Worksheet 9 10/26/2023

1. Plot the point whose polar coordinates are given. Then find two other pairs of polar coordinates of this point, one with r > 0 and one with r < 0. Then find the Cartesian coordinates of the point.

(a)
$$(-2, 3\pi/2)$$

(b)
$$(2, -11\pi/4)$$

2. The Cartesian coordinates of a point are given. Find a pair of polar coordinates (r, θ) where r > 0, $0 \le \theta < 2\pi$ and a pair of polar coordinates (r, θ) where r < 0, $-\pi < \theta \le \pi$.

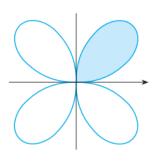
(a)
$$(-4,4)$$

(b)
$$(\sqrt{3}, -1)$$

3. Sketch the polar curve $r = 1 - \cos \theta$ where $0 \le \theta \le 3\pi$.

4. Find the area enclosed by the curve in Problem 3.

5. Find the area of the shaded region below.



 $r = \sin 2\theta$