Name: _____ Group Members: _____

Exploration 5-6a: Double Argument Properties

Date: _____

Objective: Express cos 2θ and sin 2θ in terms of functions of θ. Use the results to solve an equation containing cos 2θ.

1. Write the composite argument properties for $\cos(A + B)$ and for $\sin(A + B)$.

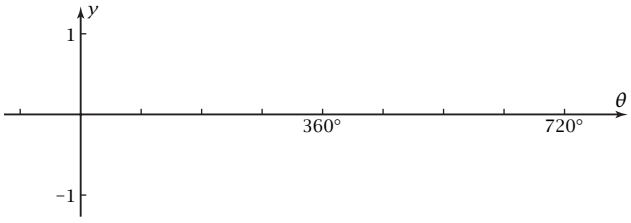
2. Write $\sin 2\theta$ as $\sin(\theta + \theta)$. Expand $\sin(\theta + \theta)$ using the composite argument for sine. The result should be an equation for $\sin 2\theta$ in terms of $\sin\theta$ and $\cos\theta$.

3. Use the technique of Problem 2 to find an equation for $\cos 2\theta$ in terms of $\cos\theta$ and $\sin\theta$.

4. Transform your answer to Problem 3 so that $\cos 2\theta$ is expressed in terms of $\cos\theta$ alone.

5. Transform your answer to Problem 3 so that $\cos 2\theta$ is expressed in terms of $\sin\theta$ alone.

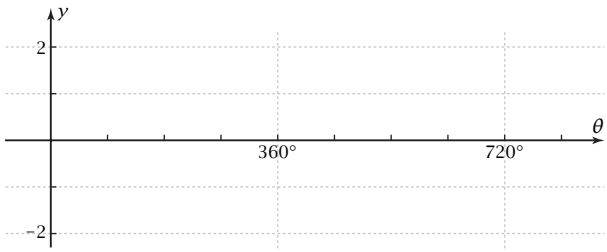
6. Plot on your grapher the right side of your equation for $\sin 2\theta$ in Problem 2. Sketch here.



7. How does your graph in Problem 6 verify that your equation in Problem 2 is correct?

8. Solve $\cos 2\theta + \cos\theta = 1$ algebraically for $\theta \in [-100°, 850°]$. It is recommended that you first transform $\cos 2\theta$ so that it involves only $\cos\theta$. Don't forget the quadratic formula!

9. Plot the left and right members of the equation in Problem 8 on your grapher. Sketch here.



10. How does the graph in Problem 9 show that your answers to Problem 8 are correct?

11. What have you learned as a result of doing this Exploration that you did not know before?