5.4--Multiple Angle Identities

Double-Angle Identities

$$\sin 2u = 2 \sin u \cos u$$

$$\cos 2u = \begin{cases} \cos^2 u - \sin^2 u \\ 2\cos^2 u - 1 \\ 1 - 2\sin^2 u \end{cases}$$

$$\tan 2u = \frac{2 \tan u}{1 - \tan^2 u}$$

Power-Reducing Identities

$$\sin^2 u = \frac{1 - \cos 2u}{2}$$

$$\cos^2 u = \frac{1 + \cos 2u}{2}$$

$$\tan^2 u = \frac{1 - \cos 2u}{1 + \cos 2u}$$

Half-Angle Identities

$$\sin \frac{u}{2} = \pm \sqrt{\frac{1 - \cos u}{2}}$$

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

$$\tan \frac{u}{2} = \pm \sqrt{\frac{1 - \cos u}{1 + \cos u}}$$

1) Develop the double-angle formula by using sum & difference formulas:

sin 2x =

cos 2x =

tan 2x =

5.4--Multiple Angle Identities

Prove the following identity:

2) $\cos^4 x - \sin^4 x = \cos 2x$

Prove the following identity:

3) $\cos^4 x = \frac{1}{8}(\cos 4x + 4\cos 2x + 3)$

5.4--Multiple Angle Identities

Solve for x algebraically over the interval [0, 2π):

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

Solve for x algebraically over the interval [0, 2π):

5) $\sin^2 x = 2 \sin^2(x/2)$