MAT 106
Quiz #15
November 3, 2004

Name: Key

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

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

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

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

$$= \pi x\Big]_0^4 + \frac{2}{5}x^{5/2}\Big]_0^4$$

$$= (4\pi - 0) + \frac{2}{5}(32 - 0)$$

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