Math 1432

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Office Hours:

Mondays 1-2pm,
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Class webpage:

http://www.math.uh.edu/~bekki/Math1432.html

POPPER 33

1. The polar plot of $r = 2 + 2\cos\theta$ is a

2. The polar plot of $r = 5 - 2\cos\theta$ is a

3. The polar plot of $r = 7 - 12\cos\theta$ is a

4. The polar plot of $r = 2\cos 5\theta$ is a

5. The polar plot of $r = 4\cos\theta$ is a

6. Give the formula for the area of the region that is enclosed by the polar curve $r = 1 + 2\sin(\theta)$ and lies **below the x-axis**.

7. Re-write $(x-3)^2 + y^2 = 9$ in polar form

Parametric Curves

Parametric equations are sets of equations that are used to express quantities explicitly in terms of another variable.

So, instead of using $y = f(x)$ (defining y in terms of x), we let $x(t)$ and $y(t)$ be functions where t is the parameter.

Then $(x(t), y(t))$ is the point that traces out the curve.

If t is restricted to lie on an interval $[a, b]$ then $x(t)$ and $y(t)$ would have an initial point $(x(a), y(a))$ and a terminal point $(x(b), y(b))$. So a parametric curve has an orientation given by the parameterizing variable.

Ex. 1: Plot (cos(t), sin(t)) for $0 \leq t \leq 2\pi$ and express the curve by an equation in x and y.

Ex. 2: Sketch the curve and eliminate the parameter.

$x(\theta) = 3\cos(\theta)$ $\quad y(\theta) = 4\sin(\theta)$ $\quad 0 \le \theta \le 2\pi$

Ex. 3: Give a parameterization of the PORTION of the line $y = -2x + 5$ between $(1, 3)$ and $(-2, 9)$

To parameterize a line SEGMENT from (x_0, y_0) to (x_1, y_1):

$$x(t) = x_0 + t(x_1 - x_0)$$
$$y(t) = y_0 + t(y_1 - y_0)$$
$$0 \le t \le 1$$

For a LINE: $-\infty < t < \infty$

Ex. 4: Parameterize the **line segment** from (3, 6) to (–2, 5).

Ex. 5: Express the curve by an equation in x and y; then sketch the curve. $x(t) = 3t - 1 \quad y(t) = 5 - 2t \quad t \in (-\infty, \infty)$

Ex. 6: Express the curve by an equation in x and y

$x(t) = 3\tan t \quad y(t) = 5 - \sec^2 t$

Ex. 7: Express the curve by an equation in x and y

$x(t) = 4 + e^t \quad y(t) = 2e^{2t}$

8. The parametric curve given by ($2cos(t)$, $2sin(t)$) is a(n)

9. The parametric curve given by ($3cos(t)$, $5sin(t)$) is a(n)

10. Eliminate the parameter and find a corresponding rectangular equation: $x = 3t^2$ and $y = 2t + 1$