Double-Angle Identities:

$\sin(2x) =$

$\cos(2x) =$

$\cos(2x) =$

$\cos(2x) =$

$\tan(2x) =$

Examples: Using the double-angle identities, find $\sin\left(\frac{2\pi}{3}\right)$, $\cos\left(\frac{2\pi}{3}\right)$, and $\tan\left(\frac{2\pi}{3}\right)$.

Example: Verify using the double-angle identities.

1. $\cos(3x) = \cos^3 x - 3\cos x \sin^2 x$

Example: Find $\sin\alpha$, $\cos\alpha$, and $\tan\alpha$ given the following double-angle.

1. $\cos(2\alpha) = -\frac{1}{3}$, if $\pi < 2\alpha < \frac{3\pi}{2}$

Half-Angle Identities:

$\sin\left(\frac{x}{2}\right) =$

$\cos\left(\frac{x}{2}\right) =$

$\tan\left(\frac{x}{2}\right) =$

$\tan\left(\frac{x}{2}\right) =$

$\tan\left(\frac{x}{2}\right) =$

Examples: Using the half-angle identities, find $\sin\left(\frac{\pi}{8}\right)$, $\cos\left(\frac{\pi}{8}\right)$, and $\tan\left(\frac{\pi}{8}\right)$.

Example: Verify using the double-angle identities.

1. $\sin^2\left(\frac{x}{2}\right)\cos^2\left(\frac{x}{2}\right) = \frac{\sin^2 x}{4}$

Example: Find $\sin \alpha$, $\cos \alpha$, and $\tan \alpha$ given the following half-angle.

1. $\sin\left(\frac{\alpha}{2}\right) = \frac{4}{5}$, if $\frac{\pi}{4} < \frac{\alpha}{2} < \frac{\pi}{2}$