CBSE Test Paper 05

CH-12 Herons Formula

1. The area of a regular hexagon of side 4 cm is
   a. $4\sqrt{3}\ cm^2$
   b. $16\sqrt{3}\ cm^2$
   c. $6\sqrt{3}\ cm^2$
   d. $24\sqrt{3}\ cm^2$
2. The sides of a triangle are 56 cm, 60 cm and 52 cm long. Then the area of the triangle is
   a. 1311 cm^2
   b. 1344 cm^2
   c. 1322 cm^2
   d. 1392 cm^2
3. The area of equilateral triangle of side 'a' is $4\sqrt{3}\ cm^2$. Its height is given by
   a. $\frac{2}{\sqrt{3}}cm$
   b. $2\sqrt{3}\ cm$
   c. $\frac{1}{3}cm$
   d. $\sqrt{3}$cm
4. Each side of an equilateral triangle is 2 x cm. If $x\sqrt{3} = \sqrt{48}$, then area of the triangle is :
   a. $\sqrt{48}\ cm^2$
   b. $48\sqrt{3}\ cm^2$

c. $16\sqrt{3}\ cm^2$

d. 16 cm^2

5. The measure of each side of an equilateral triangle whose area is $\sqrt{3}\ cm^2$ is

   a. 8 cm

   b. 4 cm

   c. 2 cm

   d. 16 cm

6. Fill in the blanks:

   Measure of each side of an equilateral triangle is 12cm. Its area is given by _____.

7. Fill in the blanks:

   For a rhombus, whose diagonals are d_1, and d_2 then its perimeter is _____.

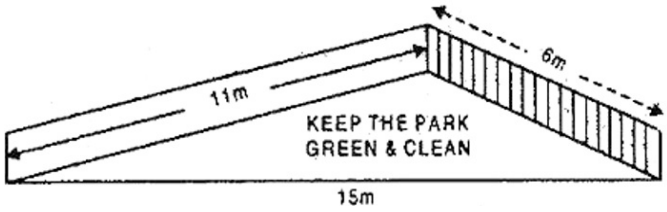
8. The base of an isosceles triangle is 10 cm and one of its equal side is 13 cm. Find its area using Heron's Formula.

9. The area of a trapezium is 475 cm^2 and the height is 19 cm. Find the lengths of its two parallel sides if one side is 4 cm greater than the other.

10. Find the area of parallelogram, whose one diagonal is 6.8 cm and the perpendicular distance of this diagonal from an opposite vertex is 7.5 cm.

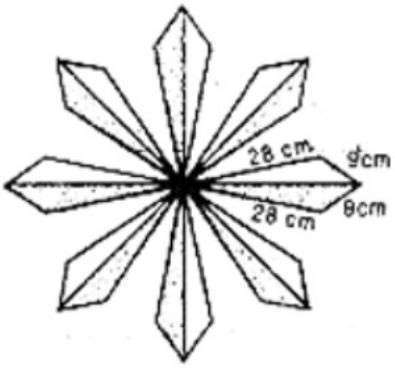
11. Find the area of triangle whose side is 42m, 56m and 70m?

12. There is slide in a park. One of its side walls has been painted in some colour with a message KEEP THE PARK GREEN AND CLEAN, (see figure). If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in colour.



13. Find the area of a quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 6 cm, DA = 5 cm and diagonal AC = 5 cm.

14. 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 figure). Find the cost of polishing the tiles at the rate of 50 paise per cm^2.



15. A rhombus shaped sheet with perimeter 40 cm and one diagonal 12 cm, is painted on both sides at the rate of Rs 5 per m^2. Find the cost of painting.

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Solution

1. (d) $24\sqrt{3}\ cm^2$

   Explanation:

   Area of regular hexagon = $\frac{3\sqrt{3}}{2}(\text{Side})^2$

   = $\frac{3\sqrt{3}}{2} \times 4 \times 4$

   = $24\sqrt{3}$ sq. cm

2. (b) 1344 cm^2

   Explanation:

   s = $\frac{56+60+52}{2} = \frac{168}{2} = 84\text{cm}$

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

   = $\sqrt{84\left(84-56\right)\left(84-60\right)\left(84-52\right)}$

   = $\sqrt{84 \times 28 \times 24 \times 32}$

   = $\sqrt{12 \times 7 \times 7 \times 4 \times 12 \times 2 \times 16 \times 2}$

   = 12 x 7 x 2 x 2 x 4

   = 1344 sq. cm

3. (b) $2\sqrt{3}\ cm$

   Explanation:

   Area of equilateral triangle = $\frac{\sqrt{3}}{4}(\text{Side})^2$

   $\Rightarrow \frac{\sqrt{3}}{4}(\text{Side})^2 = 4\sqrt{3}$

   $\Rightarrow (\text{Side})^2 = 4^2$

$\Rightarrow$ Side = 4 cm

Area of triangle = $\frac{1}{2}$ x Base x Height

$\Rightarrow 4\sqrt{3}$ = $\frac{1}{2}$ x 4 x Height

$\Rightarrow$ Height = $2\sqrt{3}$ cm

4. (c) $16\sqrt{3}\ cm^2$
   Explanation:

   Here , $x\sqrt{3} = \sqrt{48}$

   $\Rightarrow x = \sqrt{16}$

   Side = 2x

   Area of equilateral triangle = $\frac{\sqrt{3}}{4}(\text{Side})^2$

   = $\frac{\sqrt{3}}{4}(2x)^2$

   = $\sqrt{3}x^2$ sq. cm

   = $\sqrt{3}\left(\sqrt{16}\right)^2 = 16\sqrt{3}$

5. (c) 2 cm
   Explanation:

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

   $\sqrt{3}$=$\sqrt{3}$a^2/4

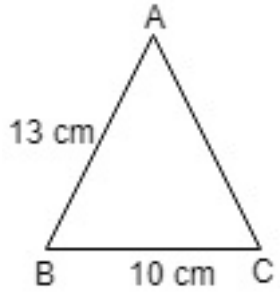
   Solving

   a^2=4

   a=2cm

6. $36\sqrt{3}$ sq cm

7. ${d_1}^2 + {d_2}^2$

8. 

a = 13, b = 10 cm, c = 13 cm.

$s = \frac{a+b+c}{2}$

$= \frac{13+10+13}{2} = 18\,\text{cm}$

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

$= \sqrt{18(18-13)(18-10)(18-13)}$

$= \sqrt{18(5)(8)(5)} = \sqrt{(9\times 2)(5)(4\times 2)(5)}$

= 3 $\times$ 5 $\times$ 2 $\times$ 2 = 60 cm^2

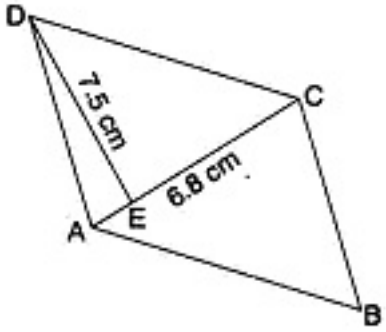
9. Area of trapezium $= \frac{1}{2}\times$(Sum of the parallel side) $\times$ height

$\Rightarrow\ 475 = \frac{1}{2} \times (x + x + 4) \times 19cm$

$\Rightarrow\ 2x + 4 = \frac{950}{19} = 50$

$\Rightarrow\ 2x = 50 - 4 = 46; x = 46 \div 2 = 23$

Hence, the length of two parallel sides are 23 cm and (23 + 4) cm i.e., 23 cm and 27 cm.

10. 

Area of triangle ACD = $\frac{1}{2}$ $\times$ Base $\times$ Altitude

= $\frac{1}{2}$ $\times$ 6.8 $\times$ 7.5 = 25.5 cm^2

$\therefore$ Area of parallelogram ABCD = 2 Area of triangle ACD

= 2 $\times$ 25.5 = 51 cm^2

11. S = $\frac{42+56+70}{2}$ m

= $\frac{168}{2}$ m = 84 m

∴ Area of Δ ABC = $\sqrt{s\,(s-a)\,(s-b)\,(s-c)}$

= $\sqrt{84\,(84-42)\,(84-56)\,(84-70)}$ sq m

= 42 × 28 sq m

= 1176sq m

12. Since, sides of coloured triangular wall are 15 m, 11 m and 6 m.

∴ Semi-perimeter of coloured triangular wall

S = $\frac{15+11+6}{2}$ = $\frac{32}{2}$ =16 m

Now, Using Heron's formula,

Area of coloured triangular wall

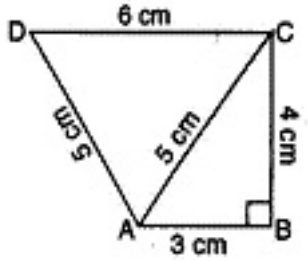
= $\sqrt{s\,(s-a)\,(s-b)\,(s-c)}$

= $\sqrt{16\,(16-15)\,(16-11)\,(16-6)}$

= $\sqrt{16\times1\times5\times10}$

= $20\sqrt{2}m^2$

Hence area painted in blue colour = $20\sqrt{2}m^2$

13. 

For △ABC

a = 4 cm, b = 5 cm, c = 3 cm

$a^2 + c^2 = b^2$

△ABC is right angled with ∠B = 90^o

∴ Area of right triangle ABC

= $\frac{1}{2}$ × Base × Height

= $\frac{1}{2}$ × AB × BC

= $\frac{1}{2}$ × 3 × 4 = 6 cm^2

For △ ACD

a = 6 cm, b = 5 cm, c = 5 cm

s = $\frac{a+b+c}{2}$ = $\frac{6+5+5}{2}$ = $\frac{16}{2}$

= 8 cm

Area of the $\triangle$ ACD

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

$= \sqrt{8(8-6)(8-5)(8-5)}$

$= \sqrt{8(2)(3)(3)}$

$= \sqrt{(4 \times 2)(2)(3)(3)}$

= 12 cm^2

$\therefore$ Area of the quadrilateral ABCD

= Area of $\triangle$ABC + Area of $\triangle$ACD

= 6 cm^2 + 12 cm^2 = 18 cm^2

14. Here, Sides of a triangular shaped tile area 9 cm, 28 cm and 35 cm.

Semi-perimeter of tile (s) = $\frac{9+28+35}{2}$ = 36 cm

Area of triangular shaped tile = $\sqrt{s\,(s-a)\,(s-b)\,(s-c)}$

= $\sqrt{36\,(36-9)\,(36-28)\,(36-35)}$

= $\sqrt{36 \times 27 \times 8 \times 1}$

= $36\sqrt{6}$

= 36 $\times$ 2.45

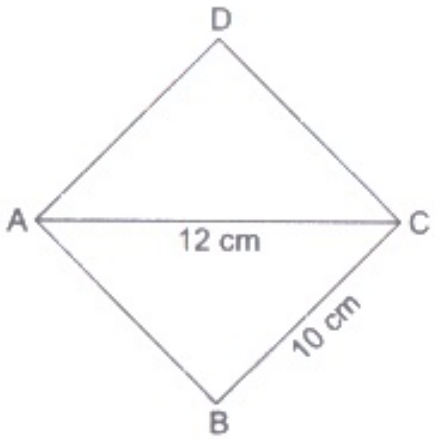
= 88.2 cm^2 (approx.)

$\therefore$ Area of 16 such tiles = 16 $\times$ 88.2 = 1411.2 cm^2 (Approx.)

$\because$ Cost of polishing 1 cm^2 of tile = Rs. 0.50

$\therefore$ Cost of polishing 1411.2 cm^2 of tile = Rs 0.50 $\times$ 1411.2 = Rs. 705.60 (Approx.)

15. Perimeter of rhombus = 40 cm



$\therefore$ 4 $\times$ side = 40

$\Rightarrow$ side $= \frac{40}{4} = 10cm$

One diagonal = 12 cm

As rhombus is also a parallelogram, so it diagonal divide it into two congruent triangles of equal area.

$\therefore$ Area of rhombus = 2(Area of triangle with sides 10cm, 10cm and 12cm)

So, let a = 10 cm, b = 10 cm and c = 12 cm

$\therefore s = \frac{a+b+c}{2} = \frac{10+10+10}{2} = \frac{32}{2} = 16cm$

$\therefore$ Area of $\Delta ABC = \sqrt{s(s-a)(s-b(s-c)}$

$= \sqrt{(16(16-10)(16-10)(16-12)}$

$= \sqrt{16 \times 6 \times 6 \times 4} = \sqrt{2304} = 48cm^2$

Now, area of rhombus ABCD = 2(area of ΔABC)

= 2 $\times$ 48 cm^2 = 86 cm^2.

Now, cost of painting both sides of rhombus shaped sheet ABCD

= Rs2 $\times$ 5 $\times$ 96 = Rs960