Perimeter and Area

PRACTICE SET 44 [PAGE 80]

Practice Set 44 | Q 1 | Page 80

If the length and breadth of a rectangle are doubled, how many times the perimeter of the old rectangle will that of the new rectangle be?

Solution: Let the length of the old rectangle = l

Let the breadth of the old rectangle = b

Perimeter of the old rectangle = 2(length + breadth) = 2(l + b)

When the length and the breadth of the rectangle are doubled, then

length of the new rectangle = 2l

breadth of the new rectangle = 2b

∴ Perimeter of new rectangle = 2(length + breadth)

= 2(2l + 2b)

= 2 × 2(l + b)

= 2 × perimeter of the old rectangle .....[∵ perimeter of old rectangle = 2(l + b)]

Hence, the perimeter of the new rectangle will become two times the perimeter of the old rectangle.

Practice Set 44 | Q 2 | Page 80

If the side of a square is tripled, how many times the perimeter of the first square will that of the new square be?

Solution: Let the length of each side of the old square = s

Then, perimeter of the old square = 4 × side = 4 × s = 4s

When the length of each side of the square is tripled, then

length of each side of the new square = 3s

∴ perimeter of the new square = 4 × side

= 4 × 3s

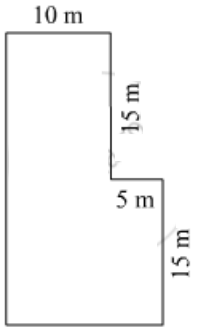
= 3 × 4s

= 3 × perimeter of the old square .....[∵ perimeter of the old square = 4s]

Hence, the perimeter of the new square will become three times the perimeter of the old square.

Practice Set 44 | Q 3 | Page 80

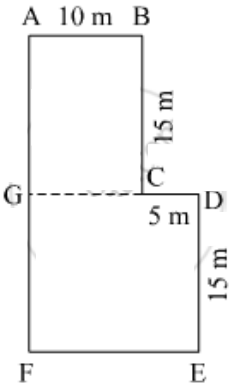
Given alongside is the diagram of a playground. It shows the length of its sides. Find the perimeter of the playground.



Solution: It is known that the perimeter of a polygon is equal to the sum of the lengths of all the sides of the polygon.

Let us mark the vertices of the given polygon as A, B, C, D, E, and F.

The given figure can be broken into rectangle and square by drawing a line CG || BA.



Now, ABCG is a rectangle and GDEF is a square.

Since, opposite sides of rectangle are equal, then

GC = AB = 10 m and AG = BC = 15 m

Since length of each sides of square is equal, then

GD = DE = EF = FG = 15 m

Perimeter of ABCDEFG

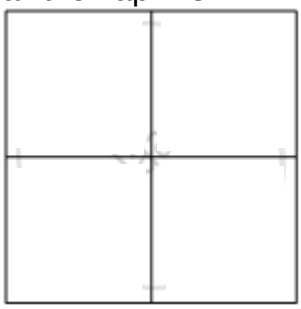
= AB + BC + CD + DE + EF + FG + GA

= 10 + 15 + 5 + 15 + 15 + 15 + 15

= 90 m

Practice Set 44 | Q 4 | Page 80

As shown in the figure, four napkins all of the same size were made from a square piece of cloth of length 1 m. What length of lace will be required to trim all four sides of all the napkins?



Solution: Length of each side of a square piece of cloth = 1 m

Now, four napkins all of the same size were made from this square piece of cloth.

∴ Length of each side of a napkin, s = Length of each side of a square piece of cloth ÷ 2

= 1 ÷ 2

= 1/2 m

Length of lace needed to trim all the four sides of a napkin = perimeter of a napkin

= 4 × s

= 4 × 1/2

= 2 m

∴ Length of lace needed to trim all the four sides of four napkins = 4 × lengths of lace needed for a napkin

= 4 × 2

= 8 m

PRACTICE SET 45 [PAGE 82]

Practice Set 45 | Q 1 | Page 82

If the side of a square is 12 cm, find its area.

Solution: Length of each side of square, s = 12 cm

∴ Area of square = s^2

= $(12)^2$

= 12 × 12

= 144 cm^2

Thus, the area of the square is 144 cm^2.

Practice Set 45 | Q 2 | Page 82

If the length of a rectangle is 15 cm and breadth is 5 cm, find its area.

Solution: Length of the rectangle, l = 15 cm

Breadth of the rectangle, b = 5 cm

∴ Area of rectangle = l × b

= 15 × 5

= 75 cm^2

Hence, the area of the rectangle is 75 cm^2.

Practice Set 45 | Q 3 | Page 82

The area of a rectangle is 102 sqcm. If its length is 17 cm, what is its perimeter?

Solution: Area of rectangle = 102 cm^2

Length of the rectangle, l = 17 cm

∴ Breadth of the rectangle, b

$$= \frac{\text{area of rectangle}}{\text{length of rectangle}} \quad \text{.....(} \because \text{ area of rectangle = length} \times \text{breadth)}$$

$$\Rightarrow b = \frac{102}{17} = 6 \text{ cm}$$

Perimeter of rectangle = 2(length + breadth)

= 2(17 + 6)

= 2 × 23

= 46 cm

Practice Set 45 | Q 4 | Page 82

If the side of a square is tripled, how many times will its area be as compared to the area of the original square?

Solution: Let the length of each side of the original square = s

Area of original square = side × side = s^2

When the side of the square is tripled, then

length of each side of new square = 3s

Area of new square = side × side

= 3s × 3s

= $9s^2$

= 9 × s^2

= 9 × area of original square .....[∵ area of original square = s^2]

Hence, the area of the new square will become nine times the area of the original square.

PRACTICE SET 46 [PAGE 84]

Practice Set 46 | Q 1 | Page 84

A page of a calendar is 45 cm long and 26 cm wide. What is its area?

Solution: Length of the calendar, l = 45 cm

Breadth of the calendar, b = 26 cm

∴ Area of calendar = l × b

= 45 × 26

= 1170 cm^2

Practice Set 46 | Q 2 | Page 84

What is the area of a triangle with base 4.8 cm and height 3.6 cm?

Solution: We have, the base of a triangle = 4.8 cm

Height of a triangle = 3.6 cm

∴ Area of a triangle = 1/2 × base × height

= 1/2 × 4.8 × 3.6

= 8.64 cm^2

Practice Set 46 | Q 3 | Page 84

What is the value of a rectangular plot of land 75.5 m long and 30.5 m broad at the rate of 1000 rupees per square metre?

Solution: Length of the rectangular plot of land, l = 75.5 m

Breadth of the rectangular plot of land, b = 30.5 m

∴ Area of a rectangular plot of land = l × b

= 75.5 × 30.5

= 2302.75 m^2

Cost of 1 m^2 of a rectangular plot of land = 1000 rupees

∴ Cost of 2302.75 m^2 of a rectangular plot of land = 1000 × 2302.75

= 2302750 rupees

Hence, the value of the rectangular plot of land is Rs 2302750.

Practice Set 46 | Q 4 | Page 84

A rectangular hall is 12 m long and 6 m broad. Its flooring is to be made of square tiles of side 30 cm. How many tiles will fit in the entire hall? How many would be required if tiles of side 15 cm were used?

Solution: Length of the rectangular hall, l = 12 m

Breadth of the rectangular hall, b = 6 m

Area of the floor of the rectangular hall = l × b

= 12 × 6

= 72 m^2

Length of each side of square tile used in the first case = 30 cm = 30/100 m = 0.3 m .....(∵ 100 cm = 1 m)

Area of each tile = side × side

= 0.3 × 0.3

= 0.09 m^2

$$\therefore \text{Required number of square tiles each of side 30 cm} = \frac{\text{area of floor}}{\text{area of each tile}}$$

$$= \frac{72}{0.09}$$

$$= \frac{72 \times 100}{9}$$

= 800

Length of each side of square tile used in the second case = 15 cm

$$= \frac{15}{100} \text{ m} = 0.15 \text{ m}$$

Area of each tile = side × side

= 0.15 × 0.15

$= 0.0225\ m^2$

$\therefore$ Required number of square tiles each of side 15 cm $= \frac{\text{area of floor}}{\text{area of each tile}}$

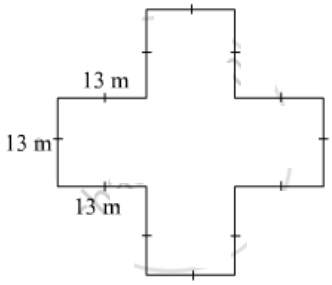
$= \frac{72}{0.0225}$

$= \frac{72 \times 10000}{225}$

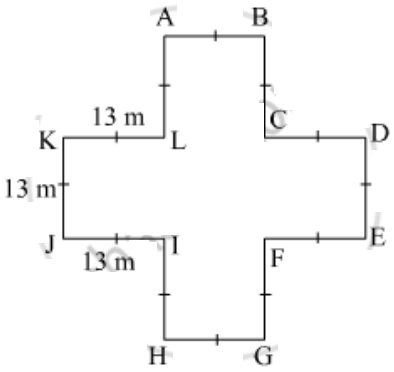
$= 3200$

Practice Set 46 | Q 5 | Page 84

Find the perimeter and area of a garden with measures as shown in the figure alongside.

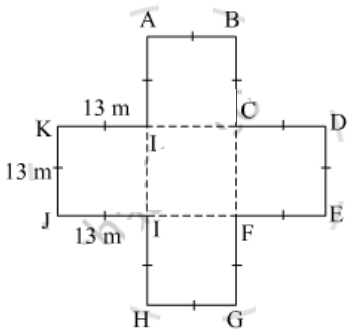


Solution:



Let us mark the vertices of the given polygon as A, B, C, D, E, F, G, H, I, J, K, and L.
Perimeter of garden ABCDEFGHIJKL = sum of all the sides of polygon = AB + BC + CD + DE + EF + FG + GH + HI + IJ + JK + KL
= 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13 + 13
= 143 m

The given figure of the garden can be broken into five squares as follows.



Now, the length of each side of each of the five squares is equal to 13 m.
Area of each square = side × side
= 13 × 13
= 169 m^2
∴ Area of the five squares = 5 × areas of each square
= 5 × 169
= 845 m^2
Hence, the area of the given garden is 845 m^2.

PRACTICE SET 47 [PAGE 86]

Practice Set 47 | Q 1.1 | Page 86

Find the total surface area of the cube having the following side.

3 cm

Solution: Length of each side of cube, l = 3 cm

∴ Total surface area of the cube = 6 × l^2

= 6 × $(3)^2$

= 6 × 9

= 54 cm^2

Practice Set 47 | Q 1.2 | Page 86

Find the total surface area of the cube having the following side.

5 cm

Solution: Length of each side of cube, l = 5 cm

∴ Total surface area of the cube = 6 × l^2

= 6 × $(5)^2$

= 6 × 25

= 150 cm^2

Practice Set 47 | Q 1.3 | Page 86

Find the total surface area of the cube having the following side.

7.2 m

Solution: Length of each side of cube, l = 7.2 m

∴ Total surface area of the cube = 6 × l^2

= 6 × $(7.2)^2$

= 6 × 51.84

= 311.04 m^2

Practice Set 47 | Q 1.4 | Page 86

Find the total surface area of the cube having the following side.

6.8 m

Solution: Length of each side of cube, l = 6.8 m

∴ Total surface area of the cube = 6 × l^2

= 6 × $(6.8)^2$

= 6 × 46.24

= 277.44 m^2

Practice Set 47 | Q 1.5 | Page 86

Find the total surface area of the cube having the following side.

5.5 m

Solution: Length of each side of cube, l = 5.5 m

∴ Total surface area of the cube = 6 × l^2

= 6 × $(5.5)^2$

= 6 × 30.25

= 181.50 m^2

Practice Set 47 | Q 2.1 | Page 86

Find the total surface area of the cuboid of length, breadth, and height as given below:

12 cm, 10 cm, 5 cm

Solution: Length of the cuboid, l = 12 cm
Breadth of the cuboid, b = 10 cm
Height of the cuboid, h = 5 cm
∴ Total surface area of the cuboid = 2(l × b + b × h + h × l)
= 2(12 × 10 + 10 × 5 + 5 × 12)
= 2(120 + 50 + 60)
= 2 × 230
= 460 cm^2

Practice Set 47 | Q 2.2 | Page 86

Find the total surface area of the cuboid of length, breadth, and height as given below:

5 cm, 3.5 cm, 1.4 cm

Solution: Length of the cuboid, l = 5 cm
Breadth of the cuboid, b = 3.5 cm
Height of the cuboid, h = 1.4 cm
∴ Total surface area of the cuboid = 2(l × b + b × h + h × l)
= 2(5 × 3.5 + 3.5 × 1.4 + 1.4 × 5)
= 2(17.5 + 4.9 + 7.0)
= 2 × 29.4
= 58.8 cm^2

Practice Set 47 | Q 2.3 | Page 86

Find the total surface area of the cuboid of length, breadth, and height as given below:

2.5 cm, 2 m, 2.4 m

Solution: Length of the cuboid, l = 2.5 cm = 2.51002.5100 m = 0.025 m .....[∵ 100 cm = 1 m]
Breadth of the cuboid, b = 2 m
Height of the cuboid, h = 2.4 m

∴ Total surface area of the cuboid = 2(l × b + b × h + h × l)

= 2(2.5 × 2 + 2 × 2.4 + 2.4 × 2.5)

= 2(5 + 4.8 + 6)

= 2 × 15.8

= 31.6 m^2

Practice Set 47 | Q 2.4 | Page 86

Find the total surface area of the cuboid of length, breadth, and height as given below:

8 m, 5 m, 3.5 m

Solution: Length of the cuboid, l = 8 m

Breadth of the cuboid, b = 5 m

Height of the cuboid, h = 3.5 m

∴ Total surface area of the cuboid = 2(l × b + b × h + h × l)

= 2(8 × 5 + 5 × 3.5 + 3.5 × 8)

= 2(40 + 17.5 + 28)

= 2 × 85.5

= 171 m^2

Practice Set 47 | Q 3 | Page 86

A matchbox is 4 cm long, 2.5 cm broad, and 1.5 cm in height. Its outer sides are to be covered exactly with craft paper. How much paper will be required to do so?

Solution: Length of the matchbox, l = 4 cm

Breadth of the matchbox, b = 2.5 cm

Height of the matchbox, h = 1.5 cm

∴ Surface area of the box

= 2(l × b + b × h + h × l)

= 2(4 × 2.5 + 2.5 × 1.5 + 1.5 × 4)

= 2(10 + 3.75 + 6)

= 2 × 19.75

= 39.5 cm^2

Hence, 39.5 cm^2 of the craft paper will be needed to cover the matchbox.

Practice Set 47 | Q 4 | Page 86

An open box of length 1.5 m, breadth 1 m, and height 1 m is to be made for use on a trolley for carrying garden waste. How much sheet metal will be required to make this box? The inside and outside surface of the box is to be painted with rust-proof paint. At a rate of 150 rupees per sqm, how much will it cost to paint the box?

Solution: Length of the open box, l = 1.5 m

Breadth of the open box, b = 1 m

Height of the open box, h = 1 m

Surface area of open box = Total surface area of the box − Area of the top

= 2(l × b + b × h + h × l) − l × b

= 2(1.5 × 1 + 1 × 1 + 1 × 1.5) − 1.5 × 1

= 2(1.5 + 1 + 1.5) − 1.5

= 2 × 4 − 1.5

= 8 − 1.5

= 6.5 m^2

Hence, 6.5 m^2 of the sheet will be needed to make the open box.

Now, it is given that the inside and the outside surface of the open box is to be painted with rust-proof paint.

∴ Total area of the box to be painted = 2 × Surface area of open box

= 2 × 6.5

= 13 m^2

Now, the cost of the painting of 1 m^2 of area = 150 rupees

∴ Cost of painting of 13 m^2 of area = 16 × 150 = 1950 rupees

Hence, it will cost 1950 rupees to paint the open box from inside and outside with rust-proof paint.