10.1

9) $x = -\sqrt{t+1} \quad y = \sqrt{3t}$

$x = -(t+1)^{1/2} \quad y = (3t)^{1/2}$

$$\frac{dy}{dx} = \frac{\frac{1}{2}(3t)^{-1/2}[3]}{-\frac{1}{2}(t+1)^{-1/2}} = -3\left(\frac{3t}{t+1}\right)^{1/2} = -9^{1/2}\left(\frac{t+1}{3t}\right)^{1/2}$$

$$= -\left(\frac{3^3(t+1)}{3t}\right)^{1/2}$$

$$= -\left(\frac{3t+3}{t}\right)^{1/2}$$

$$= -\left(3+\frac{3}{t}\right)^{1/2}$$

$$\frac{d^2y}{dx^2} = \frac{-\frac{1}{2}\left(3+\frac{3}{t}\right)^{-1/2}\left[-\frac{3}{t^2}\right]}{-\frac{1}{2}(t+1)^{-1/2}}$$

$$= \left(\frac{t+1}{3+\frac{3}{t}}\right)^{1/2}\left[\frac{3}{t^2}\right]$$

$$= \left(\frac{t+1}{3+\frac{3}{t}}\right)^{1/2}\left[\frac{9}{t^4}\right]^{1/2}$$

$$= \left[\frac{t+1}{3+\frac{3}{t}} \cdot \frac{9}{t^4}\right]^{1/2}$$

$$= \left[\frac{9t+9}{3t^4+3t^3}\right]^{1/2}$$

$$= \left[\frac{9(t+1)}{3t^3(3t+1)}\right]^{1/2}$$

$$= \left[\frac{3}{t^3}\right]^{1/2}$$

10.1

23) $x = 2 + \cos t$, $y = -1 + \sin t$

$\frac{dy}{dx} = \frac{-\cos t}{\sin t}$

(a) HORIZONTAL $-\cos t = 0$

(b) VERTICAL $\sin t = 0$

25) $x = 2 - t$, $y = t^3 - 4t$

$\frac{dy}{dx} = \frac{3t^2 - 4}{-1}$

$-3t^2 + 4 = 0$

$4 = 3t^2$

$\frac{4}{3} = t$

$\pm \frac{2}{\sqrt{3}} = t$