Review Problems

April 5, 2017

1. (Fall 2002, Final Exam, #20) Find the slope of the tangent line to $x = t3^{-t}$, $y = \dfrac{t^3}{3}$ at $t = 2$.

2. (Fall 2002, Final Exam, #22) Write an integral that gives the length of the curve $r = \sin^3\theta$, $0 \leq \theta \leq \pi$. (Fall 2006, Final Exam, #21) Find the equation of the tangent line to the curve given by $x(t) = t^2 + t + 1$, $y(t) = t^3 + t + 8$ at $(1, 8)$.

3. (Fall 2007, Final Exam, #23) Find the length of the curve given by $x = \sin 2t$, $y = 1 + \cos 2t$, $0 \leq t \leq \frac{\pi}{4}$.

4. (Fall 2008, Final Exam, #19) Find the equation of the tangent line to the curve $x = \cos t + \sin t$, $y = e^{2t}$ corresponding to $t = 0$.

5. (Fall 2008, Final Exam, #22) Sketch the curve represented by the parametric equations $x = \sec t$, $y = \tan^2 t$, $-\pi/2 < t < \pi/2$.

6. (Fall 2013, Final Exam, #22) Let $x = t^2$, $y = t^2 + t$. Find $\dfrac{d^2y}{dx^2}$ at the point $(1, 2)$.

7. (Fall 2015, Final Exam, #23) Given the parametric equations $x = 4 + t^7$ and $y = t + t^3$, what is $\dfrac{d^2y}{dx^2}$?