$\sin(2x) = 2\sin x \cos x$

$\cos(2x) = 2\cos^2 x - 1$

$\cos X = 2\cos^2\left(\frac{1}{2}X\right) - 1$

$$\sqrt{\frac{\cos X + 1}{2}} = \cos\frac{1}{2}X$$

ex: $\cos 30° = \frac{\sqrt{3}}{2}$

$$\cos 15° = \sqrt{\frac{\frac{\sqrt{3}}{2}+1}{2}} = \sqrt{\frac{\sqrt{3}+2}{4}}$$ ✓

$$\boxed{\cos\frac{1}{2}x = \sqrt{\frac{\cos x + 1}{2}}}$$

$\sin\frac{1}{2}x =$

$$\sin x = 2 \sin \frac{1}{2}x \cos \frac{1}{2}x$$

$$\Rightarrow \sin \frac{1}{2}x = \frac{\sin x}{2 \cos \frac{1}{2}x} \quad \checkmark$$

$$= \frac{\sin x}{2\sqrt{\frac{\cos x + 1}{2}}} = \frac{\sin x}{\sqrt{2}\sqrt{(\cos x + 1)}}$$

$$\sin 30° = \frac{1}{2} \qquad \cos 30 = \frac{\sqrt{3}}{2}$$

$$\sin 15° = \frac{1/2}{\sqrt{2}\sqrt{\left(\frac{\sqrt{3}}{2} + 1\right)}} = 0{,}259 \quad \checkmark$$

$$\boxed{\sin \frac{1}{2}x = \frac{\sqrt{2} \sin x}{2\sqrt{1 + \cos x}}}$$