Quiz #3 Math 101 Semester 042

Name:	I.D.	Section #	

1. Find dy/dx if $\csc y = (yx)^2$

$$-y' \csc y \cot y = 2(y-x)(y + xy')$$

2. Approximate $\csc 31^\circ$

$f(x) = \csc x \quad x = \pi/6$

$$f(x) \approx L(x) = f(x_0) + f'(x_0)(x - x_0)$$

$$\csc \pi/6 + (-\csc \pi/6 \cot \pi/6)\left(\frac{31\pi}{180} - \frac{\pi}{6}\right)$$

3. If two resistors with resistances R1 and R2 are connected in parallel then the total resistance, measured in ohms is given by $\frac{1}{R} = \frac{1}{R1} + \frac{1}{R2}$ If R1 and R2 are increasing at rates of 0.3 ohms/sec and 0.2 ohms/sec respectively, how fast is R changing when R1 =80 ohms and R2= 100 ohms

$$-\frac{R'(t)}{R^2(t)} = -\frac{R_1'(t)}{R_1^2(t)} - \frac{R_2'(t)}{R_2^2(t)}$$

$$-R'(t) = \left(-\frac{0.3}{80^2} - \frac{0.2}{100^2}\right)\left(\frac{400}{9}\right)$$

$$R'(t) = 0.0097 \text{ ohms/sec.}$$

$$\frac{1}{R(t)} = \frac{1}{80} + \frac{1}{100}$$

$$= \frac{100+80}{8000}$$

$$= \frac{180}{8000}$$

$$= \frac{9}{400}$$