Trigonometric Ratios Ex 5.2 Q27

Answer :

(i) Given:

$A = B = 60^\circ$ ..... (1)

To verify:

$\cos(A-B) = \cos A \cos B + \sin A \sin B$ ..... (2)

Now consider left hand side of the expression to be verified in equation (2)

Therefore,

$$\begin{aligned}\cos(A-B) &= \cos(60-60)\\ &= \cos 0\\ &= 1\end{aligned}$$

Now consider right hand side of the expression to be verified in equation (2)

Therefore,

$$\begin{aligned}\cos A \cos B + \sin A \sin B &= \cos B \cos B + \sin B \sin B\\ &= \cos^2 B + \sin^2 B\\ &= 1\end{aligned}$$

Hence it is verified that,

$\cos(A-B) = \cos A \cos B + \sin A \sin B$

(ii) Given:

$A = B = 60^\circ$ ..... (1)

To verify:

$\sin(A-B) = \sin A \cos B - \cos A \sin B$ ..... (2)

Now consider LHS of the expression to be verified in equation (2)

Therefore,

$$\begin{aligned}\sin(A-B) &= \sin(B-B)\\ &= \sin 0\\ &= 0\end{aligned}$$

Now by substituting the value of *A* and *B* from equation (1) in the above expression

We get,

$$\begin{aligned}\sin A \cos B - \cos A \sin B &= \sin B \cos B - \cos B \sin B\\ &= 0\end{aligned}$$

Hence it is verified that,

$\sin(A-B) = \sin A \cos B - \cos A \sin B$

(iii) Given:

$A = B = 60^\circ$ ..... (1)

To verify:

$\tan(A-B) = \dfrac{\tan A - \tan B}{1 + \tan A \tan B}$ ..... (2)

Now consider LHS of the expression to be verified in equation (2)

Therefore,

$$\begin{aligned}\tan(A-B) &= \tan(B-B)\\ &= \tan 0\\ &= 0\end{aligned}$$

Now consider RHS of the expression to be verified in equation (2)

Therefore,

Now by substituting the value of *A* and *B* from equation (1) in the above expression

We get,

$$\frac{\tan A - \tan B}{1 + \tan A \tan B} = \frac{\tan B - \tan B}{1 + \tan B \tan B}$$
$$= \frac{0}{1 + \tan^2 B}$$
$$= 0$$

Hence it is verified that,

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Trigonometric Ratios Ex 5.2 Q28

Answer :

(i) Given

$A = 30°$ and $B = 60°$ ..... (1)

To verify:

$\sin(A + B) = \sin A \cos B + \cos A \sin B$ ..... (2)

Now consider LHS of the expression to be verified in equation (2)

Therefore,

$$\sin(A + B) = \sin(30 + 60)$$
$$= \sin 90$$
$$= 1$$

Now consider RHS of the expression to be verified in equation (2)

Therefore;

$$\sin A \cos B + \cos A \sin B = \sin 30 \cos 60 + \cos 30 \sin 60$$
$$= \frac{1}{2} \times \frac{1}{2} + \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{3}$$
$$= \frac{1+3}{4}$$
$$= 1$$

Hence it is verified that,

$\sin(A + B) = \sin A \cos B + \cos A \sin B$

(ii) Given:

$A = 30°$ and $B = 60°$ ..... (1)

To verify:

$$\cos(A+B) = \cos A \cos B - \sin A \sin B \quad \ldots\ldots (2)$$

Now consider LHS of the expression to be verified in equation (2)

Therefore,

$$\begin{aligned}\cos(30+60) &= \cos 90 \\ &= 0\end{aligned}$$

Now consider RHS of the expression to be verified in equation (2)

Therefore,

$$\begin{aligned}\cos A \cos B - \sin A \sin B &= \cos 30 \cos 60 - \sin 30 \sin 60 \\ &= \frac{\sqrt{3}}{2} \times \frac{1}{2} - \frac{1}{2} \times \frac{\sqrt{3}}{2} \\ &= 0\end{aligned}$$

Hence it is verified that,

$$\cos(A+B) = \cos A \cos B - \sin A \sin B$$

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