PPV#3

Find $a)$ $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ b) evaluate both at $\theta = \frac{\pi}{4}$

1. $x = \cos^3\theta$ $y = \sin^3\theta$

Write the eqn of the tangent line to the curve at the given point.

2. $x = t - 1$ $y = \frac{1}{t} + 1$ at t=1
3. $x = 4\cos\theta$ $y = 3\sin\theta$ at $\theta = \frac{3\pi}{4}$

Find all pts (if any) of HT and VT to the curve.

4. $x = 1 - t$ $y = t^3 - 3t$
5. $x = \cos\theta$ $y = 2\sin\theta$

Find the arclength (use fnint)

6. $x = e^{-t}\cos t$ $y = e^{-t}\sin t$ $0 \le t \le \frac{\pi}{2}$

Find $\frac{dy}{dx}$ and evaluate it at $\theta = \frac{\pi}{3}$

7. $r = 3\sin\theta$

Find the area of the given region:

8.   One leaf of $r = 4\sin2\theta$
9.   Inner loop of $r = 3 + 4\sin\theta$
10. Between the loops of $r = 2(1 + 2\sin\theta)$

Find the intersection points of

11. $r = 2 - 3\cos\theta$ and $r = \cos\theta$

Find the arclength (use fnint)

12. $r = 5(1 + \cos\theta)$ $0 \le \theta \le 2\pi$

Find the a) position at time t=3, b) distance the particle travels $t \in [0,3]$ use fnint on (b)

13. $v(t) = < e^t - t, e^t + t >$ s(0)=(1,0)