## Product-to-Sum Formulas

Cos(A + B) = Cos A Cos B - Sin A Sin B Cos(A - B) = Cos A Cos B + Sin A Sin B Cos(A + B) + Cos(A - B) = d Cos A Cos B  $Cos A Cos B = \frac{1}{2} [Cos(A - B) + Cos(A + B)]$  Cos(A - B) - Cos(A + B) = d Sin A Sin B  $Sin A Sin B = \frac{1}{2} [Cos(A - B) - Cos(A + B)]$ 

$$Sin (A + B) = Sin A Cos B + Cos A Sin B$$

$$Sin (A - B) = Sin A cos B - Cos A Sin B$$

$$Sin (A + B) + Sin(A - B) = 2 Sin A Cos B$$

$$Sin A Cos B = \frac{1}{2} \left[ Sin(A + B) + Sin(A - B) \right]$$

$$Sin A Sin B = \frac{1}{2} \left[ Cos(A - B) - Cos(A + B) \right]$$

$$Cos A Cos B = \frac{1}{2} \left[ Cos(A - B) + Cos(A + B) \right]$$

$$Sin A (os B) = \frac{1}{2} \left[ Sin(A + B) + Sin(A - B) \right]$$

$$Product - to - Sum Sor multis$$

find exact Value for 
$$(0545^{\circ}Sin 15^{\circ})$$
  
 $Cos 45^{\circ}Sin (5^{\circ} = \frac{1}{2} \left[ Sin (45^{\circ} + 15^{\circ}) + Sin (45^{\circ} - 15^{\circ}) \right]$   
 $= \frac{1}{2} \left[ Sin 60^{\circ} + Sin 30^{\circ} \right]$   
 $= \frac{1}{2} \left[ \frac{\sqrt{3}}{2} + \frac{1}{2} \right] = \frac{1}{2} \cdot \frac{1}{2} \left[ \sqrt{3} + 1 \right]$   
 $= \frac{1}{4} \left( \sqrt{3} + 1 \right)$ 

$$\begin{aligned} & \text{Sind exact Value Sor } 4 \text{ Sin} \left( x + \frac{\pi}{4} \right) \text{Sin} \left( x - \frac{\pi}{4} \right) \\ & \text{4 Sin} \left( x + \frac{\pi}{4} \right) \text{Sin} \left( x - \frac{\pi}{4} \right) = 4 \cdot \frac{1}{2} \left[ \cos \left( \frac{\pi}{2} \right) - \cos \left( \frac{\pi}{2} \right) \right] \\ & x + \frac{\pi}{4} - \left( x - \frac{\pi}{4} \right) = \frac{\pi}{2} \\ & x + \frac{\pi}{4} + x - \frac{\pi}{4} = 2x \\ & \text{Cos } \frac{\pi}{2} = \cos 90^{\circ} = 0 \end{aligned} = 2 \left[ 0 - \cos 2x \right] \\ & = 2 \left[ 0 - \cos 2x \right] \\ & = \left[ -2 \cos 2x \right] \end{aligned}$$

Evaluate 
$$C_{0S} \frac{5\pi}{12} C_{0S} \frac{\pi}{12}$$
  
 $C_{0S} \frac{5\pi}{12} C_{0S} \frac{\pi}{12} = \frac{1}{2} \begin{bmatrix} C_{0S}(-) + (os(+)) \\ \frac{\pi}{12} - \frac{\pi}{12} = \frac{4\pi}{12} = \frac{\pi}{3} \\ = \frac{1}{2} \begin{bmatrix} C_{0S} \pi + (os(\pi)) \\ \frac{\pi}{2} - \frac{\pi}{2} \end{bmatrix}$   
 $= \frac{1}{2} \begin{bmatrix} C_{0S} \pi + (os(\pi)) \\ \frac{\pi}{2} \end{bmatrix}$   
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