

MATH 2000 Lab 1

Due Tuesday September 19, 2017

1. Give two sets of parametric equations that describe a full circle that is centered at the point $(-1, 3)$ and has a radius of 5.
2. Give a set of parametric equations that generate the line that has a slope of 3 and passes through the point $(1, -2)$.
3. Consider the following parametric equations. (a) Make a brief table of t , x and y (as we did in class); (b) plot the points from previous table and the full curve (with the direction of increasing t); (c) Eliminate the parameter to obtain an equation in terms of x and y ; (d) Describe the curve in words.

(a) $x = 2t, y = 3t - 4, \quad -10 \leq t \leq 10$

(b) $x = t^2 + 2, y = 4t, \quad -4 \leq t \leq 4$

(c) $x = -t + 6, y = 3t - 3, \quad -5 \leq t \leq 5$

4. Eliminate the parameter to obtain an equation in terms of x and y . Indicate the center and then sketch the curve.

(a) $x = 4 \cos t, y = 4 \sin t, \quad \pi \leq t \leq 2\pi$

(b) $x = 4 \sin t + 3, y = 2 \cos t - 1, \quad 0 \leq t \leq 2\pi$

(c) $x = 2 \cos t, y = -2 + 3 \sin t, \quad 0 \leq t \leq 2\pi$

5. Eliminate the parameter to obtain an equation in terms of x and y , describe the curve and then plot the curve. $x = -2 + 4 \cos t, y = 4 + 2 \sin t, \quad 0 \leq t \leq 2\pi$.

6. Find parametric equations for line segments. (Note answers are not unique)

(a) From $P(1, -3)$ to $Q(3, 4)$.

(b) From $P(-1, 3)$ to $Q(-2, 1)$.

7. In the following questions, (a) Determine $\frac{dy}{dx}$ in terms of t ; (b) Make a sketch of the curve showing the tangent line at the point corresponding the given value of t .

(a) $x = 4 \sin t, y = 4 \cos t, \quad t = \frac{\pi}{2}$

(b) $x = \cos t, y = 4 \sin t, \quad t = \pi$

(c) $x = \sqrt{t}, y = 2t, \quad t = 4$