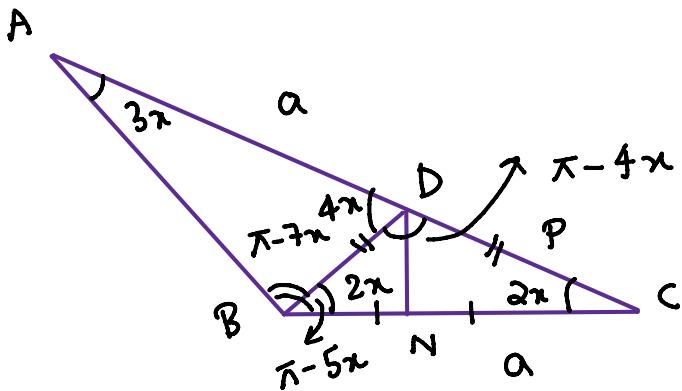


Question 5

Question. In $\triangle ABC$, D is on AC such that $AD = BC$, $BD = DC$, $\angle BDC = 2\pi$ and $\angle BAD = 3\pi$, all angles are in degrees then find the value of π .

Solution.



In $\triangle ABC$,

$$\frac{AC}{\sin 5\pi} = \frac{BC}{\sin 3\pi}$$

$$\Rightarrow \frac{a+p}{\sin 5\pi} = \frac{a}{\sin 3\pi} \quad \text{--- (i)}$$

\therefore In $\triangle BDN$,

$$\cos 2\pi = \frac{a}{2p}$$

$$\Rightarrow a = 2p \cos 2\pi \quad \text{--- (ii)}$$

\therefore From (i) :-

$$\frac{2p \cos 2\pi + p}{\sin 5\pi} = \frac{2p \cos 2\pi}{\sin 3\pi}$$

$$\Rightarrow 2\cos 2x \cdot \sin 3x + \cancel{\sin 3x} = 2\cos 2x \cdot \sin 5x$$
$$\Rightarrow \sin 5x + \sin x + \cancel{\sin 3x} = \sin 7x + \cancel{\sin 3x}$$

$$\Rightarrow \sin 7x - \sin 5x = \sin x$$

$$\Rightarrow 2 \cos 6x \sin x = \sin x$$

$$\cos 6x = \frac{1}{2}$$

$$\Rightarrow 6x = 60^\circ$$

$$\boxed{x = 10^\circ} \quad \underline{\text{Ans.}}$$