PUBLIC SCHOOL DARBHANGA

SESSION (2020-21)
CLASS-IX
MATHEMATICS
HERON'S FORMULA
REVISION
WORKSHEET(ANSWER KEY)

1. A kite in the shape of a square with a diagonal 32 cm and an isosceles triangle of base 8 cm and sides 6 cm each is to be made of three different shades as shown in Fig. 12.17. How much paper of each shade has been used in it?

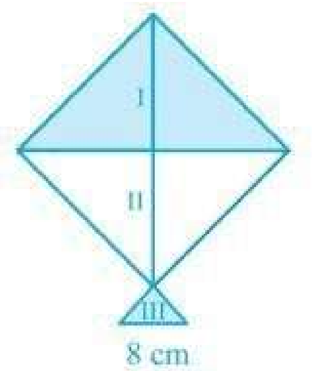


Fig. 12.17

Solution:

For each triangular piece, The semi perimeter will be

s = (50 + 50 + 20)/2 cm = 120/2 cm = 60cm

Using Heron's formula,

Area of the triangular piece = $\sqrt{s (s-a) (s-b) (s-c)}$

$= \sqrt{60(60 - 50) (60 - 50) (60 - 20)}\ cm^2$

$= \sqrt{60 \times 10 \times 10 \times 40}\ cm^2$

$= 200\sqrt{6}\ cm^2$

∴ The area of all th e triangular pieces = $5 \times 200\sqrt{6}\ cm^2 = 1000\sqrt{6}\ cm^2$

2. A floral design on a floor is made up of 16 tiles which are triangular, the sides of the triangle being 9 cm, 28 cm and 35 cm (see Fig. 12.18). Find the cost of polishing the tiles at the rate of 50p per cm^2 .

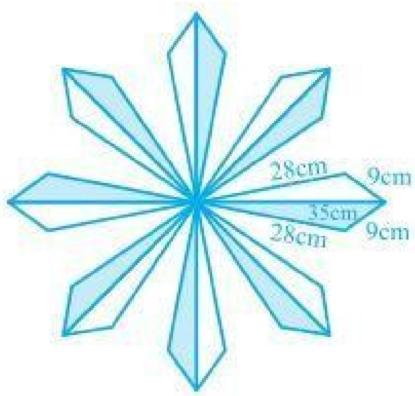


Fig. 12.18

The semi perimeter of the each triangular shape = (28 + 9 + 35)/2 cm = 36 cm

By using Heron's formula,

The area of each triangular shape will be

$$\sqrt{s(s-a)(s-b)(s-c)}$$

$$\left(\sqrt{36 \times (36-35) \times (36-28) \times (36-9)}\right)$$

$$\left(\sqrt{36} \times 1 \times 8 \times 27\right) cm^2$$

= $36\sqrt{6}$ cm^2 = 88.2 cm^2

Now, the total area of 16 tiles = 16 × 88.2 cm^2 = 1411.2

cm^2 It is given that the polishing cost of tiles = 50

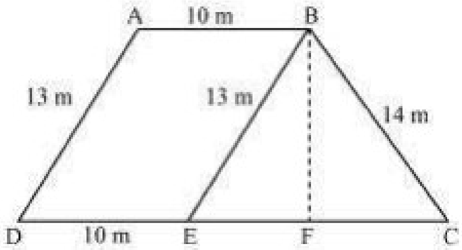
paise/cm^2

∴ The total polishing cost of the tiles = Rs. (1411.2 × 0.5) = Rs. 705.6

3. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non- parallel sides are 14 m and 13 m. Find the area of the field.

Solution:

First, draw a line segment BE parallel to the line AD. Then, from B, draw a perpendicular on the line segment CD.



Now, it can be seen that the quadrilateral ABED is a parallelogram. So,

AB = ED = 10 m

AD = BE = 13 m

EC = 25 - ED = 25 - 10 = 15 m

Now, consider the triangle BEC,

Its semi perimeter (s) = (13+ 14 + 15)/2 = 21

m By using Heron's formula,

Area of ΔBEC =

$$\sqrt{s(s-a)(s-b)(s-c)}$$

$$\left(\sqrt{21 \times (21-13) \times (21-14) \times (21-15)}\right) m^2$$

$$\left(\sqrt{21} \times 8 \times 7 \times 6\right) m^2$$

= 84 m^2

We also know that the area of ΔBEC = (½) × CE ×

BF 84 cm^2 = (½) × 15 × BF

=> BF = (168/15) cm = 11.2 cm

So, the total area of ABED will be BF × DE i.e. 11.2 × 10 = 112 m^2

∴ Area of the field = 84 + 112 = 196 m^2

4. An isosceles right triangle has area 8 cm^2. The length of its hypotenuse is

(A) $\sqrt{32}$ cm

(B) $\sqrt{16}$ cm

(C) $\sqrt{48}$ cm

(D) $\sqrt{24}$ cm

Solution:

(A) $\sqrt{32}$ cm

Explanation:

Let height of triangle = h

As the triangle is isosceles,

Let base = height = h

According to the question,

Area of triangle = $8cm^2$

$\Rightarrow \frac{1}{2} \times \text{Base} \times \text{Height} = 8$

$\Rightarrow \frac{1}{2} \times h \times h = 8$

$\Rightarrow h^2 = 16$

$\Rightarrow h = 4cm$

Base = Height = 4cm

Since the triangle is right angled,

$\text{Hypotenuse}^2 = \text{Base}^2 + \text{Height}^2$

$\Rightarrow \text{Hypotenuse}^2 = 4^2 + 4^2$

$\Rightarrow \text{Hypotenuse}^2 = 32$

$\Rightarrow \text{Hypotenuse} = \sqrt{32}$

Hence, Options A is the correct answer.

5. The perimeter of an equilateral triangle is 60 m. The area is

(A) 10√3 m^2

(B) 15√3 m^2

(C) 20√3 m^2

(D) 100√3 m^2

Solution:

(D) 100√3 m^2

Explanation:

Area of an equilateral triangle of side a = $\sqrt{3}/4\ a^2$

According to the question,

Perimeter of triangle = 60m

$\Rightarrow a + a + a = 60$

$\Rightarrow 3a = 60$

$\Rightarrow a = 20m$

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

$= (\sqrt{3}/4)\ (20)^2$

$= (\sqrt{3}/4)\ (400)$

$= 100\sqrt{3}$

Hence, Options D is the correct answer.