EXERCISE 12.3

Find the cost of laying grass in a triangular field of sides 50 m, 65 m and 65 m at the rate of Rs 7 per m^2.

Solution:

According to the question,

Sides of the triangular field are 50 m, 65 m and 65 m.

Cost of laying grass in a triangular field = Rs 7 per m^2

Let a = 50, b = 65, c = 65

s = (a + b + c)/2

⇒ s = (50 + 65 + 65)/2

= 180/2

= 90.

Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{90(90-50)(90-65)(90-65)}$

= $\sqrt{90\times40\times25\times25}$

= 1500m^2

Cost of laying grass = Area of triangle ×Cost per m^2

= 1500×7

= Rs.10500

1 The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 13 m, 14 m and 15 m. The advertisements yield an earning of Rs 2000 per m^2 a year. A company hired one of its walls for 6 months. How much rent did it pay?

Solution:

According to the question,

The sides of the triangle are 13 m, 14 m and 15 m

Let a = 13, b = 14, c = 15

s = (a + b + c)/2

⇒ s = (13 + 14 + 15)/2

= 42/2

= 21.

Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{21(21-13)(21-14)(21-15)}$

= $\sqrt{21\times8\times7\times6}$

= 84m^2

Cost of advertisements for a year = Area of triangle × Cost per m^2

= 84×2000

= Rs. 168000

Since the board is rented for only 6 months:

Cost of advertisements for 6 months = (6/12) × 168000

= Rs. 84000

2 From a point in the interior of an equilateral triangle, perpendiculars are drawn on the three sides. The lengths of the perpendiculars are 14 cm, 10 cm and 6 cm. Find the area of the triangle.

Solution:

According to the question,
The lengths of the perpendiculars are 14 cm, 10 cm and 6 cm.
We know that,
Area of an equilateral triangle of side a = $\sqrt{3}/4\ a^2$
We divide the triangle into three triangles,
Area of triangle = $(1/2 \times a \times 14) + (1/2 \times a \times 10) + (1/2 \times a \times 6)$

$\sqrt{3}/4\ a^2 = ½ \times a \times (14 + 10 + 6)$
$\sqrt{3}/4\ a^2 = ½ \times a \times 30$
$a = 60/\sqrt{3}$
$= 20\sqrt{3}$

Area of the triangle $= \sqrt{3}/4\ a^2$
$= \sqrt{3}/4\ (20\sqrt{3})^2$
$= 300\sqrt{3}\ cm^2$

3 The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3 : 2. Find the area of the triangle.

Solution:

According to the question,
Perimeter of the isosceles triangle = 32 cm
It is also given that,
Ratio of equal side to base = 3 : 2
Let the equal side = 3x
So, base = 2x
Perimeter of the triangle = 32
$\Rightarrow 3x + 3x + 2x = 32$
$\Rightarrow 8x = 32$
$\Rightarrow x = 4.$
Equal side = $3x = 3\times4 = 12$
Base = $2x = 2\times4 = 8$
The sides of the triangle = 12cm, 12cm and 8cm.
Let a = 12, b = 12, c = 8
$s = (a + b + c)/2$
$\Rightarrow s = (12 + 12 + 8)/2$
$= 32/2$
$= 16.$
Area of the triangle = $\sqrt{s(s-a)(s-b)(s-c)}$
$= \sqrt{16(16-12)(16-12)(16-8)}$
$= \sqrt{16\times4\times4\times8}$
$= 32\sqrt{2}\ cm^2$

4 Find the area of a parallelogram given in Fig. 12.2. Also find the length of the altitude from vertex A on the side DC.

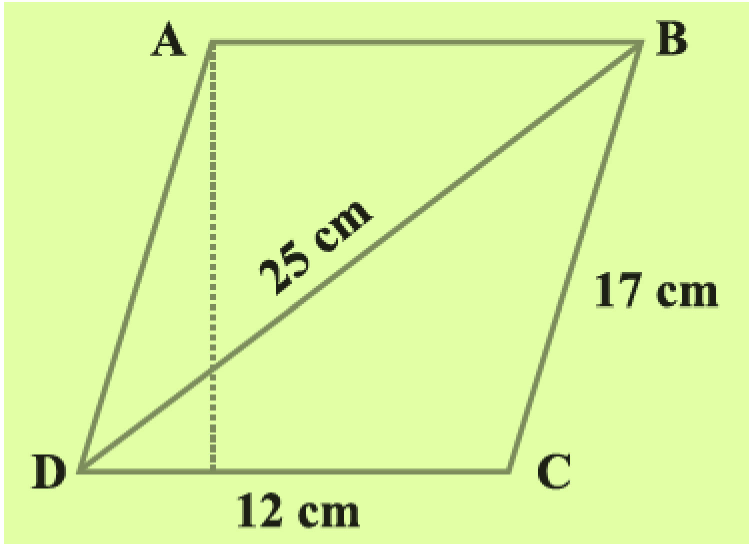

Fig. 12.2

Solution:
We know that,
Area of parallelogram(ABCD) = Area(ΔBCD) + Area(ΔABD)
For Area (ΔBCD),
We have,
a = 12, b = 17, c = 25
s = (a + b + c)/2
⇒ s = (12 + 17 + 25)/2 = 54/2 = 27.
Area of (ΔBCD) = √s(s-a)(s-b)(s-c)
= √27(27-12)(27-17)(27-25)
= √27×15×10×2
= 90 cm^2
Since, ABCD is a parallelogram,
Area(ΔBCD) = Area(ΔABD)
Area of parallelogram(ABCD) = Area(ΔBCD) + Area(ΔABD)
= 90 + 90
= 180 cm^2
Let altitude from A be = x
Also, Area of parallelogram(ABCD) = CD × (Altitude from A)
⇒ 180 = 12 × x
⇒ x = 15 cm