

MATH 141 (Section 5 & 6)
Prof. Meade

University of South Carolina
Fall 2013

Quiz 12
November 21, 2013

Name: Key
Section: 005 / 006 (circle one)

1. (5 points) Find the derivative of $h(x) = \int_{x^3}^0 \sqrt{1+r^2} dr$.

$$= - \int_0^{x^3} \sqrt{1+r^2} dr$$

$$h'(x) = - \sqrt{1+(x^3)^2} \cdot \frac{d}{dx}(x^3)$$

$$= -3x^2 \sqrt{1+x^6}$$

2. (5 points) Evaluate $\int_1^4 \sqrt{t}(1+t) dt$.

$$= \int_1^4 t^{1/2} + t^{3/2} dt$$

$$= \left(\frac{t^{3/2}}{3/2} + \frac{t^{5/2}}{5/2} \right) \Big|_1^4$$

$$= \left(\frac{2}{3} \cdot 4^{3/2} + \frac{2}{5} \cdot 4^{5/2} \right) - \left(\frac{2}{3} \cdot 1^{3/2} + \frac{2}{5} \cdot 1^{5/2} \right)$$

$$= \left(\frac{2}{3} \cdot 8 + \frac{2}{5} \cdot 32 \right) - \left(\frac{2}{3} + \frac{2}{5} \right)$$

$$= \frac{16}{3} + \frac{64}{5} - \frac{2}{3} - \frac{2}{5}$$

$$= \frac{14}{3} + \frac{62}{5}$$

$$= \frac{70 + 192}{15} = \frac{262}{15}$$