

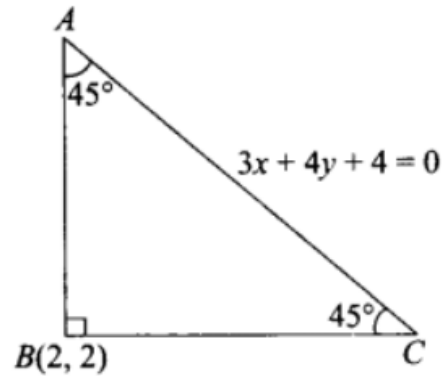
Q12. Find the equation of one of the sides of an isosceles right angled triangle whose hypotenuse is given by $3x + 4y = 4$ and the opposite vertex of the hypotenuse is $(2, 2)$.

Sol. As shown in the figure, hypotenuse is along the line $3x + 4y + 4 = 0$.

$$\therefore \text{Slope of } AC = \frac{-3}{4}.$$

Since ABC is isosceles right angled triangle, $\angle BAC = \angle ACB = 45^\circ$.

Now, let the slope of the line making an angle 45° with AC be m .



$$\therefore \tan 45^\circ = \left| \frac{m - \left(-\frac{3}{4}\right)}{1 + m\left(-\frac{3}{4}\right)} \right| \Rightarrow \frac{4m + 3}{4 - 3m} = \pm 1$$

$$\Rightarrow 4m + 3 = 4 - 3m \text{ or } 4m + 3 = 3m - 4 \Rightarrow m = 1/7 \text{ or } m = -7$$

So, if the slope of line BC is $1/7$ then the slope of line AB is -7 .

So, equation of BC is: $y - 2 = (1/7)(x - 2) \Rightarrow x - 7y + 12 = 0$.

Equation of AB is: $y - 2 = -7(x - 2) \Rightarrow 7x + y - 16 = 0$.