cm (B) 744 cm
 (C) 696 cm (D) 764 cm (Level-2)

9. Find the perimeter of the given figure (not drawn to scale).



- (A) 156 cm (B) 183 cm
 (C) 146 cm (D) None of these (Level-2)

10. Study the given figure carefully and answer the question that follows.



What is the total area of living and dining room?

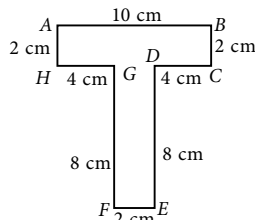
- (A) 35 sq. m (B) 36 sq. m
 (C) 37 sq. m (D) 38 sq. m (Level-2)

HINTS & EXPLANATIONS

SELF TEST - 1

1. (C): Area of rectangle = Length \times Breadth
 $= 15 \times 7 = 105$ sq. cm

2. (D): Perimeter of figure
 $= AB + BC + CD + DE$
 $+ EF + FG + GH + HA$
 $= (10 + 2 + 4 + 8 + 2 +$
 $8 + 4 + 2)$ cm
 $= 40$ cm



3. (C): Area of square = 81 sq. cm $= (9 \times 9)$ sq. cm
 \therefore Side of square = 9 cm

4. (D): Perimeter = $16 \times 3 = 48$ cm

5. (D): Number of shaded squares = 8

Area of 1 shaded square = $2 \times 2 = 4$ sq. cm

\therefore Area of 8 shaded squares = $8 \times 4 = 32$ sq. cm

EXERCISE

1. (D): Perimeter = $(5 + 2 + 3 + 4 + 3 + 2 + 5 + 2 +$
 $3 + 4 + 3 + 2)$ cm
 $= 38$ cm

2. (C): Length of the board = 75 cm

Breadth of the board = $\frac{2}{5} \times 75 = 30$ cm

So, perimeter of the board = $2(75 + 30) = 210$ cm

3. (A): Number of shaded squares = 4

Area of 1 shaded square = $1 \times 1 = 1$ sq. cm

Area of 4 shaded squares = $4 \times 1 = 4$ sq. cm

4. (C): Area of the rectangular field = 1512 sq. m

\Rightarrow Length \times Breadth = 1512

\Rightarrow Length $\times 28 = 1512$

\Rightarrow Length = $1512 \div 28 = 54$ m

5. (C): Number of shaded squares = 26

Area of each square = 1 sq. unit

So, area of shaded squares = $26 \times 1 = 26$ sq. units

6. (B): Since, Length = 3 \times Breadth

Length = 96 cm

So, breadth = $\frac{96}{3} = 32$ cm

\therefore Area = Length \times Breadth
 $= 96 \times 32 = 3072$ sq. cm

7. (B): Perimeter = $(7 + 4 + 2 + 5 + 3 + 3 + 2 + 12)$ cm
 $= 38$ cm

8. (A): Number of shaded squares = 7

Area of 1 shaded square = $3 \times 3 = 9$ sq. cm

Area of 7 shaded squares = 7×9
 $= 63$ sq. cm

9. (B): Side of square park = 40 m

Perimeter of square park = $40 \times 4 = 160$ m

\therefore Total distance walked by Kapil = $6 \times 160 = 960$ m

10. (A): Number of shaded squares = 10

Area of 1 shaded square = $2 \times 2 = 4$ sq. cm

\therefore Area of 10 shaded squares = $10 \times 4 = 40$ sq. cm

11. (B): Perimeter of the given figure = 30 cm

$\Rightarrow (4 + 5 + 5 + x + 6 + 5) = 30$ cm

$\Rightarrow 25 + x = 30$

$\Rightarrow x = 5$ cm

12. (A): Area of shaded part = Area of bigger
 rectangle – Area of smaller rectangle

$= (25 \times 15) - (5 \times 3)$

$= 375 - 15 = 360$ sq. cm

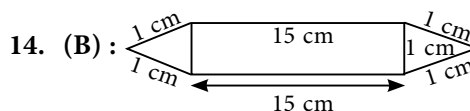
13. (A): Ritik covered the distance in one round

$$= \frac{576}{2} = 288 \text{ m}$$

So, perimeter of the square field = 288 m

\Rightarrow Each side of the square field = $\frac{288}{4} = 72$ m

\therefore Area of the square field = $72 \times 72 = 5184$ sq. m



Perimeter of the figure = $(1 + 15 + 1 + 1 + 15 + 1)$ cm
 $= 34$ cm

15. (C): Area of 1 rectangle = $6 \times 2 = 12$ sq. cm

Number of shaded rectangles = 3

So, area of shaded figure = $12 \times 3 = 36$ sq. cm

16. (C): Perimeter of 1 picture = $2(8 + 3) = 22$ cm

So, perimeter of 6 pictures = $6 \times 22 = 132$ cm

17. (B): Perimeter of the court = $2(20 + 6) = 52$ m

18. (D): Area of 1 square = $(5 \times 5) = 25$ sq. cm

Number of shaded squares = 3

So, area of shaded part = $25 \times 3 = 75$ sq. cm

19. (B): Total number of shaded squares = 21

Area of 1 square = 2 sq. units

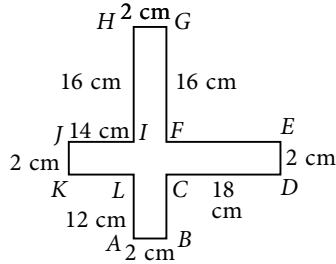
So, area of shaded figure = $21 \times 2 = 42$ sq. units

20. (B): Area of figure =

Area of rectangle *HGBA* + area of rectangle *JILK* + area
 angle *FEDC*

$$= (30 \times 2) + (18 \times 2) + (14 \times 2)$$

$$= 60 + 36 + 28 = 124 \text{ sq. cm}$$



21. (D): Area of given rectangle = $8 \times 6 = 48 \text{ sq. cm}$

New breadth = $6 - 2 = 4 \text{ cm}$

Now, new area = 48 sq. cm

\Rightarrow New length $\times 4 \text{ cm} = 48 \text{ sq. cm}$

\Rightarrow New length = $48 \div 4 = 12 \text{ cm}$

22. (A): Area of given rectangle = $32 \times 18 = 576 \text{ sq. cm}$

So, area of shaded region = $\frac{576}{2} = 288 \text{ sq. cm}$

23. (A): Perimeter of the given figure

= $(5 + 3 + 1 + 1 + 3 + 1 + 2 + 2 + 3 + 4 + 2 + 1) \text{ cm}$
= 28 cm

24. (B): Perimeter of figure P = $2 \times (6 + 5) = 22 \text{ cm}$

Perimeter of figure Q = $(7 + 3 + 9 + 3) = 22 \text{ cm}$

Perimeter of figure R = $(4 + 4 + 4 + 4) = 16 \text{ cm}$

25. (B): Perimeter of rectangle = 90 cm

Length = 35 cm

So, $2(\text{Length} + \text{Breadth}) = 90 \text{ cm}$

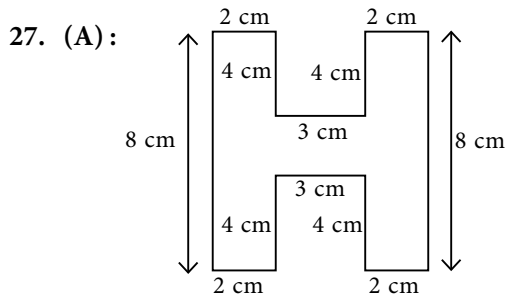
$\Rightarrow 35 + \text{Breadth} = 45$

$\Rightarrow \text{Breadth} = 10 \text{ cm}$

\therefore Area of rectangle = Length \times Breadth = 35×10
= 350 sq. cm

26. (D): Perimeter of rectangular field = $2[175 + 85]$
= 520 m

Hence, length of wire required = $5 \times 520 = 2600 \text{ m}$



Perimeter of the figure

= $(8 + 2 + 4 + 3 + 4 + 2 + 8 + 2 + 4 + 3 + 4 + 2) \text{ cm}$
= 46 cm

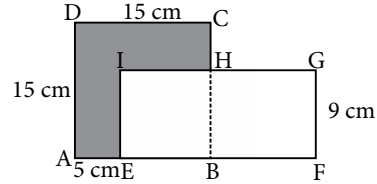
28. (B): Area of figure = Area of rectangle + Area of square = $(8 \times 5) + (4 \times 4)$

= $40 + 16 = 56 \text{ sq. cm}$

29. (B): Area of the square ABCD

$$= 15 \times 15 = 225 \text{ sq. cm}$$

So, area of the rectangle EFGI = 225 sq. cm



$\Rightarrow EF \times GF = 225$

$\Rightarrow EF = \frac{225}{9} = 25 \text{ cm}$

Now, $DC + GH = AE + EF = 5 + 25 = 30$

$CH + GF = AB = 15 \text{ cm}$

Perimeter of the figure = $AF + FG + GH + CH + CD + DA$
= $AF + (FG + CH) + (GH + DC) + DA$
= $30 + 15 + 30 + 15 = 90 \text{ cm}$

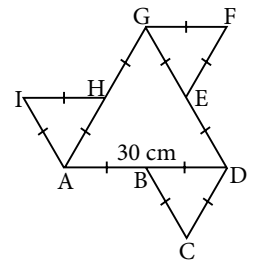
30. (A): $AD = 30 \text{ cm}$

$\Rightarrow AB + BD = 30 \text{ cm}$

$\Rightarrow 2AB = 30 \text{ cm}$

$\Rightarrow AB = 15 \text{ cm}$

So, perimeter of the given figure = $9 \times AB = 9 \times 15 = 135 \text{ cm}$



31. (C): Perimeter of each cloth

= $4 \times 32 = 128 \text{ cm}$

So, length of lace required for each cloth = 128 cm

Length of lace required for 20 clothes

= $20 \times 128 = 2560 \text{ cm}$

32. (B): Area of square QRSX = 4 sq. cm

= $(2 \times 2) \text{ sq. cm}$

\Rightarrow Side of square QRSX = 2 cm

$\therefore QX = XS = 2 \text{ cm} = RS = QR$

Area of rectangle XSTU = 8 sq. cm

$\Rightarrow XS \times XU = 8 \text{ sq. cm}$

$\Rightarrow XU = 4 \text{ cm} = ST$

Area of rectangle PQXW = 16 sq. cm

$\Rightarrow PQ \times QX = 16 \text{ sq. cm}$

$\Rightarrow PQ = (16 \div 2) \text{ sq. cm} = 8 \text{ cm}$

\therefore Area of shaded part = $WX \times XU$

= $8 \times 4 = 32 \text{ sq. cm}$

33. (C): Area of rectangular garden = $(24 \times 15) \text{ sq. m}$
= 360 sq. m

Since, cost of manuring per sq. m = ₹ 8

So, cost of manuring $360 \text{ sq. m} = ₹ (8 \times 360) = ₹ 2880$

34. (C): Number of shaded squares = 18

Area of 1 square = $2 \times 2 = 4 \text{ sq. cm}$

\therefore Area of shaded region = $18 \times 4 = 72 \text{ sq. cm}$

35. (A): Perimeter = $(3 + 3 + (14 \times 2)) \text{ cm} = 34 \text{ cm}$

36. (C): Area of rectangle PQRS = $13 \times 8 = 104 \text{ sq. cm}$

Area of each small rectangle = $5 \times 2 = 10 \text{ sq. cm}$

Area of 2 rectangles = $2 \times 10 = 20 \text{ sq. cm}$

So, area of shaded part = $(104 - 20) \text{ sq. cm} = 84 \text{ sq. cm}$

37. (A) : Perimeter of rectangular floor = 82 cm
 $\Rightarrow 2(\text{length} + \text{breadth}) = 82$
 $\Rightarrow 26 + \text{breadth} = 41$
 $\Rightarrow \text{Breadth} = 15 \text{ cm}$
 So, area of floor = $(26 \times 15) \text{ sq. cm} = 390 \text{ sq. cm}$

38. (D) : Perimeter of square park = $(4 \times 75) \text{ m}$
 $= 300 \text{ m}$
 So, total distance he jogged = $(8 \times 300) \text{ m} = 2400 \text{ m}$

39. (C) : Fig. (i) :
 Total number of shaded squares = 10
 Area of 1 square = $4 \times 4 = 16 \text{ sq. cm}$
 So, area of shaded part = $10 \times 16 = 160 \text{ sq. cm}$

Fig. (ii) :
 Total number of shaded squares = 12
 Area of 1 square = $3 \times 3 = 9 \text{ sq. cm}$
 So, area of shaded part = $12 \times 9 = 108 \text{ sq. cm}$
 So, required difference = $160 - 108 = 52 \text{ sq. cm}$

40. (B) : Side of given square = 8 cm
 New side of the square = $2 \times 8 = 16 \text{ cm}$
 So, area of new square = $(16 \times 16) \text{ sq. cm}$
 $= 256 \text{ sq. cm}$

41. (C) : Rope of length = Perimeter of square
 So, perimeter of square = 32 m
 $\Rightarrow 4 \times \text{Side} = 32 \text{ m}$
 $\Rightarrow \text{Side} = 32 \div 4 = 8 \text{ m}$

42. (A) : Perimeter of figure P = $2(11 + 8) = 38 \text{ cm}$
 Perimeter of figure Q = $4 \times 7 = 28 \text{ cm}$
 Perimeter of figure R = $3 \times 9 = 27 \text{ cm}$
 So, figure P has maximum perimeter.

43. (A) : Perimeter of table = $2(60 + 30) \text{ cm} = 180 \text{ cm}$
 As, cost of putting the border per cm = ₹ 2
 So, cost of putting the border 180 cm
 $= ₹(2 \times 180) = ₹ 360$

44. (A) : Area of rectangular field = $(300 \times 50) \text{ sq. m}$
 $= 15000 \text{ sq. m}$
 Area of square field = $(250 \times 250) \text{ sq. m} = 62500 \text{ sq. m}$
 So, square field has $(62500 - 15000) = 47500 \text{ sq. m}$
 more area than rectangular field.

45. (D) : Number of shaded squares = 18
 Area of 1 square = $2 \times 2 = 4 \text{ sq. cm}$
 So, area of shaded figure = $18 \times 4 = 72 \text{ sq. cm}$

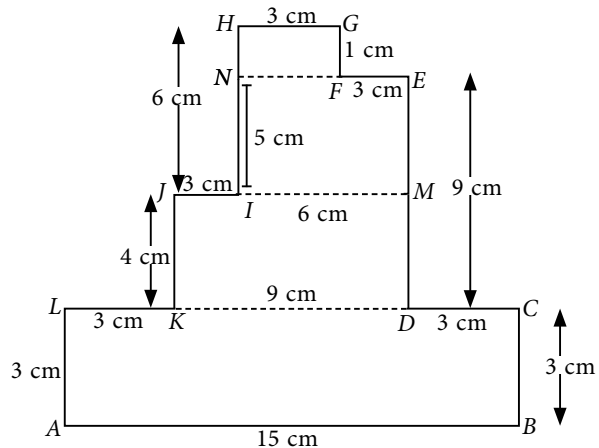
46. (A) : Required perimeter = $12 \times 4 = 48 \text{ cm}$

47. (C)

48. (B) : Perimeter of figure 1 = $2(18 + 4) = 44 \text{ cm}$
 Perimeter of figure 2 = $2(25 + 3) = 56 \text{ cm}$
 Area of figure 1 = $18 \times 4 = 72 \text{ sq. cm}$
 Area of figure 2 = $25 \times 3 = 75 \text{ sq. cm}$

49. (A) : Perimeter of figure P = $(5 + 3 + 4 + 2 + 4 + 2 + 5 + 7) \text{ cm} = 32 \text{ cm}$
 Perimeter of figure Q = $(6 + 3 + 2 + 3 + 6 + 1 + 1 + 2 + 1 + 1) \text{ cm} = 26 \text{ cm}$
 Perimeter of figure R = $(6 + 1 + 2 + 3 + 2 + 1 + 6 + 1 + 2 + 3 + 2 + 1) \text{ cm} = 30 \text{ cm}$
 So, correct ascending order is Q, R, P.

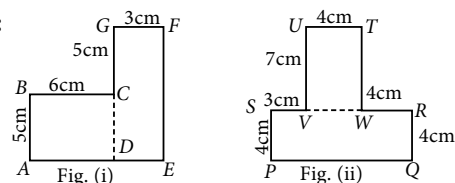
50. (D) :



Area of given figure = Area of rectangle ABCL + Area of rectangle KDMJ + Area of rectangle IMEN + Area of rectangle NFGH
 $= (15 \times 3) + (9 \times 4) + (6 \times 5) + (3 \times 1)$
 $= 45 + 36 + 30 + 3 = 114 \text{ sq. cm}$

SOF IMO 2019 QUESTIONS

1. (D) :



For figure (i) :

Area of rectangle ABCD = $BC \times AB = 6 \times 5 = 30 \text{ sq. cm}$
 Area of rectangle DEFG = $DG \times GF$
 $= (DC + CG) \times 3 = 10 \times 3 = 30 \text{ sq. cm}$
 So, area of figure (i) = $30 + 30 = 60 \text{ sq. cm}$

For figure (ii) :

Area of rectangle PQRS = $PQ \times QR = 11 \times 4 = 44 \text{ sq. cm}$
 Area of rectangle TUVW = $TU \times UV = 4 \times 7 = 28 \text{ sq. cm}$
 So, area of figure (ii) = $44 + 28 = 72 \text{ sq. cm}$
 \therefore Required difference = $72 - 60 = 12 \text{ sq. cm}$

2. (D) : Since, $UV + UT + TS = PR$

$\Rightarrow 3 UV = 60 \text{ m}$ ($\because UV = UT = TS$)
 $\Rightarrow UV = 20 \text{ m}$

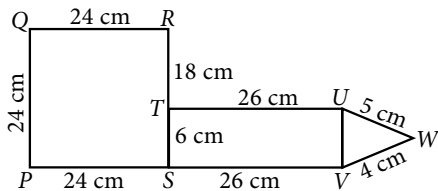
Also, $QR = \frac{3}{5} PR = \frac{3}{5} \times 60 = 36 \text{ m}$

So, $PQ = PR - QR = 60 - 36 = 24 \text{ m}$

\therefore Perimeter of PQUV = $24 + 18 + 20 + 26 = 88 \text{ m}$

3. (D): Let l be the length of the rectangle.

Length of side of square $PQRS = 24$ cm



So, breadth of rectangle $STUV = \frac{1}{4} \times 24 = 6$ cm

Now, area of square + area of rectangle = 732 sq. cm

$$\Rightarrow 24 \times 24 + l \times 6 = 732$$

$$\Rightarrow 6l = 732 - 576 \Rightarrow 6l = 156$$

$$\Rightarrow l = 156 \div 6 = 26 \text{ cm}$$

Now, perimeter of figure = $PQ + QR + RT + TU + UW + WV + VS + SP$

$$= 24 + 24 + 18 + 26 + 5 + 4 + 26 + 24 = 151 \text{ cm}$$

4. (C): Area of square $VSRQ = 400 \text{ cm}^2$

$$\Rightarrow \text{Side} \times \text{Side} = 400 \text{ cm}^2 = 20 \times 20 \text{ cm}^2$$

$$\Rightarrow \text{Side} = 20 \text{ cm}$$

$$\therefore VS = SR = RQ = QV = 20 \text{ cm}$$

Now, perimeter of given figure = 150 cm

$$\Rightarrow PU + UT + TS + SR + RQ + QV + VP = 150 \text{ cm}$$

$$\Rightarrow (PU + TS) + PV + SR + RQ + QV + PV = 150 \text{ cm}$$

$$\Rightarrow 20 + 20 + 20 + 20 + 2PV = 150$$

$$\Rightarrow 2PV = 70 \Rightarrow PV = 35 \text{ cm}$$

$$\text{So, } PQ = PV + VQ = 35 + 20 = 55 \text{ cm}$$

5. (D): **Statement-I**: Length of rectangle = 16 m

Breadth of rectangle = 13 m

$$\text{New length} = 2 \times 16 = 32 \text{ m}$$

$$\text{New breadth} = 2 \times 13 = 26 \text{ m}$$

$$\text{New perimeter} = 2(32 + 26) = 116 \text{ m}$$

So, Statement-I is false.

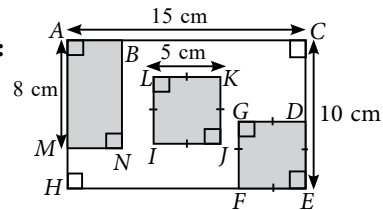
Statement-II: Perimeter of square field = 144 m

$$\Rightarrow \text{Side of square} = \frac{144}{4} = 36 \text{ m}$$

$$\text{Sum of opposite two sides of square} = 36 + 36 = 72 \text{ m}$$

So, Statement-II is true.

6. (B):



Area of rectangle = $ACEH = (15 \times 10) \text{ sq. cm} = 150 \text{ sq. cm}$

Area of rectangle $ABNM = (3 \times 8) = 24 \text{ sq. cm}$

Area of 2 squares = $2 \times (5 \times 5) = 50 \text{ sq. cm}$

So, total area of shaded parts = $(24 + 50) = 74 \text{ sq. cm}$

$$\text{Hence, required fraction} = \frac{74}{150} = \frac{37}{75}$$

7. (D): Area of 12 identical squares = 768 sq. cm

$$\Rightarrow 12 \times \text{side} \times \text{side} = 768 \text{ sq. cm}$$

$$\Rightarrow \text{Side} \times \text{side} = 64 \text{ sq. cm}$$

$$\Rightarrow \text{Side} = 8 \text{ cm}$$

Now, perimeter of a square = $4 \times 8 = 32 \text{ cm}$

8. (B): Breadth of rectangle = 18 cm

$$\text{Since, breadth} = \frac{\text{Length}}{2} - 4$$

$$\Rightarrow \frac{\text{Length}}{2} = 22$$

$$\Rightarrow \text{Length} = 44 \text{ cm}$$

So, length of wire = Perimeter of 6 rectangles

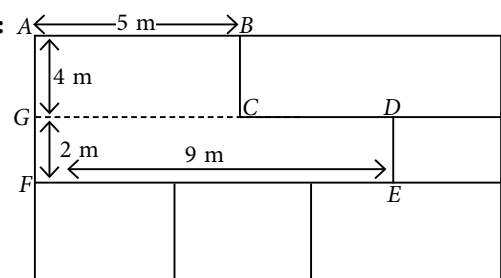
$$= 6 \times [2(44 + 18)]$$

$$= 6 \times [124] = 744 \text{ cm}$$

9. (A): Perimeter of the given figure

$$= 7 + 6 + 10 + 3 + 9 + 8 + 12 + 4 + 30 + 4 + 8 + 4 + 10 + 4 + 7 + 30 = 156 \text{ cm}$$

10. (D):



Total area of living and dining room = Area $(ABCG) +$

$$\text{Area } (GDEF) = (5 \times 4) + (9 \times 2)$$

$$= 20 + 18 = 38 \text{ sq. m}$$