3. TRIANGLE

Q.1 In ΔABC, if $\angle A + \angle B = 110^0$ and $\angle B + \angle C = 132^0$, then find $\angle A$, $\angle B$ and $\angle C$.

Solution - We have $\angle A + \angle B = 110^0$……. (1)

$\angle B + \angle C = 132^0$….. (2)

Now,

$\angle A + \angle B + \angle C = 180^0$ Sum of angle of triangle is 180^0

$110^0 + \angle C = 180^0$…… ($\because \angle A + \angle B = 110^0$)

$\angle C = 180^0 - 110^0$

$\angle C = 70^0$

Now, from II we have,

$\angle B + \angle C = 132^0$

$\angle B = 132^0 - 70^0$

$\angle B = 62^0$

$\angle A + \angle B = 110^0$…… (From I)

$\angle A + 62^0 = 110^0$

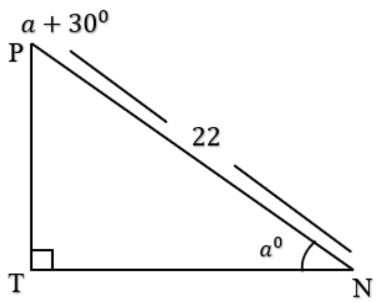
$\angle A = 110^0 - 62^0$

$\angle A = 48^0$

$\therefore \angle A = 48^0, \angle B = 62^0$ and $\angle C = 70^0$

Q.2 In .Δ PTN , $\angle T = 90^0, \angle N = a^0, \angle P = (a + 30)^0$

If PN = 22 then find PT and TN.



In Δ PTN

$\angle P + \angle T + \angle N = 180^0$

…… (Sum of angles of triangles is 180^0)

$\therefore (a + 30)^0 + 90^0 + a^0 = 180^0$

$a + 30^0 + 90^0 + a^0 = 180^0$

$2a^0 + 120^0 = 180^0$

$2a^0 = 180^0 - 120^0$

$2a^0 = 60^0$

$a^0 = \frac{60^0}{2}$

$a^0 = 30^0$

$\angle N = a^0 = 30^0$

$\angle P = (a + 30)^0 = a^0 + 30^0 = 30^0 + 30^0 = 60^0$

Δ PTN is $30^0 - 60^0 - 90^0$ of triangle-

PT = $\frac{1}{2} \times$ PN…… (side opposite to 30^0)

$= \frac{1}{2} \times 22$

$\therefore$ PT = 11units

TN = $\frac{\sqrt{3}}{2} \times$ PN…….. (side opposite to 60^0)

$= \frac{\sqrt{3}}{2} \times 22$

TN = $11\sqrt{3}$ units

$\therefore$ PT = 11 units TN = $11\sqrt{3}$ units

Q.3 In Δ ABC AB = 5cm] BC= 8 cm] AC = 10 cm. Write all its angles in the descending order of their measure.

Solution – In Δ ABC]

AB = 5cm] BC = 8cm] AC = 10 cm

10 > 8 > 5

∴ AC > BC > AB……. (1)

Now,

AC > BC…….

∴ ∠ B > ∠ A…… (II)(Angle opposite to greater side is greater)

BC > ∠ AB…… From II

∴ ∠ A > ∠ C--------- From III (Angle opposite to greater

∴ ∠ B > ∠ A > ∠ C --------- (From II and III)

Q.4 Triangle ABC has sides of length 7.8 and 9 units while

Δ PQR has perimeter of 360 units. If Δ ABC is similar to Δ PQR

then find find then find the sides of Δ PQR

Solution Sides of Δ ABC are of 7, 8 and 9 units-

Perimeter of Δ PQR = 360

$\therefore x + y + z = 360$…… (i)

Δ ABC ~ Δ XYZ

$\therefore \frac{7}{x} = \frac{8}{y} = \frac{9}{z}$……. (Corresponding sides of similar triangles)

$\therefore \frac{7}{x} = \frac{8}{y} = \frac{9}{z} = \frac{7+8+9}{x+y+z}$…… (Property of equal ratios)

$$\therefore \frac{7}{x} = \frac{8}{y} = \frac{9}{z} = \frac{24}{360}$$

$$\therefore \frac{7}{x} = \frac{8}{y} = \frac{9}{z} = \frac{1}{15}$$

Now,

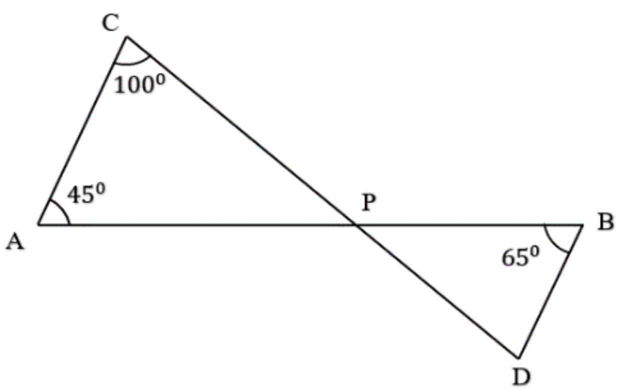
$\frac{7}{x} = \frac{1}{15} \quad \therefore x = 7 \times 15 = 105$

$\frac{8}{y} = \frac{1}{15} \quad \therefore y = 8 \times 15 = 120$

$\frac{9}{z} = \frac{1}{15} \quad \therefore z = 9 \times 15 = 135$

$\therefore$ Corresponding sides of Δ PQR are 105 units , 120 units , 135 units respectively.

Q.5 In the adjoining figure, line AB and CD are intersect to point P. Then, $\angle PAC = 45^0$, $\angle ACP = 100^0$ and $\angle PBD = 65^0$, $\angle CPA$, $\angle DPB$ and $\angle BDP$



Solution –

Sum of angles of triangle is 180^0

In Δ ACP

$\angle PAC + \angle ACP + \angle CPA = 180^0$

$45^0 + 100^0 + \angle CPA = 180^0$

$145^0 + \angle CPA = 180^0$

$\angle CPA = 180^0 - 145^0$

$\angle CPA = 35^0$

$\therefore \angle DPB = \angle CPA = 35^0$….. (Vertically opposite angle)

In Δ PBD

$\angle DPB + \angle PBD + \angle BDP = 180^0$

……. (Sum of angles of a triangle)

$35^0 + 65^0 + \angle BDP = 180^0$

$100^0 + \angle BDP = 180^0$

$\angle BDP = 180^0 - 100^0$

$\angle BDP = 80^0$

$\therefore \angle CPA = 35^0$, $\angle DPB = 35^0$, $\angle BDP = 80^0$