6.4 Double-Angle and Half Angle Identities

$$\sin 2\theta = 2\sin\theta\cos\theta, \quad \cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$\cos 2\theta = 1 - 2\sin^2\theta, \quad \cos 2\theta = 2\cos^2\theta - 1$$

$$\sin^2\theta = \frac{1-\cos 2\theta}{2}, \quad \cos^2\theta = \frac{1+\cos 2\theta}{2}$$

$$\cos\frac{A}{2} = \pm\sqrt{\frac{1+\cos A}{2}}, \quad \sin\frac{A}{2} = \pm\sqrt{\frac{1-\cos A}{2}}$$

1. Find $\cos 2\alpha$ given that $\sin\alpha = -4/5$ and α lies in quadrant III.
2. Find $\sin 2\beta$ given that $\cos\beta = 12/13$ and α lies in quadrant IV.
3. Find $\sin\frac{\theta}{2}$ given that $\cos\theta = -1/4$ and $\pi < \theta < \frac{3\pi}{2}$
4. Find $\cos\frac{\theta}{2}$ given that $\sin\theta = -12/13$ and $\frac{7\pi}{4} < \frac{\theta}{2} < 2\pi$
5. Find $\sin\theta$ given that $\cos(2\theta) = 3/5$ and $0 < 2\theta < \frac{\pi}{2}$
6. Find $\cos\theta$ given that $\sin(2\theta) = 5/13$ and $0 < \theta < \frac{\pi}{4}$
7. Write $\cos^4\theta$ in terms of $\cos\theta$.