
Double Angle Formulas

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

$$\cos 2u = \cos^2 u - \sin^2 u$$

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

$$= 2 \cos^2 u - 1$$

$$= 1 - 2 \sin^2 u$$

Example 1: Use the double angle formula to *rewrite* the expressions as a single trigonometric function or as a single number.

a. $3 - 6 \sin^2 x$.

b. $\cos^2 15^\circ - \sin^2 15^\circ$

c. $2 \sin 5x \cos 5x$

d. $\frac{2 \tan \frac{\pi}{6}}{1 - \tan^2 \frac{\pi}{6}}$

Example 2: Find the exact value of each of the following using an appropriate identity.

a. $\sin 2(45^\circ)$

b. $\cos 2\left(\frac{5\pi}{3}\right)$

Example 3: Solve $\cos 2x + \cos x = 0$.

Example 4: Find $\sin 2u$, $\cos 2u$, and $\tan 2u$ if $\sin u = \frac{3}{5}$ and $\frac{\pi}{2} < u < \pi$.

Homework: pages 413-415 #11-25 odd, 29-41 odd, 135