

Quiz Review:

$$x = 1 + t^{-2}$$

$$y = 1 - 3t^{-1}$$

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

$$2) \frac{d^2y}{dx^2} = \frac{\frac{-3}{2}}{\frac{-2}{t^3}} = \frac{-3}{2} \cdot \frac{t^3}{-2} = \frac{3t^3}{4}$$

$$3) x = 1 + \frac{1}{2^2} = \frac{5}{4}$$

$$y + \frac{1}{2} = -3\left(x - \frac{5}{4}\right)$$

$$y = 1 - \frac{3}{2} = -\frac{1}{2}$$

$$\frac{dy}{dx} \Big|_{t=2} = \frac{-3(2)}{2} = -3$$

$$4) \begin{aligned} -3t &= 0 \\ t &= 0 \end{aligned}$$

$$x = 1 + \frac{1}{0}$$

→ nowhere

$$y = 1 - \frac{3}{0}$$

5) none

$$6) x - 1 = \frac{1}{t^2}$$

$$t^2(x - 1) = 1$$

$$t^2 = \frac{1}{x - 1}$$

$$t = \pm \sqrt{\frac{1}{x - 1}}$$

$$y = 1 \pm \frac{3}{\sqrt{\frac{1}{x - 1}}}$$

$$7) \quad x = 3 \cos\left(\frac{\pi}{4}t\right) \quad y = 5 \sin\left(\frac{\pi}{4}t\right)$$

$$v(t) = \left\langle -\frac{3\pi}{4} \sin\left(\frac{\pi}{4}t\right), \frac{5\pi}{4} \cos\left(\frac{\pi}{4}t\right) \right\rangle$$

$$8) \quad a(t) = \left\langle -\frac{3\pi^2}{16} \cos\left(\frac{\pi}{4}t\right), -\frac{5\pi^2}{16} \sin\left(\frac{\pi}{4}t\right) \right\rangle$$

$$9) \quad \sqrt{\left(\frac{3\pi}{4} \sin\left(\frac{3\pi}{4}\right)\right)^2 + \left(\frac{5\pi}{4} \cos\left(\frac{3\pi}{4}\right)\right)^2} \approx 3.238$$

$$10) \quad \sqrt{\left(-\frac{3\pi^2}{16} \cos\left(\frac{3\pi}{4}\right)\right)^2 + \left(-\frac{5\pi^2}{16} \sin\left(\frac{3\pi}{4}\right)\right)^2} \approx 2.543$$

$$11) \quad \frac{x}{3} = \cos\left(\frac{\pi}{4}t\right) \quad \cos^2\left(\frac{\pi}{4}t\right) + \sin^2\left(\frac{\pi}{4}t\right) = \frac{x^2}{9} + \frac{y^2}{25}$$
$$\frac{y}{5} = \sin\left(\frac{\pi}{4}t\right) \quad 1 = \frac{x^2}{9} + \frac{y^2}{25}$$

$$12) \quad 3.238 \quad (\text{same as \#9})$$