

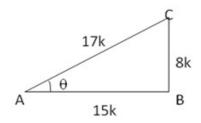
Question 6

Given:
$$cot\theta = \frac{AB}{BC} = \frac{15}{8}$$

Let AB = 15k and BC = 8k,

Where k is positive

Let us draw a $\triangle ABC$ in which $\angle B = 90^{\circ}$ and $\angle BAC = \theta$



By Pythagoras theorem, we have

$$AC^{2} = AB^{2} + BC^{2}$$

$$= (15k)^{2} + (8k)^{2}$$

$$= 225k^{2} + 64k^{2}$$

$$= 289k^{2}$$

$$AC = 17k$$

$$\sin \theta = \frac{BC}{AC} = \frac{8k}{17k} = \frac{8}{17}, \quad \cos \theta = \frac{AB}{AC} = \frac{15k}{17k} = \frac{15}{17}$$

$$\therefore \frac{(2 + 2\sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(2 - 2\cos \theta)} = \frac{(2 + 2 \times \frac{8}{17})(1 - \frac{8}{17})}{(1 + \frac{15}{17})(2 - 2 \times \frac{15}{17})}$$

$$= \frac{\frac{50}{17} \times \frac{9}{17}}{\frac{32}{17} \times \frac{4}{17}} = \frac{50 \times 9}{32 \times 4} = \frac{25 \times 9}{32 \times 2} = \frac{225}{64}$$

********** END *******