Name: Key

MAT 106
Quiz #15
November 3, 2004

You may not use your notes. Please show all of your work. An answer without justification will receive little credit.

(1) Suppose that $g(x) = \int_1^{\sin(x)} t^2 dt$. What is $g'(x)$?

Let $u(x) = \sin(x)$. Then

$$g'(x) = \frac{d}{dx} \left[ \int_1^{u(x)} t^2 dt \right] = \frac{d}{du} \left[ \int_1^{u} t^2 dt \right] \frac{du}{dx}$$

$$= u^2(x), \quad u'(x) = \sin^2(x) \cos(x).$$

(2) Evaluate $\int_0^4 (\pi + x\sqrt{x})dx$.

$$\int_0^4 (\pi + x\sqrt{x})dx = \pi \int_0^4 dx + \frac{2}{5} \int_0^4 x^{3/2}dx$$

$$= (4\pi - 0) + \frac{2}{5} \left[ \frac{2}{5} x^{5/2} \right]_0^4$$

$$= 4\pi + \frac{64}{5}$$