

1. Plot the graphs given by the following parametric expressions. Sketch the graph yourself first and check it then with the computer.

- (a) $x(t) = \cos t$, $y(t) = \sin t$, $0 \leq t \leq \pi/2$
- (b) $x(t) = \cos t$, $y(t) = \sin t$, $0 \leq t \leq 3\pi/2$
- (c) $x(t) = t \cos t$, $y(t) = t \sin t$, $0 \leq t \leq 2\pi$
- (d) $x(t) = (2\pi - t) \cos t$, $y(t) = (2\pi - t) \sin t$, $0 \leq t \leq 2\pi$
- (e) $x(t) = 2 \cos t$, $y(t) = 3 \sin t$, $0 \leq t \leq 2\pi$
- (f) $x(t) = \cos 2t$, $y(t) = \sin 3t$, $0 \leq t \leq 2\pi$
- (g) $x(t) = \cos 3t$, $y(t) = \sin 5t$, $0 \leq t \leq 2\pi$
- (h) $x(t) = t^2$, $y(t) = t^3$, $-10 \leq t \leq 10$

2. Find the parametric equations describing the following graphs. Check your answer with the computer.

- (a) The circle given by $x^2 + (y - 5)^2 = 36$, starting at $(6, 5)$.
- (b) The ellipse given by $\frac{x^2}{49} + \frac{y^2}{64} = 1$, starting at $(0, 8)$.
- (c) The hyperbola given by $\frac{x^2}{49} - \frac{y^2}{64} = 1$, starting at $(0, 8)$.

3. For each of the three graphs in 2., find the slope of the tangent at the following points.

(a) $x^2 + (y - 5)^2 = 36$

Tangent at $(0, 11)$:

Tangent at $(-\sqrt{35}, 6)$:

(b) $\frac{x^2}{49} + \frac{y^2}{64} = 1$

Tangent at $\left(5, \frac{16\sqrt{6}}{7}\right)$:

Tangent at $(7, 0)$:

(c) $\frac{x^2}{49} - \frac{y^2}{64} = 1$

Tangent at $\left(-5, \frac{8\sqrt{74}}{7}\right)$:

Tangent at $(-7, 0)$: