Don't worry, you do not have to memorize the following formulas, but you have to know how to use them....

Double-Angle Formulas

$$\sin(2\theta) = 2\sin\theta\cos\theta$$
$$\cos(2\theta) = \cos^2\theta - \sin^2\theta$$
$$= 2\cos^2\theta - 1$$
$$= 1 - 2\sin^2\theta$$
$$\tan(2\theta) = \frac{2\tan\theta}{1 - \tan^2\theta}$$

Ex. 1) Use a double-angle formula to <u>rewrite</u> the expression.



Ex. 2) Use the figure to find the <u>exact value</u> of the following:

 $\sin 2\theta =$

 $\cos 2\theta =$



 $\tan 2\theta =$

Ex. 3) Find the exact value of the following if $\csc x = 3$, and $\frac{\pi}{2} < x < \pi$

 $\tan 2x =$

Ex. 4) Find the exact solution of the equation in the interval $[0, 2\pi)$

 $\sin 2x + \cos x = 0$

Ex. 5) Find the exact solution of the equation in the interval $\left[0,2\pi\right)$

 $\cos 2x + \sin x = 0$

Ex. 6) Find the exact solution of the equation in the interval $[0, 2\pi)$

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

The signs of $\sin\frac{\theta}{2}$ and $\cos\frac{\theta}{2}$ depend on the quadrant in which $\frac{\theta}{2}$ lies



Ex. 1) Use the half-angle formulas to simplify the expression.



Ex. 2) Use the figure to find the exact value of the following:



$$\sin\frac{\theta}{2} =$$

$$\tan\frac{\theta}{2} =$$

Ex. 3) Find the exact value of $\tan \frac{u}{2}$ if $\sin u = \frac{5}{13}$ and $\frac{\pi}{2} < u < \pi$.

Ex. 4) Use the half-angle formulas to determine the exact values of:

a) $sin(22.5^{\circ})$

b) cos105°

HW: 5.5 p.415: 3, 5, 9, 13, 19, 21, 27, 35, 37, 41, 53, 55