

University of Bahrain
Department of Mathematics
MATHS122: Calculus II
Spring 2016
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Worksheet 7: Polar Coordinates

Students' Name: _____

1. Replace the Cartesian equations with equivalent polar equations and vice versa.

1. $y^2 = 4x$

2. $x^2 + xy + y^2 = 1$

3. $r^2 \sin(2\theta) = 2$

4. $r = \csc \theta e^{r \cos \theta}$

2. Graph each of the following functions in polar coordinates:

1. $r = 2 + 2 \cos \theta$.

2. "Archimedian Spiral" $r = \theta$.

3. $r = 2 + 2 \cos \theta$.

4. "four-leaved rose" $r = \sin(2\theta)$.

5. "Cardioid" $r = -1 + \cos \theta$.

6. "fan" $r = \cos(3\theta)$.

7. "Limacon" $r = 3 + 2 \cos \theta$.

8. "Limacon with a loop" $r = 1 - 2 \sin \theta$.

9. $r = \tan \theta \sec \theta$. (Hint: What is the corresponding xy equation of this curve?)

10. $r = \sec \theta$ and $r = \csc \theta$.

3. Find the area of the following regions:
 1. Shaded by the circle $r = 2$ and the cardioid $r = 2 - 2 \cos \theta$.

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2. Inside the circle $r = -2 \cos \theta$ and outside the circle $r = 1$.

3. Find the area of the inner loop of the limaçon $r = 2 - 3 \sin \theta$

