Math 171 - Quiz 6

October 3, 2013

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (4 points) Determine each derivative.

(a) $\frac{d}{dx}\sqrt[5]{(x^4+6)^2}$ $= \frac{d}{dx}(x^4+6)^{2/5}$

$= \frac{2}{5}(x^4+6)^{-3/5}(4x^3)$

(b) $\frac{d}{d\theta}\tan(3\theta^2)$

$= \sec^2(3\theta^2)(6\theta)$

2. (3 points) Assume y is implicitly defined as a function of x by the equation

$$x^2 + xy^2 + 3 = y.$$

Find dy/dx.

$$2x + \left[y^2 + x(2y\frac{dy}{dx})\right] + 0 = \frac{dy}{dx}$$

$$2x + y^2 + 2xy\frac{dy}{dx} - \frac{dy}{dx} = 0$$

$$\frac{dy}{dx} = \frac{-2x - y^2}{2xy - 1}$$

3. (3 points) The area of a circle is increasing at a rate of $2\,\text{in}^2/\text{sec}$. Find the rate of change of its radius at the moment the radius is 8 in.

A = AREA AT TIME t

r = RADIUS AT TIME t

$\frac{dA}{dt} = 2$

FIND $\frac{dr}{dt}$ WHEN $r = 8$

$A = \pi r^2$

$\frac{dA}{dt} = 2\pi r\frac{dr}{dt}$

$2 = 2\pi(8)\frac{dr}{dt}$

$\frac{dr}{dt} = \frac{1}{8\pi}$ IN/SEC