

For each of the following, find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$.

1. $x = t^4$
 $y = \sin 3t$

2. $x = 6 \ln t$
 $y = t^3$

For each of the following, find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$, and find the slope and concavity (if possible) at the indicated value of the parameter.

3. $x = 2t$, $y = 3t - 1$ $t = 3$

4. $x = t + 1$, $y = t^2 + 3t$ $t = -1$

6. $x = 2 \cos \theta$, $y = 2 \sin \theta$ $\theta = \frac{\pi}{4}$

7. $x = t^2 + 3t + 2$, $y = 2t$ $t = 0$

8. $x = \cos^3 \theta$, $y = \sin^3 \theta$, $\theta = \frac{\pi}{4}$