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Maths

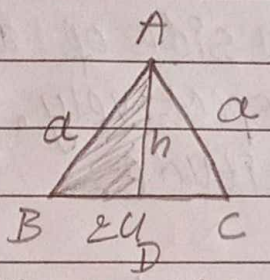
1. The base of an isosceles triangle is 24 cm and its area is 192 cm^2, then find its semi perimeter.

→ Area of triangle = 192 cm^2

$A = \frac{1}{2} \times b \times h$

$192 = \frac{1}{\cancel{2}_1} \times \cancel{24}^{12} \times h$

$h = \frac{\cancel{192}^{16}}{\cancel{12}_1} = 16\,cm$



Area = 192 cm^2

In ΔABD

$AD = 16\,cm$, $BD = 12\,cm$

By Pyth; $AB^2 = AD^2 + BD^2$

$a^2 = 16^2 + 12^2$

$a^2 = 256 + 144$

$a^2 = 400$

$a = \sqrt{400} = 20$

$\boxed{a = 20\,cm}$

$s = \frac{a+b+c}{2} = \frac{AB + AC + BC}{2} = \frac{20+20+24}{2}$

$= \frac{64}{2} = 32\,cm$

2. If the area of an equilateral triangle is $36\sqrt{3}$ cm^2, then find its perimeter.

→ $\frac{\sqrt{3}}{4} a^2 = 36\sqrt{3}$

$a^2 = 36 \times 4$

$a^2 = 144$

$a = \sqrt{144} = 12$

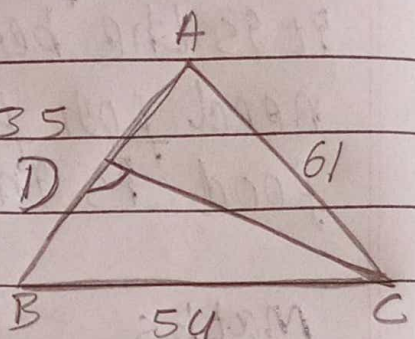
Perimeter $= 3a$

$= 3 \times 12$

$= 36$ cm

3. The side of a triangle are 35, 54 and 61 cm respectively. Find the length of its longest altitude.

→ Let ABC be a triangle in which sides AB = 35cm, BC = 54cm and CA = 61cm



Now, $s = \frac{a+b+c}{2} = \frac{35+54+61}{2}$

$= \frac{150}{2} = 75$ cm

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

$= \sqrt{75(75-35)(75-54)(75-61)}$

$= \sqrt{75(40)(21)(14)}$

$= \sqrt{25 \times 3 \times 4 \times 2 \times 5 \times 7 \times 3 \times 7 \times 2}$

$= 5 \times 2 \times 2 \times 3 \times 7\sqrt{5}$

$= 420\sqrt{5}$

Also, Area of $\Delta ABC = \frac{1}{2} \times AB \times$ Altitude

$\frac{1}{2} \times 35 \times CD = 420\sqrt{5}$

$CD = \frac{420 \times 2\sqrt{5}}{35}$

$CD = 24\sqrt{5}$

∴ Length of longest altitude is $24\sqrt{5}$ cm.

4. The sides of a triangle field are 41m, 40m and 9m. Find the number of rose beds can be prepared in field, if each rose bed, on an average needs 900 cm^2 space.

→ Area of triangular field

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

$s = \frac{a+b+c}{2} = \frac{41+9+40}{2} = \frac{90}{2} = 45m$

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

$= \sqrt{45(45-41)(45-9)(45-40)}$

~~$= 4 \times 5 \times$~~

$= \sqrt{45(4)(36)(5)}$

$= \sqrt{5 \times 9 \times 4 \times 9 \times 4 \times 5}$

$= 5 \times 4 \times 9 = 180 m^2$

$= 180 \times 10^4 cm^2$

Now, 900 cm^2 area required for 1 rose bed $= \frac{180 \times 10^4}{900}$

0.2

$= 2,000$ rose beds.