FREEMIND

Date

Page

Tender Heart High School, Sec-33B, Chandigarh

Class :- VI
Subject :- Mathematics

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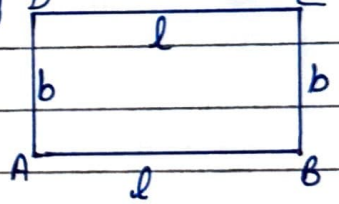
Teacher :- Ms. Sushma

Chapter-23
Perimeter and Area of Plane Figures.

Perimeter of Plane Figures :→

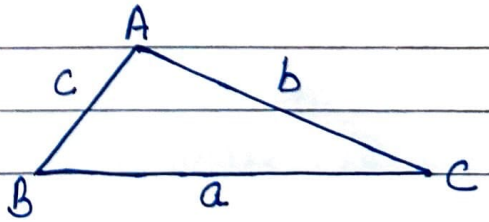
The perimeter of a plane figure is the sum of the lengths of all its sides.

Perimeter of a Rectangle = 2(l+b) units
where, l = length and b = breadth.



Perimeter of a square :→
= (4 × side) units.

Perimeter of a Triangle = (a+b+c) units, where a, b, c, are its sides.



Area :→

The measurement of the region enclosed by a plane figure is called the area of the figure.

Area of a rectangle = (Length × Breadth) sq. units

$$\text{Length} = \left(\frac{\text{Area}}{\text{Breadth}}\right) \text{ units}$$

$$\text{Breadth} = \left(\frac{\text{Area}}{\text{Length}}\right) \text{ units}$$

$$\text{Area of square} = (\text{side})^2 \text{ sq. units}$$

Conversion of Units :→

(i) $1\ cm^2 = 100\ mm^2$
(ii) $1\ m^2 = 10000\ cm^2$
(iii) $1\ dm^2 = 100\ cm^2$
(iv) $1\ km^2 = 1000000\ m^2$

Exercise 23A

Q1. The length of three sides of a Triangle are 14 cm, 17cm and 25 cm. Find the perimeter of the triangle.

Soln:→ The length of three sides of a triangle are 14 cm, 17cm and 25 cm.
Perimeter of the triangle = 14 cm + 17cm + 25cm
= 56 cm
so, the perimeter of the triangle is 56cm.

Q2. The perimeter of a triangle is 40 cm. Two of its sides measure 12.9 cm and 14.6 cm. Find the length of its third side.

Soln:→ The perimeter of a triangle = 40cm.
Two sides of a triangle is 12.9 cm and 14.6cm.
Third side = Perimeter − (12.9 + 14.6) = 40 − (27.5)

FREEMIND

Date

Page

$= 12.5\ cm$

$$\begin{array}{r} {}^{3}\not{4}\ {}^{10}\not{0}.\not{0}6m \\ -\ 27.56m \\ \hline 12.50m \end{array}$$

So, the third side of a triangle is 12.5cm.

Q3. Find the perimeter and area of a rectangle whose:

(i) length = 25cm and breadth = 18 cm

Perimeter of a rectangle $= 2(l+b)$
$= 2(25+18)$
$= 2 \times 43$
$= 86\ cm$

Area of a rectangle $= l \times b$
$= 25 \times 18$
$= 450\ cm^2$

(ii) length = 27 cm and breadth = 17cm

Perimeter of a rectangle $= 2(l+b)$
$= 2(27+17)$
$= 2 \times 44$
$= 88\ cm$

Area of a rectangle $= l \times b$
$= 27 \times 17$
$= 459\ cm^2$

Q4. Each side of a square field is 9m. Find:
(i) its perimeter and (ii) its area.

Soln:→ Side of a square = 9m
Perimeter of a square = 4 × Side = 4 × 9m = 36m
Area of a Square = S × S = 9 × 9 = 81 m^2

Q5. The area of a square is $256\ cm^2$. Find.
(i) the length of each side of the square.
(ii) the perimeter of the square.

Soln:→ The area of a square $= 256\ cm^2 = 16\ cm \times 16\ cm$
(i) length of each side $= 16\ cm$
(ii) Perimeter of the square $= 4 \times$ side
$= 4 \times 16$
$= 64\ cm$

Q6. The area of a rectangular field $= 768\ m^2$
Length of a rectangular field $= 32\ m$
(i) Breadth " " " $=$ Area $\div$ Length
$= 768 \div 32$
$= 24\ m$

$$\begin{array}{r} 24 \\ 32\overline{)768} \\ -64\downarrow \\ \hline 128 \\ -128 \\ \hline 0 \end{array}$$

Perimeter of rectangular field $= 2(l+b)$
$= 2(32+24)$
$= 2 \times 56 = 112\ m$

(ii) the cost of fencing it at ₹20 per metre.
Soln:→ The cost of fencing for 1m $=$ ₹ 20
The cost of fencing for 112 m $=$ ₹ 20×112
$=$ ₹ 2240

Q7. The area of a rectangular field is $3400\ m^2$ and its length is 68 m. Find (i) its breadth
Soln:→ Area of a rectangular field $= 3400\ m^2$
length $= 68\ m$
Breadth $=$ Area $\div$ length
$= 3400 \div 68$
$= 50\ m$

FREEMIND

Date

Page

Qn The perimeter of a rectangular plot is 174m and its breadth is 35m. Find the length of the area of the plot.

Soln:→ Perimeter of a rectangular plot = 174 m

Breadth = 35m

$2(l+b) = 174$

$2(l+35) = 174$

$l + 35 = \frac{174}{2}$ 87

$l + 35 = 87$

$l = 87 - 35$

$l = 52$ m

So, length of rectangular plot = 52m.

Qn A square and a rectangle have equal areas. If each side of the square is 18cm and the width of the rectangle is 12 cm, find the length of the rectangle.

Soln:→ Side of the square = 18 cm

Area of square = $s \times s = 18 \times 18 = 324\ cm^2$

A square and a rectangle have equal areas.

Area of a rectangle = 324

$l \times b = 324$

$l \times 12 = 324$

$l = 324 \div 12 = 27$ cm

Qn A rectangular hall is 16m long and 12m wide. How many marble slabs of size 25 cm x 15 cm are needed to cover the floor of the hall?

Soln:- Length of a rectangular hall = 16 m

Breadth " " " " = 12m

Area " " " " = $l \times b = 16 \times 12$

$= 192\ m^2$

FREEMIND

Date

Page

Area of a marble slab = 25 cm × 15 cm
= 375 cm^2

No. of marble slabs = $\frac{\text{Area of floor}}{\text{Area of 1 marble slab}}$

$= \frac{192 \times 100 \times 100}{375}$

$= \frac{1920000}{375}$ $= \frac{5120}{1}$

= 5120 Marble slabs.

Qu A room is 13 m long and 9 m broad. Find the cost of carpeting the room with a carpet 75 cm broad at ₹ 50 per metre.

Soln:→ Length of the room = 13 m
Breadth of the room = 9 m
Area of the room = l × b = 13 × 4 = 117 m^2
Breadth of the carpet = 75 cm = $\frac{75}{100} = \frac{3}{4}$ m

Length of the carpet = $117 \div \frac{3}{4} = 117 \times \frac{4}{3}$

= 156 m

Cost of 1 m of carpeting = ₹ 50
Cost of 156 m of carpeting = ₹ 50 × 156
= ₹ 7800

Qu How many envelopes can be made out of a sheet of paper 384 cm by 172 cm, if each envelope requires a piece of paper of size 16 cm by 12 cm?

Date

Page

Soln:→ length of paper sheet = 384 cm

Breadth " " " = 172 cm

Area " " " = $l \times b = 384 \times 172$

=

Area of piece of paper required (for one envelope)

$= 16 \times 12 \text{ cm}^2$

No. of Envelopes $= \frac{384 \times 172}{16 \times 12}$

$= \frac{96 \times 43}{4 \times 3}$

$= 8 \times 43 = 344$

Qy The total cost of cultivating a rectangular field at ₹ 15 per m^2 is ₹ 18330. If the breadth of the field is 26 m, find the cost of fencing the field at ₹ 20 per metre.

Soln:- The total cost of the cultivating field = ₹ 18330

Rate = ₹ 15 / m^2

So Area of the field $= \frac{18330}{15} = 1222 m^2$

Breadth = 26 m

length $= \frac{1222}{26} = 47 m$

Perimeter $= 2(l+b)$

$= 2(47+26) = 2 \times 73 = 146 m$

Cost of fencing field = ₹ 20 / m

$= 146 \times 20 =$ ₹ 2920

16.

(i) Vertical Area = $10 \times 1 = 10\ m^2$

Horizontal Area = $8 \times 2 = 16\ m^2$

Total Area = $(10 + 16)\ m^2 = 26\ m^2$

(ii) Vertical Area = $13 \times (12 - 10)$

$= 13 \times 2 = 26\ m^2$

Upper Horizontal Area = $10 \times 1 = 10\ m^2$

Lower Horizontal Area = $8 \times 2 = 16\ m^2$

Total Area = $(26 + 10 + 16)\ m^2 = 52\ m^2$

(iii) Vertical Area = $12 \times 2 = 24\ m^2$

Horizontal Area = $(14 - 2) \times (12 - 10.5)$

$= 12 \times 1.5 = 18\ m^2$

Total Area = $(24 + 18)\ m^2 = 42\ m^2$

(iv) Vertical Area = $2(12 \times 1.5)$

$= 2 \times 18 = 36\ m^2$

Horizontal Area = $2[(16 - 3) \times (1.5)]$

$= 2[13 \times 1.5)]$

$= 2 \times 19.5 = 39$

Total Area = $36 + 39 = 75\ m^2$

(v) Horizontal Area from lower to upper end

$= (4 \times 1) + (3 \times 1) + (2 \times 1) + (1 \times 1)$

$= 4 + 3 + 2 + 1 = 10\ m^2$