Welcome to the Weekly Review for MATH 2414. This week’s review talks about Polar Coordinates. We would like to thank Patrick Bourque and the Spring 2015 MATH 2414 students for allowing us to film the Weekly Reviews.

The following problems are presented in the Week 10 video. Thank you!

Part A: Polar Coordinates

1. Convert $P(-\sqrt{3},1)$ into polar coordinates.

2. Convert the rectangular equation $x^2 + y^2 = 16$ to polar form.

3. Answer the following for the rectangular equation $x^2 + 6x + y^2 = 0$.
   (a) Graph
   
   (b) Convert to Polar form

   (c) Sketch
4. Answer the following for the rectangular equation $2x + 3y = 12$.
   
   (a) Graph

   (b) Convert to Polar form

5. Answer the following for the rectangular equation $(x^2 + y^2)^2 - 9(x^2 - y^2) = 0$.
   
   (a) Convert to Polar form

   (b) Sketch
(c) Find the area

6. Graph $r = 1 + \sin(\theta)$ and find the values that produce vertical tangencies.
7. Find the Arc Length of $r = 1 + \sin \theta$
8. Sketch $r_1 = 2$ and $r_2 = 4 \sin(2\theta)$ and find the common area.
9. Show that the area of $r = a \sin(n\theta)$ does not depend on the value of $n$. 
10. Graph $r = 1 + 2\sin(\theta)$ and find the area of the inner loop.