

Half-Angle Cosine Formula

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

+ or – determined by quadrant of angle $\frac{\alpha}{2}$

Proof:

$$\cos^2 \theta = \frac{1 + \cos (2\theta)}{2} \quad \cos^2 \frac{\alpha}{2} = \frac{1 + \cos (2 \cdot \frac{\alpha}{2})}{2}$$

$$\text{let } \theta = \frac{\alpha}{2}$$

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

Half-Angle Cosine Formula

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Evaluate the following

$$\cos 22.5^\circ$$

Half-Angle Cosine Formula

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

Evaluate the following

$$\cos \frac{\pi}{12}$$

Half-Angle Cosine Formula

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

Evaluate the following

$$\cos 105^\circ$$

Half-Angle Cosine Formula

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

Given $\cos \alpha = -\frac{1}{2}$; α lies in quadrant 3, determine the value of $\cos \frac{\alpha}{2}$

Half-Angle Cosine Formula

$$\cos \frac{\alpha}{2} = \pm \sqrt{\frac{1 + \cos \alpha}{2}}$$

Given $\sin \alpha = \frac{3}{5}$; α lies in quadrant 1, determine the value of $\cos \frac{\alpha}{2}$

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+ or – determined by quadrant of angle $\frac{\alpha}{2}$