Sections 5.4-5.5 Precalculus with Trig Name _____
Formulas Period _____

Sum and Difference Formulas

$\sin(u \pm v) = \sin u \cos v \pm \cos u \sin v$

$\cos(u \pm v) = \cos u \cos v \mp \sin u \sin v$

$\tan(u \pm v) = \dfrac{\tan u \pm \tan v}{1 \mp (\tan u)(\tan v)}$

Double-Angle Formulas

$\sin 2x =$ $2 \sin x \cos x$

Use $\sin(u+v) = \sin x \cos x + \sin x \cos x$, $\sin(x+x) = 2 \sin x \cos x$

$\tan 2x =$ $\dfrac{2 \tan x}{1 - \tan^2 x}$

$\tan(x+x) = \dfrac{\tan x + \tan x}{1 - \tan^2 x}$

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

$\cos(x+x) = \cos x \cos x - \sin x \sin x =$

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

$\cos 2x =$ $1 - 2\sin^2 x$

Use $\cos^2 x + \sin^2 x = 1$ to manipulate

Power-Reducing Formulas

$\sin^2 x =$ $\dfrac{1 - \cos 2x}{2}$

rearrange last formula for $\cos 2x$

$\cos^2 x =$ $\dfrac{1 + \cos 2x}{2}$

same as $\sin^2 x$ only opposite

~~$\cos 2x + \sin^2 x$~~ ~~$\cos 2x + 1 - \cos^2 x$~~

$\tan^2 x =$ $\dfrac{1 - \cos 2x}{1 + \cos 2x}$

$\dfrac{\sin^2 x}{\cos^2 x}$

Half-Angle Formulas

$\sin \dfrac{x}{2} =$ $\pm\sqrt{\dfrac{1 - \cos x}{2}}$

$\sin^2\left(\frac{x}{2}\right) = \dfrac{1 - \cos 2\left(\frac{x}{2}\right)}{2} = \sqrt{\dfrac{1 - \cos x}{2}}$

$\cos \dfrac{x}{2} =$ $\pm\sqrt{\dfrac{1 + \cos x}{2}}$

$\tan \dfrac{x}{2} =$ $\dfrac{1 - \cos x}{\sin x}$ or $\dfrac{\sin x}{1 + \cos x}$

The signs of $\sin \dfrac{x}{2}$ and $\cos \dfrac{x}{2}$ depend on the quadrant in which $\dfrac{x}{2}$ lies.