

Precalculus

5-06 Multiple Angle Formulas

Double-Angle Formulas

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

If $\sin u = \frac{3}{5}$ and $0 < u < \frac{\pi}{2}$,

Find $\sin 2u$

$\cos 2u$

$\tan 2u$

Derive a triple angle formula for $\cos 3x$

Power-Reducing Formulas

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

Rewrite $\cos^4 x$ as a sum of 1st powers of cosines.

Half-Angle Formulas

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

Find the exact value of $\cos 105^\circ$