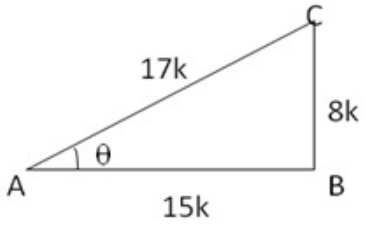
Question 6

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

Let AB = 15k and BC = 8k,

Where k is positive

Let us draw a ΔABC in which ∠B = 90^0 and ∠BAC = θ



By Pythagoras theorem, we have

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

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

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

$= 289k^2$

$AC = 17k$

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

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

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

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