Trigonometric Ratios Ex 5.3 Q10

Answer :

Given that: $\sin\theta = \cos\left(\theta - 45^\circ\right)$ where θ and $\left(\theta - 45^\circ\right)$ are acute angles

We have to find θ

$$\sin\theta = \cos\left(\theta - 45^\circ\right)$$

$$\Rightarrow \cos\left(90^\circ - \theta\right) = \cos\left(\theta - 45^\circ\right)$$

$$\Rightarrow 90^\circ - \theta = \theta - 45^\circ$$

$$\Rightarrow -2\theta = -135^\circ$$

$$\Rightarrow \theta = \frac{135^\circ}{2}$$

Therefore $\boxed{\theta = 67\frac{1}{2}^\circ}$

Trigonometric Ratios Ex 5.3 Q11

Answer :

(i) We have to prove: $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$

Since we know that in triangle ABC

$$A + B + C = 180^\circ$$

$$\Rightarrow B + C = 180^\circ - A$$

Dividing by 2 on both sides, we get

$$\Rightarrow \frac{B+C}{2} = 90^\circ - \frac{A}{2}$$

$$\Rightarrow \sin\frac{B+C}{2} = \sin\left(90^\circ - \frac{A}{2}\right)$$

$$\Rightarrow \boxed{\sin\frac{B+C}{2} = \cos\frac{A}{2}}$$

Proved

(ii) We have to prove: $\cos\left(\frac{B+C}{2}\right)=\sin\frac{A}{2}$

Since we know that in triangle ABC

$$A+B+C=180^\circ$$

$$\Rightarrow B+C=180^\circ-A$$

Dividing by 2 on both sides, we get

$$\Rightarrow \frac{B+C}{2}=90^\circ-\frac{A}{2}$$

$$\Rightarrow \cos\frac{B+C}{2}=\cos\left(90^\circ-\frac{A}{2}\right)$$

$$\Rightarrow \boxed{\cos\frac{B+C}{2}=\sin\frac{A}{2}}$$

Proved

Trigonometric Ratios Ex 5.3 Q12

Answer :

Given that: $\sin(2\theta+45^\circ)=\cos(30^\circ-\theta)$ where $(2\theta+45^\circ)$ and $(30^\circ-\theta)$ are acute angles

We have to find θ

So we have

$$\sin(2\theta+45^\circ)=\cos(30^\circ-\theta)$$

$$\Rightarrow \sin(2\theta+45^\circ)=\sin\left[90^\circ-(30^\circ-\theta)\right]$$

$$\Rightarrow 2\theta+45^\circ=90^\circ-30^\circ+\theta$$

$$\Rightarrow \theta=15^\circ$$

Hence the value of θ is $\boxed{\theta=15^\circ}$

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