Trigonometric Ratios Ex 5.1 Q9

Answer :

Given:

$$\tan\theta = \frac{a}{b} \quad \dots\dots (1)$$

Now, we know that $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$

Therefore equation (1) becomes as follows

$$\frac{\sin\theta}{\cos\theta} = \frac{a}{b}$$

Now, by applying invertendo

We get,

$$\frac{\cos\theta}{\sin\theta} = \frac{b}{a}$$

Now, by applying Compenendo-dividendo

We get,

$$\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta} = \frac{b+a}{b-a}$$

Therefore,

$$\frac{\cos\theta + \sin\theta}{\cos\theta - \sin\theta} = \frac{b+a}{b-a}$$

Trigonometric Ratios Ex 5.1 Q10

Answer :

Given:

$$3\tan\theta = 4$$

Therefore,

$$\tan\theta = \frac{4}{3} \quad \ldots\ldots (1)$$

Now, we know that $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$

Therefore equation (1) becomes

$$\frac{\sin\theta}{\cos\theta} = \frac{4}{3} \quad \ldots\ldots (2)$$

Now, by applying Invertendo to equation (2)

We get,

$$\frac{\cos\theta}{\sin\theta} = \frac{3}{4} \quad \ldots\ldots (3)$$

Now, multiplying by 4 on both sides

We get,

$$4 \times \frac{\cos\theta}{\sin\theta} = 4 \times \frac{3}{4}$$

Therefore

$$\frac{4\cos\theta}{\sin\theta} = \frac{3}{1}$$

Now by applying dividendo in above equation

We get,

$$\frac{4\cos\theta - \sin\theta}{\sin\theta} = \frac{3-1}{1}$$

$$\frac{4\cos\theta - \sin\theta}{\sin\theta} = \frac{2}{1} \quad \ldots\ldots (4)$$

Now, multiplying by 2 on both sides of equation (3)

We get,

$$2 \times \frac{\cos\theta}{\sin\theta} = 2 \times \frac{3}{4}$$

Therefore

$$\frac{2\cos\theta}{\sin\theta} = \frac{3}{2}$$

Now by applying componendo in above equation

We get,

$$\frac{2\cos\theta + \sin\theta}{\sin\theta} = \frac{3+2}{2}$$

$$\frac{2\cos\theta + \sin\theta}{\sin\theta} = \frac{5}{2} \quad \ldots\ldots (5)$$

Now, by dividing equation (4) by equation (5)

We get,

$$\frac{\dfrac{4\cos\theta - \sin\theta}{\sin\theta}}{\dfrac{2\cos\theta + \sin\theta}{\sin\theta}} = \frac{\dfrac{2}{1}}{\dfrac{5}{2}}$$

Therefore,

$$\frac{4\cos\theta - \sin\theta}{\sin\theta} \times \frac{\sin\theta}{2\cos\theta + \sin\theta} = \frac{2}{1} \times \frac{2}{5}$$

Therefore, on L.H.S $\sin\theta$ cancels and we get,

$$\frac{4\cos\theta - \sin\theta}{2\cos\theta + \sin\theta} = \frac{2}{1} \times \frac{2}{5}$$

Therefore,

$$\frac{4\cos\theta - \sin\theta}{2\cos\theta + \sin\theta} = \frac{4}{5}$$

Hence,

$$\frac{4\cos\theta - \sin\theta}{2\cos\theta + \sin\theta} = \frac{4}{5}$$