

Math 112  
Quiz #1

Evaluate the following:

3 1.  $\frac{d}{dx} \int_0^1 \sqrt{1+t^3} dt.$   
 $\frac{d}{dx} \left[ \int_0^1 \sqrt{1+t^3} dt \right] = 0$

3 2.  $\int_0^1 \frac{d}{dt} \sqrt{1+t^3} dt.$   
 $\int_0^1 \frac{d}{dt} \sqrt{1+t^3} dt = \sqrt{1+t^3} \Big|_0^1 = \sqrt{2} - 1.$

4 3.  $\frac{d}{dx} \int_{x^2}^{x^4} \sqrt{1+t^3} dt.$   
 $\frac{d}{dx} \int_{x^2}^{x^4} \sqrt{1+t^3} dt = \frac{d}{dx} [F(x^4) - F(x^2)]$   
 $= 4x^3 F'(x^4) - 2x F'(x^2)$   
 $= \underbrace{4x^3 \sqrt{1+x^{12}}}_2 - \underbrace{2x \sqrt{1+x^6}}_2$