# 12. Perimeter and Area

- Perimeter of a rectangle = 2 (length + breadth)

  **Example:**

  What is the perimeter of a rectangular field whose length and breadth are 15 m and 8 m respectively?

  **Solution:**

  Perimeter of rectangular field = 2 (15 m + 8 m) = (2 × 23) m = 46 m

Perimeter of an equilateral triangle = 3 × length of a side
Perimeter of a square = 4 × length of a side
In general, perimeter of a regular closed polygon = Number of sides of the polygon × length of each side

**Example:**
**If a farmer wants to fence a square field of length 50 m with 5 rounds of wire then what is the length of the wire required?**

**Solution:**

Length of wire required = 5 × (perimeter of square field)

= 5 × (4 × side)

= 5 × [(4 × 50) m]

= 1000 m

- Area of a rectangle is given by the formula:

  **Area of a rectangle = length × breadth**
  **Example:** How much carpet is required to cover a rectangular floor of length 25 m and breadth 18 m?

  **Solution:** Area of the carpet required = Area of rectangular floor

  = 25 m × 18 m = 450 $m^2$

- Area of a square is given by the formula:

  **Area of a square = side × side**

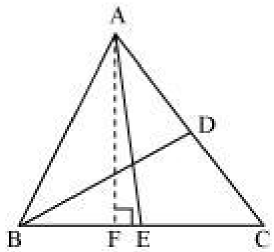
  **Example:** What is the area of a square park of side 10 m 20 cm?

  **Solution:** Length of park = 10 m 20 cm = 10.2 m

  ı of ark = 10.2 m × 10.2 m = 104.04 $m^2$

- Area of a triangle:
  - Area of a triangle = $\frac{1}{2}\times\text{Base}\times\text{Altitude}$
  - All the congruent triangles are equal in area, but the triangles having equal areas may or may not be congruent.

**Example:** ΔABC is isosceles with AC = BC = 6 cm. AE and BD are the medians and AF = 4 cm. What is the area of ΔABD?




**Solution:** In ΔABE and ΔBAD, we have

BE = AD $\left[AC = BC \Rightarrow \frac{1}{2}AC=\frac{1}{2}BC\right]$]

∠ABE = ∠BAD [Angles opposite to equal sides]

AB = AB [Common]

⇒ ΔABE ≅ ΔBAD [By SAS congruency criterion]

Area (ΔABE) = Area (ΔBAD)

Now, Area ΔABE $=\frac{1}{2}\times\text{Base}\times\text{Altitude}$

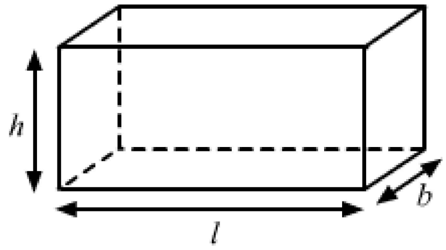
$=\frac{1}{2}\times BE\times AF$

$=\frac{1}{2}\times\left(\frac{6\text{ cm}}{2}\right)\times 4\text{cm}$

$= 6\text{ cm}^2$

⇒ Area ΔABD = 6 $cm^2$

- **Surface areas of cuboid:**




Lateral surface area of the cuboid = $2h(l + b)$

Total surface area of the cuboid = $2(lb + bh + hl)$

**Note:** Length of the diagonal of a cuboid = $\sqrt{l^2 + b^2 + h^2}$

**Example**:

**Find the edge of a cube whose surface area is 294 $m^2$.**

**Solution**:

Let the edge of the given cube be *a*.

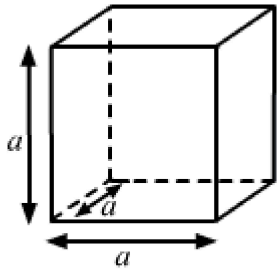
∴ Surface area of the cube = $6a^2$

Given, $6a^2 = 294$

$\Rightarrow a^2 = 49\ \text{m}^2$

$\therefore a = \sqrt{49}\ \text{m} = 7\ \text{m}$

- **Surface areas of cube:**




Lateral surface area of the cube = $4a^2$

Total surface area of the cube = $6a^2$

**Note:** Length of the diagonal of a cube = $\sqrt{a^2 + a^2 + a^2} = \sqrt{3a^2} = \sqrt{3}a$