

Quiz #3 Math 101 Semester 042

Name:	I.D.	Section #	
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1. Find dy/dx if $\csc y = (yx)^2$

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

2. Approximate $\csc 31^\circ$

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

$$f(x) \approx L(x) = f(x_0) + f'(x_0) \left(\frac{x - x_0}{180} - \frac{\pi}{6} \right)$$

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

3. If two resistors with resistances R_1 and R_2 are connected in parallel then the total resistance, measured in ohms is given by $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$. If R_1 and R_2 are increasing at rates of 0.3 ohms/sec and 0.2 ohms/sec respectively, how fast is R changing when $R_1 = 80$ ohms and $R_2 = 100$ ohms

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

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

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

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

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

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

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