Area and Perimeter

Real – Life Example

- Whenever we have to pave any surface with tiles we calculate the area to be paved and the area covered by one tile. This gives the no. of tiles to be used In fencing an area we find the perimeter of the garden etc. which gives us the length of wire to be used.

Historical preview

- The uniform systems of measur3ements seem to have been created by Egypt, Mesopotamia and Indus valley people. Indus valley people achieved great accuracy in measurement of length, time etc.

LEARNING OBJECTIVE

This lesson -will help you to:—

- Understand the concept of area and perimeter of polygons.
- Calculate the area, perimeter and volume of two dimensional and three dimensional shapes.

QUICK CONCEPT REVIEW

AREA is the space occupied by a closed figure. For example: the area covered by a carpet on the floor.

PERIMETER is the distance around a closed figure. For I example: when you take a round around your play ground the distance covered by you in taking one round is called the perimeter.

Area of square

As we know that the square has all its four sides equal. The formula for area of a square is side x side.

For example: Calculate the area of a square with each side of 5 cm.

Then to calculate the area of the square we apply the formula side x side.

$5 \times 5 = 25$, so the area of the square will be 25.

UNITS: While calculating the area of square we are multiplying two numbers with same unit. Like in the example above, 5cm is multiplied by 5cm so the result

will be in cm^2. This means the area will be $25\,cm^2$. Whenever we find area of the square the units will be square units, like m2, cm^2. or $inch^2$. etc.

Amazing Facts

- If base of a triangle is doubled the area of the triangle also gets doubled.

- ❖ When there are two rectangles of same perimeter, closer the length and the width, greater is the area.

  For example, if there are three rectangles with sides:

- ➢ l = 1; b= 5 perimeter is 2 (1 + 5) $= 2 \times 6 = 12$ units: area is $1 \times 5 = 5sq$ units.
- ➢ l = 2; b = 4 perimeter is 2(2 + 4) $= 2 \times 6 = 12$ units; area is $2 \times 4 = 8sq$ units.
- ➢ l = 3; b = 3 permeter is 2(3 + 3) $= 2 \times 6 = 12$ units; area is $3 \times 3 = 9sq$ units.

  In all of the above given rectangles, perimeter is same. The rectangle in which the difference between the sides is least (case iii), that rectangle has the greatest area.

  [Difference in sides – (i) 5 – 1 = 4, (ii) 4 – 2 = 2, (iii) 3 – 3]

- ❖ Similarly if the areas of three rectangles are equal, closer the length and width smaller is the area. You can try this yourself !!!!

Perimeter of square

When we find the perimeter of square we add all the sides or we multiply the length of one side by 4.

For example: Calculate the perimeter of a square with each side 4 units.

Perimeter of square = $4 \times side$

So, $4 \times 4 = 16 \Rightarrow$ the perimeter of square is 16 units.

The units of perimeter of a figure will be the same as that of units of side of the figure. Like cm, m and inches.

Area of rectangle

As we know there is length and breadth in a rectangle.

So, to calculate area of rectangle we multiply length by breadth.

So area of a rectangle is length $\times$ breadth

For example to calculate the area of a rectangle with length = 5cm and breadth = 9cm, we multiply 5 by 9

$5 \times 9 = 45$, So the area of rectangle is $45cm^2$.

Perimeter of rectangle

If we want to calculate the distance around a rectangle we shall have both length and breadth twice. So to calculate the perimeter of a rectangle we add all the four sides.

$\Rightarrow$ Perimeter of rectangle = I + b + I + b where I = length and b = breadth

= 21 + 2b

$=2(l + b)$

So, the perimeter of rectangle $= 2(1 + b)$

Triangle

Area of triangle $= \frac{1}{2} \times base \times height.$

Height: In a triangle, the length of the perpendicular which is drawn from vertex to the opposite side is called height of the triangle.

Base: In a triangle, the length of the side of the triangle on which perpendicular is drawn is called base.

Perimeter of a triangle is sum of lengths of three sides.

Units

Area —sq. units —— cm^2, m^2 etc.

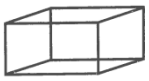
Perimeter -—single units —cm, m etc.

- ❖ Volume

  Holding capacity of a container is called volume.

- ❖ Volume of Cuboid

  $= length \times breadth \times heigth$



Point to remember

We can also calculate the length of sides if perimeter of area is given.

Say we know the area of rectangle and its length, then to calculate breadth:

$Area = length \times breadth$

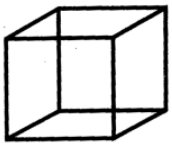
$\Rightarrow \quad Area / length = breadth$

Similarly we can find the other missing dimensions.

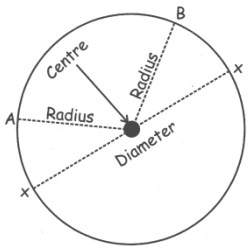
- ❖ Volume of cube

  $= side \times side \times side$

- ❖ Volume is measured in cubic units.



Circumference of a circle



The perimeter of a circle is called the circumference. The distance between the centre and any point on the circle is called its radius. And the line segment passing through the centre of the circle, whose end points lie on the circle is called the diameter of the circle. The diameter of a circle is twice the radius.

Finding circumference

To find the circumference of a circle we must remember Circumference $\frac{\text{Circumference}}{\text{diameter}} = 3.14 \text{or} \frac{22}{7}$.

This makes it much easier to find the circumference of a circle. Measure the diameter of the circle and multiply it by 3.14 or $\frac{22}{7}$ to get the circumference.

For eg. The diameter of a circle is 5cm. Find the circumference.

Circumference = $5 \times 3.14 cm = 15.7 cm$