Trigonometric Ratios of Compound Angles Ex 7.1 Q1

We have,

$$\sin A = \frac{4}{5} \text{ and } \cos B = \frac{5}{13}$$

$\therefore$ $\cos A = \sqrt{1 - \sin^2 A}$ and $\sin B = \sqrt{1 - \cos^2 B}$

$\Rightarrow$ $\cos A = \sqrt{1 - \left(\frac{4}{5}\right)^2}$ and $\sin B = \sqrt{1 - \left(\frac{5}{13}\right)^2}$

$\Rightarrow$ $\cos A = \sqrt{1 - \frac{16}{25}}$ and $\sin B = \sqrt{1 - \frac{25}{169}}$

$\Rightarrow$ $\cos A = \sqrt{\frac{25 - 16}{25}}$ and $\sin B = \sqrt{\frac{169 - 25}{169}}$

$\Rightarrow$ $\cos A = \sqrt{\frac{9}{25}}$ and $\sin B = \sqrt{\frac{144}{169}}$

$\Rightarrow$ $\cos A = \frac{3}{5}$ and $\sin B = \frac{12}{13}$

Now,

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

$$= \frac{4}{5} \times \frac{5}{13} + \frac{3}{5} \times \frac{12}{13}$$

$$= \frac{20}{65} + \frac{36}{65}$$

$$= \frac{20 + 36}{65}$$

$$= \frac{56}{65}$$

We have,

$$\sin A = \frac{4}{5} \text{ and } \cos B = \frac{5}{13}$$

$\therefore \qquad \cos A = \sqrt{1 - \sin^2 A} \text{ and } \sin B = \sqrt{1 - \cos^2 B}$

$\Rightarrow \qquad \cos A = \sqrt{1 - \left(\frac{4}{5}\right)^2} \text{ and } \sin B = \sqrt{1 - \left(\frac{5}{13}\right)^2}$

$\Rightarrow \qquad \cos A = \sqrt{1 - \frac{16}{25}} \text{ and } \sin B = \sqrt{1 - \frac{25}{169}}$

$\Rightarrow \qquad \cos A = \sqrt{\frac{25 - 16}{25}} \text{ and } \sin B = \sqrt{\frac{169 - 25}{169}}$

$\Rightarrow \qquad \cos A = \sqrt{\frac{9}{25}} \text{ and } \sin B = \sqrt{\frac{144}{169}}$

$\Rightarrow \qquad \cos A = \frac{3}{5} \text{ and } \sin B = \frac{12}{13}$

Now,

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

$$= \frac{3}{5} \times \frac{5}{13} - \frac{4}{5} \times \frac{12}{13}$$

$$= \frac{15}{65} - \frac{48}{65}$$

$$= \frac{15 - 48}{65}$$

$$= \frac{-33}{65}$$

We have,

$$\sin A = \frac{4}{5} \text{ and } \cos B = \frac{5}{13}$$

$\therefore \qquad \cos A = \sqrt{1 - \sin^2 A} \text{ and } \sin B = \sqrt{1 - \cos^2 B}$

$\Rightarrow \qquad \cos A = \sqrt{1 - \left(\frac{4}{5}\right)^2} \text{ and } \sin B = \sqrt{1 - \left(\frac{5}{13}\right)^2}$

$\Rightarrow \qquad \cos A = \sqrt{1 - \frac{16}{25}} \text{ and } \sin B = \sqrt{1 - \frac{25}{169}}$

$\Rightarrow \qquad \cos A = \sqrt{\frac{25 - 16}{25}} \text{ and } \sin B = \sqrt{\frac{169 - 25}{169}}$

$\Rightarrow \qquad \cos A = \sqrt{\frac{9}{25}} \text{ and } \sin B = \sqrt{\frac{144}{169}}$

$\Rightarrow \qquad \cos A = \frac{3}{5} \text{ and } \sin B = \frac{12}{13}$

Now,

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

$$= \frac{4}{5} \times \frac{5}{13} - \frac{3}{5} \times \frac{12}{13}$$

$$= \frac{20}{65} - \frac{36}{65}$$

$$= \frac{20 - 36}{65}$$

$$= -\frac{16}{65}$$

We have,

$$\sin A = \frac{4}{5} \text{ and } \cos B = \frac{5}{13}$$

$\therefore$ $\cos A = \sqrt{1 - \sin^2 A}$ and $\sin B = \sqrt{1 - \cos^2 B}$

$\Rightarrow$ $\cos A = \sqrt{1 - \left(\frac{4}{5}\right)^2}$ and $\sin B = \sqrt{1 - \left(\frac{5}{13}\right)^2}$

$\Rightarrow$ $\cos A = \sqrt{1 - \frac{16}{25}}$ and $\sin B = \sqrt{1 - \frac{25}{169}}$

$\Rightarrow$ $\cos A = \sqrt{\frac{25 - 16}{25}}$ and $\sin B = \sqrt{\frac{169 - 25}{169}}$

$\Rightarrow$ $\cos A = \sqrt{\frac{9}{25}}$ and $\sin B = \sqrt{\frac{144}{169}}$

$\Rightarrow$ $\cos A = \frac{3}{5}$ and $\sin B = \frac{12}{13}$

Now,

$$\cos(A - B) = \cos A \cos B + \sin A \sin B$$
$$= \frac{3}{5} \times \frac{5}{13} + \frac{4}{5} \times \frac{12}{13}$$
$$= \frac{15}{65} + \frac{48}{65}$$
$$= \frac{15 + 48}{65}$$
$$= \frac{63}{65}$$

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