

LT: Identify the sum/difference identities for sine, cosine, and tangent functions; apply the identities to solve mathematical problems.

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

$$\cos(A \oplus B) = \cos A \cos B \ominus \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

Part I: Given A & B

Ex 1) $\cos(A - B)$
 $\cos(240^\circ - 0^\circ)$
A B

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

$$= \cos 240^\circ \cos 0^\circ + \sin 240^\circ \sin 0^\circ$$

$$\left(\frac{-1}{2}\right)(1) + \left(\frac{-\sqrt{3}}{2}\right)(0)$$

$$= \frac{-1}{2}$$

Ex 2)

$$\cos 240^\circ - \cos 0^\circ$$

$$-\frac{1}{2} - 1$$

$$-1.5 \text{ OR } -\frac{1}{2}$$

You Try!

$$\text{Ex 3) } \sin\left(\frac{\pi}{6} + \frac{\pi}{3}\right)$$

$$\sin\frac{\pi}{6}\cos\frac{\pi}{3} + \cos\frac{\pi}{6}\sin\frac{\pi}{3}$$

$$\left(\frac{1}{2}\right)\left(\frac{1}{2}\right) + \left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{3}}{2}\right)$$

$$\frac{1}{4} + \frac{\sqrt{9}}{4}$$

$$\frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1$$

$$\text{Ex 4) } \sin\frac{\pi}{6} + \sin\frac{\pi}{3}$$

$$\frac{1}{2} + \frac{\sqrt{3}}{2}$$

$$\frac{1 + \sqrt{3}}{2}$$

Part II: Determine A & B to Evaluate

$$\text{Ex 5) } \cos 75^\circ$$

120 - 45, 30 + 45,

$$\cos(30 + 45)$$

$$\cos 30 \cos 45 - \sin 30 \sin 45$$

$$\left(\frac{\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right) - \left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$$

$$\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} \rightarrow$$

$$\frac{\sqrt{6} - \sqrt{2}}{4}$$

Ex 6) $\sin 195^\circ$

$$\sin 150 \cos 45 + (\cos 150 \sin 45)$$

$$\left(\frac{1}{2}\right)\left(\frac{\sqrt{2}}{2}\right) + \left(\frac{-\sqrt{3}}{2}\right)\left(\frac{\sqrt{2}}{2}\right)$$

$$- \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\frac{-\sqrt{2}}{4} + \frac{-\sqrt{6}}{4} = \frac{-\sqrt{2} - \sqrt{6}}{4}$$