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NCERT Class 9 Solutions: Surface Areas and Volumes (Chapter 13) Exercise 13.1 – Part 1

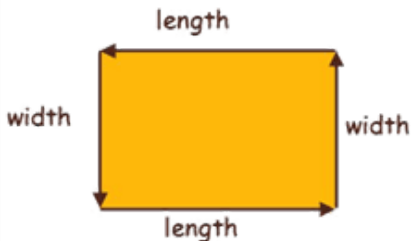
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PERIMETER AND AREA

Perimeter

Perimeter of a shape is the total length of its sides.

Perimeter of a rectangle = length + width + length + width



$$P = l + w + l + w$$

$$P = 2l + 2w$$

$$P = 2(l + w)$$

Q-1 A plastic box 1.5m long, 1.25m wide and 65 cm deep is to be made. It is opened at the top. Ignoring the thickness of the plastic sheet, determine:

1. The area of the sheet required for making the box.
2. The cost of sheet, if a sheet measuring $1m^2$ costs ₹20 .

Solution:



- Plastic box length is $(l) = 1.5m$
- Plastic box width is $(b) = 1.25m$
- Plastic box depths is $(h) = 65\text{ cm} = 0.65m$

Solution (i) The area of sheet required to make the box is equal to the surface area of the box excluding the top.

- Surface area of the box = Lateral surface area + Area of the base
- $2(l + b) \times h + (l \times b)$
- $2(1.5 + 1.25) \times 0.65 + (1.5 \times 1.25)$
- $(3.575 + 1.875) m^2$
- $5.45m^2$

The sheet required required to make the box is $5.45m^2$

Solution (ii) Cost of $1m^2$ of sheet = ₹20

\therefore Cost of $5.45m^2$ of sheet = ₹ $(20 \times 5.45) = ₹109$

Q-2 The length, breadth and height of a room are $5m, 4m$ and $3m$ respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of ₹7.50 $perm^2$

Solution:

- The room length is $(l) = 5m$
- The room breadth is $(b) = 4m$
- The room height is $(h) = 3m$

Area of four walls including the ceiling = Area of walls $(2 \times l \times h + 2 \times l \times b)$ + area of ceiling $(l \times b)$

- $2(l + b) \times h + (l \times b)$
- $2(5 + 4) \times 3 + (5 \times 4) m^2$
- $(54 + 20) m^2$
- $74m^2$

Cost of white washing = ₹7.50 $perm^2$

Total cost = ₹. (74 × 7.50) = ₹. 555

Q-3 The floor of a rectangular hall has a perimeter $250m$. If the cost of painting the four walls at the rate of ₹. 10 $perm^2$ is ₹15000, find the height of the hall.

Solution:

- Perimeter of rectangular hall = $2(l + b) = 250m$
- Total cost of painting = ₹15000
- Rate per m^2 = ₹. 10

Area of four walls = $2 \times l \times h + 2 \times b \times h = (2 \times l + 2 \times b) \times h$

- Now $(2 \times l + 2 \times b)$ is the perimeter of the floor which is 250 m. Therefore, area of four walls is $(250 \times h) m^2$
- Total cost of painting = Area of four walls hall × rate per square m = $(250 \times h) \times 10 = ₹15000$
- Therefore, $2500 \times h = ₹15000$ or $h = \frac{15000}{2500} m = 6m$

So, the height of the hall is $6m$.