

Calculus I 201-NYA-05 C3

Quiz 6

October 18, 2008

Name:

Student Number:

1. (8 Marks). Differentiate the following functions:

$$\text{a) } f(x) = \sqrt{4+3x^3} = (4+3x^3)^{\frac{1}{2}}$$

$$f'(x) = \frac{1}{2} (4+3x^3)^{-\frac{1}{2}} (9x^2)$$

$$= \frac{9x^2}{2\sqrt{4+3x^3}}$$

$$\text{b) } g(x) = \tan(\sin x)$$

$$g'(x) = \sec^2(\sin x) \cdot \frac{d}{dx} [\sin x]$$

$$= \sec^2(\sin x) \cdot \cos x$$

2. (6 Marks). Find $\frac{dy}{dx}$:

$$x^2 + 3x^3y - y^3 = 9$$

$$\frac{d}{dx}[x^2] + \frac{d}{dx}[3x^3y] - \frac{d}{dx}[y^3] = \frac{d}{dx}[9]$$

$$2x + \frac{d}{dx}[3x^3] \cdot y + 3x^3 \cdot \frac{dy}{dx} - 3y^2 \frac{dy}{dx} = 0$$

$$2x + 9x^2y + 3x^3 \frac{dy}{dx} - 3y^2 \frac{dy}{dx} = 0$$

$$3x^3 \frac{dy}{dx} - 3y^2 \frac{dy}{dx} = -2x - 9x^2y$$

$$\frac{dy}{dx} (3x^3 - 3y^2) = -2x - 9x^2y$$

$$\frac{dy}{dx} = \frac{-2x - 9x^2y}{3x^3 - 3y^2}$$