



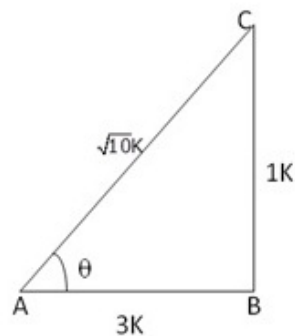
Question 5

Given: $\operatorname{cosec} \theta = \frac{AC}{BC} = \frac{\sqrt{10}}{1}$

Let $AB = \sqrt{10}k$ and $AC = 1k$,

Where k is positive

Let us draw a ΔABC in which $\angle B = 90^\circ$ and $\angle BAC = \theta$



By Pythagoras theorem, we have

$$(AC)^2 = (AB)^2 + (BC)^2 \Rightarrow (AB)^2 = (AC)^2 - (BC)^2$$

$$= \left[(\sqrt{10}k)^2 - (k)^2 \right] = (10k^2 - 1k^2)$$

$$\Rightarrow (AB)^2 = 9k^2$$

$$\Rightarrow AB = \sqrt{9k^2} = 3k$$

$$\therefore \sin \theta = \frac{BC}{AC} = \frac{1}{\sqrt{10}}$$

$$\cos \theta = \frac{AB}{AC} = \frac{3k}{\sqrt{10}k} = \frac{3}{\sqrt{10}}$$

$$\operatorname{cosec} \theta = \sqrt{10} \text{ (given)}$$

$$\sec \theta = \frac{1}{\cos \theta} = \frac{\sqrt{10}}{3}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta} = \left(\frac{1}{\sqrt{10}} \times \frac{\sqrt{10}}{3} \right) = \frac{1}{3}$$

$$\cot \theta = \frac{1}{\tan \theta} = 3$$

***** END *****