Chapter 3.5: Trigonometric Equations

Expected Skills:

- Be able to solve trigonometric equations.

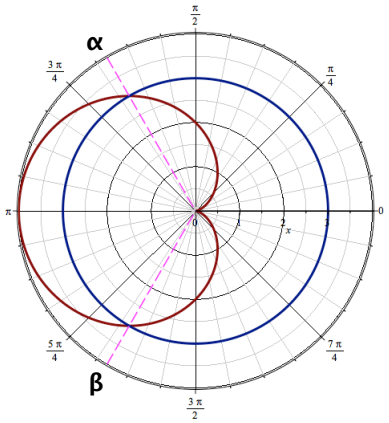
Practice Problems:

For problems 1-7, find all values of θ which satisfy the following equations.

1. $2\sin x + \sqrt{3} = 0$
2. $2\cos^2\theta - \cos\theta - 1 = 0$
3. $\sin(2\theta) + \cos\theta = 0$
4. $\sin\theta - \cos(2\theta) = 0$
5. $\sec^2\theta - 2 = 0$
6. $|\tan\theta| = \sqrt{3}$
7. $\tan 4\theta = -1$

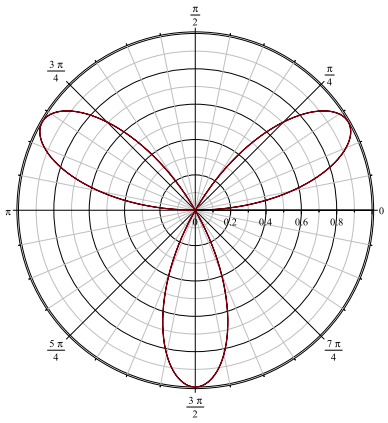
In Math 122, you will study the polar coordinate system. In the polar coordinate system, we identify the location of a point in the plane as an ordered pair (r, θ) where r is the distance of the point from the origin and θ is the angle from the positive x-axis. In this coordinate system, we often describe curves by expressing r as a function of θ, $r = f(\theta)$.

8. The curve $r = 2 - 2\cos\theta$ is called a cardioid, shown in red below. The curve $r = 3$ is the blue circle shown below.



Find the angles α and β at which these curves intersect where $0 < \alpha < \beta < 2\pi$

9. The curve $r = \sin(3\theta)$ describes the rose, shown below.



(a) Find all values of θ in the interval $[0, \pi]$ at which the curve passes through the origin. (Hint: At these points, $r = 0$.)

(b) Find all values of θ in the interval $[0, \pi]$ which correspond to the "tips" of the rose petals. (Hint: At these points, either $r = 1$ or $r = -1$.)