## **Double-Angle Formulas**

Sin (A +B) = Sin A (os B + Cos A Sin B

Replace B by A,

Sin (A \*A) = Sin A Cos A + Cos A Sin A

$$Sin 2A = 2 Sin A Cos A$$

Cos  $2A = Cos^2 A - Sin^2 A$ 

$$= Cos^2 A - (1 - (os^2 A) = 2 Cos^2 A - 1)$$

$$= 1 - Sin^2 A - Sin^2 A$$

$$tan 2A = 2 tan A$$

$$1 - tan^2 A$$

Find an expression for Sin3x in terms of Sinx.  
Sin3x = Sin(2x + x)
$$= Sin2x (osx + (os2x Sinx))$$

$$= 2 Sinx (osx \cdot (osx + (1 - 2Sin^2x)Sinx))$$

$$= 2 Sinx (os^2x + Sinx - 2Sin^3x)$$

$$= 2 Sinx (1 - Sin^2x) + Sinx - 2 Sin^3x$$

$$= 3 Sinx - 4 Sin^3x$$

Verify 
$$\frac{\sin 2x}{1 + \cos 2x} = \tan x$$

$$\frac{\sin 2x}{1 + \cos 2x} = \frac{2 \sin x \cos x}{1 + 2 \cos x}$$

$$= \frac{2 \sin x \cos x}{1 + 2 \cos x}$$

$$= \frac{2 \sin x \cos x}{1 + 2 \cos x}$$

$$= \frac{\sin x}{\cos x} = \tan x$$

$$= \frac{\sin x}{\cos x}$$

Graph 
$$y = \lambda - 4 \cos^2 x$$
  

$$y = \lambda \left(1 - 2 \cos^2 x\right)$$

$$y = -2 \left(2 \cos^2 x - 1\right)$$

$$y = -2(2\cos^2x - 1)$$

$$SP = 2x = 0$$

S.P. 2x = 0 x = 0 y = -2

MP 
$$2x = \pi$$
  $x = \frac{\pi}{2}$   $y = 2$   
E.P.  $2x = 2\pi$   $x = \pi$   $y = -2$ 



