Evaluate:

1. \( \sin(5\pi/6) = \)
2. \( \cos(5\pi/4) = \)
3. \( \cos(2\pi/3) = \)
4. \( \sin(-12\pi) = \)
5. \( \cos(-\pi/6) = \)
6. \( \tan(\pi/4) = \)
7. \( \frac{d}{\theta} \sin \theta/\theta = \)
8. \( \frac{d}{dx} 2\sin(x^2) \cos(x^2) = \)
9. \( \frac{d}{dt} e^t (\sin^2 t + \cos^2 t) = \)

Find Cartesian and parametric equations that describe each of the following:

1. An ellipse centered at \((3, -1)\) with semiaxes of length 2 and 5
2. A parabola opening upward that hits its minimum at \((2, 0)\)
3. A hyperbola opening horizontally.

Describe the path the particle takes, and sketch. Find all points (in time and space) where the line tangent to the curve has slope 1.

1. \( x = -3 \cos t, \ y = 2 \sin t, \ \pi/2 \leq t \leq 3\pi/2 \)
2. \( x = \sin 2t, \ y = 1 - \cos^2 2t, \ 0 \leq t \leq 2\pi \)
3. \( x = t^2 - 1, \ y = t^2 - 1, \ -\infty < t < \infty \)
Below are graphs of the polar equations $r = \sin \theta$, $r = \sin 2\theta$, $r = \sin 3\theta$, and $r = \sin 4\theta$. Explain. What does the path of the particle look like?

What do you think the graphs of $r = \cos \theta$, $r = \cos 2\theta$, $r = \cos 3\theta$, $r = \cos 4\theta$ look like?

True or False? Explain your reasoning.

1. The curve defined by any set of parametric equations $(x, y) = (f(t), g(t))$ can also be defined by an equation of the form $y = h(x)$.

2. The curve defined by any equation of the form $y = h(x)$ can also be defined by a set of parametric equations $(x, y) = (f(t), g(t))$.

3. If $dy/dt = 0$ at some point on a curve then the tangent line at that point is horizontal.

4. If a circle is parametrized as $(x, y) = (\cos t, \sin t)$, then for any $t$ the angle between $(x(t), y(t))$ and the positive x-axis will be equal to $t$.

5. If $f(\theta) = f(-\theta)$ for all $\theta$, then the curve defined by $r = f(\theta)$ will have a vertical axis of symmetry.

6. If $f(\theta) = f(\theta + \pi)$ for all $\theta$, then the curve defined by $r = f(\theta)$ will be unchanged when it is rotated by 180 degrees about the origin.