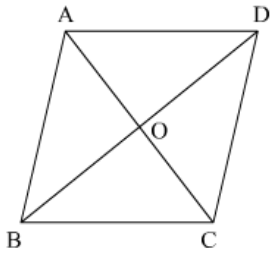
Herons Formula Ex 12.2 Q7

Answer :

We assume ABCD be the given rhombus having

AB = BC = CD = DA

BD and AC be the diagonals of rhombus



We need to find cost of painting both sides

Perimeter of rhombus ABCD, say P is 32 m

$$P = AB+BC+CD+DA$$

$$32 = 4AB$$

$$AB = \frac{32}{4}$$

$$AB = 8 \text{ m}$$

We know that BD and AC diagonals of rhombus and $AO=\frac{1}{2}AC$ and $BO=\frac{1}{2}BD$. So,

$$\text{side} = \frac{1}{2}\sqrt{BD^2+AC^2}$$ (Diagonals in rhombus intersect at right angle)

BD = 24 m; AC = h; side = AB = 8m

$$8 = \frac{1}{2}\sqrt{(10)^2 + (h)^2}$$

$$8\times 2 = \sqrt{(10)^2 + (h)^2}$$

Taking square of both sides, we get

$$(16)^2 = \left(\sqrt{(10)^2 + (h)^2}\right)^2$$

$$256 = 100 + (h)^2$$

$$(h)^2 = 256 - 100$$

$$h = \sqrt{156}$$

$$h = 2\sqrt{39}$$

Area of rhombus, say A_1

$$A_1 = \frac{1}{2}(BD\times AC)$$

$$A_1 = \frac{1}{2}\left(10\times 2\sqrt{39}\right)$$

$$A_1 = 20\sqrt{39} \text{ m}^2$$

Area of both sides of rhombus;

$$A_2 = 2A_1$$
$$= 2 \times 10\sqrt{39}$$

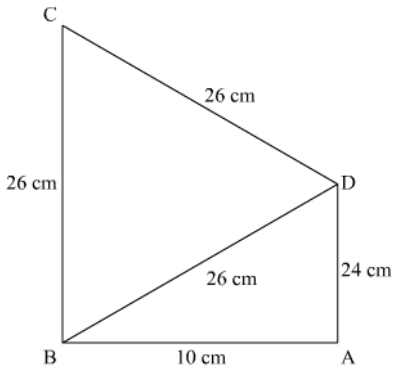
Cost of painting = Rate × Area of both sides of rhombus

$$= 5 \times 20\sqrt{39}$$
$$\boxed{= \text{Rs.}624.49}$$

Herons Formula Ex 12.2 Q8

Answer :

We assume ABCD be the quadrilateral having sides AB, BC, CD, DA, diagonal BD and angle BAD = 90° where BCD forms an equilateral triangle having equal sides.



We need to find area of ABCD

In triangle BAD, we have

$BD^2 = BA^2 + AD^2$ .So

$$BA = \sqrt{26^2 - 24^2}$$
$$= 10 \text{ cm}$$

Area of right angled triangle ABD, say A_1 is given by

$$A_1 = \frac{1}{2}(\text{Base} \times \text{Height})$$

Where,

Base = BA = 10 cm; Height = AD = 24 cm

$$A_1 = \frac{1}{2}(10 \times 24)$$
$$A_1 = 120 \text{ cm}^2$$

Area of equilateral triangle BCD, say A_2 having sides a, b, c is given by

$$A_2 = \frac{\sqrt{3}}{4}a^2, \text{ where}$$

a = BC = CD = BD = 26 cm

$$A_2 = \frac{\sqrt{3}}{4}(26)^2$$
$$A_2 = \frac{1169.48}{4}$$
$$A_2 = 292.37 \text{ cm}^2$$

Area of quadrilateral ABCD, say A

A = Area of triangle BAD + Area of triangle BCD

$$A = A_1 + A_2$$
$$A = 120 + 292.37$$
$$A = \boxed{412.37 \text{ cm}^2}$$

********** END **********