Math 122
Spring 2011
Instructor: Shawn Rafalski

Applied Calculus II
Quiz 9
Write your name on this quiz

SOLN

1. (2 points each) Compute the following derivatives. You do not need to simplify the answers.

(a) $\frac{d}{dx}\left(3\sin(4x^2)\right) = 3\cos(4x^2)\cdot 8x$

(b) $\frac{d}{dx}\left(\cot x\right)$ (hint: $\cot x = \frac{\cos x}{\sin x}$)

$$= \frac{(\cos x)'(\sin x) - (\cos x)(\sin x)'}{\sin^2 x}$$

$$= \frac{-\sin^2 x - \cos^2 x}{\sin^2 x} = \frac{-1}{\sin^2 x} = -\csc^2 x$$

(c) $\frac{d}{dx}\left(\cos^3 x\right)$

$$= 3\cos^2 x\cdot(-\sin x) = -3\sin x\cos^2 x$$

(turn this page over)

2. (4 points) Use substitution to compute the indefinite integral $\int \frac{\cos x}{\sin^2 x}\, dx$.

$u = \sin x$

$du = \cos x\, dx$

$$\int \frac{du}{u^2} = -\frac{1}{u} + C$$

$$= -\frac{1}{\sin x} + C$$

$$= \boxed{-\csc x + C}$$