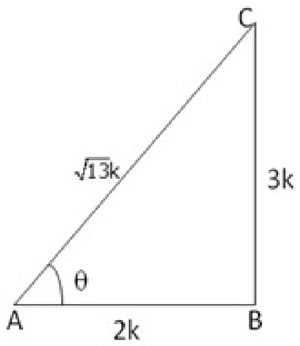
Question 14

Given: $cot\theta = \frac{2}{3} = \frac{2k}{3k}$

Let us draw a ΔABC in which $\angle B = 90^0$ and $\angle A = \theta$



By Pythagoras theorem, we have

$$AC^2 = AB^2 + BC^2$$
$$= (2k)^2 + (3k)^2$$
$$= 4k^2 + 9k^2 = 13k^2$$
$$\Rightarrow \quad AC = \sqrt{13}k$$
$$\therefore \sin\theta = \frac{3k}{\sqrt{13}k} = \frac{3}{\sqrt{13}}$$
$$\cos\theta = \frac{2k}{\sqrt{13}k} = \frac{2}{\sqrt{13}}$$
$$\text{L.H.S.} = \frac{4\sin\theta - 3\cos\theta}{2\sin\theta + 6\cos\theta}$$
$$= \frac{4 \times \frac{3}{\sqrt{13}} - 3 \times \frac{2}{\sqrt{13}}}{2 \times \frac{3}{\sqrt{13}} + 6 \times \frac{2}{\sqrt{13}}}$$
$$= \frac{\frac{12-6}{\sqrt{13}}}{\frac{6+12}{\sqrt{13}}}$$
$$= \frac{6}{18} = \frac{1}{3} = \text{R.H.S.}$$

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