Student: Arfaz Hossain **Date:** 04/20/22	**Instructor:** Muhammad Awais **Course:** Math 101 A04 Spring 2022	**Assignment:** Practice Questions for Sections 11.4 & 11.5 [Not f

Identify the symmetries of the curve $r^2 = 49 \cos \theta$. Then sketch the curve.

The curve is symmetric about the x-axis when the point (r,θ) lies on the graph and the point $(r,-\theta)$ or $(-r,\pi-\theta)$ lies on the graph.

Test to see if the curve is symmetric about the x-axis. In the equation $r^2 = 49 \cos \theta$ substitute $(r,-\theta)$ or $(-r,\pi-\theta)$ for (r,θ) and see if the resulting equation is equivalent to the original one. If is helpful to make use of the identities $\cos(-\theta) = \cos(\theta)$ and $\cos(\pi-\theta) = -\cos(\theta)$. The equation does not change, so the curve is symmetric about the x-axis.

The curve is symmetric about the y-axis when the point (r,θ) lies on the graph and the point $(r,\pi-\theta)$ or $(-r,-\theta)$ lies on the graph.

Test to see if the curve is symmetric about the y-axis. In the equation $r^2 = 49 \cos \theta$ substitute $(r,\pi-\theta)$ or $(-r,-\theta)$ for (r,θ) and see if the resulting equation is equivalent to the original one. If is helpful to make use of the identities $\cos(\pi-\theta) = -\cos(\theta)$ and $\cos(-\theta) = \cos(\theta)$. The equation does not change, so the curve is symmetric about the y-axis.

The curve is symmetric about the origin when the point (r,θ) lies on the graph and the point $(-r,\theta)$ or $(r,\theta+\pi)$ lies on the graph.

Test to see if the curve is symmetric about the origin. In the equation $r^2 = 49 \cos \theta$ substitute $(-r,\theta)$ or $(r,\theta+\pi)$ for (r,θ) and see if the resulting equation is equivalent to the original one. If is helpful to make use of the identity $\cos(\theta+\pi) = -\cos(\theta)$. The equation does not change, so the curve is symmetric about the origin.

This sketch shows the curve $r^2 = 49 \cos \theta$.