

Quiz 9Name: SOLUTIONS

Math 103 - Introduction to Calculus

August 12, 2008

Note: *In order to receive full credit, you must show work that justifies your answer.*

Evaluate the definite integrals:

1. $\int_1^4 \frac{\sqrt{x} + 1}{x^2} dx$

$$\begin{aligned} \int_1^4 \frac{\sqrt{x} + 1}{x^2} dx &= \int_1^4 (x^{-3/2} + x^{-2}) dx = [-2x^{-1/2} - x^{-1}]_1^4 \\ &= \left(\frac{-2}{\sqrt{4}} - \frac{1}{4} \right) - \left(\frac{-2}{1} - \frac{1}{1} \right) = \frac{-5}{4} + 3 = \frac{7}{4} \end{aligned}$$

2. $\int_0^\pi (2 \sin \theta - 3 \cos \theta) d\theta$

$$\int_0^\pi (2 \sin \theta - 3 \cos \theta) d\theta = [-2 \cos \theta - 3 \sin \theta]_0^\pi = (2 - 0) - (-2 - 0) = 4$$

3. $\int_2^3 \frac{dx}{(2x - 3)^2}$

$$\begin{aligned} \int_2^3 \frac{dx}{(2x - 3)^2} &= \frac{1}{2} \int_1^3 u^{-2} du \quad \leftarrow \text{let } u = 2x - 3, \text{ so } du = 2dx \\ &= \frac{-1}{2u} \Big|_1^3 \\ &= \frac{-1}{6} - \frac{-1}{2} = \frac{1}{3} \end{aligned}$$