Math 1A (7:30am – 8:20am)
Group Quiz 6
Fri Nov 7, 2008

Group Members' Names: _____

SCORE: ___ / 10 POINTS

NO CALCULATORS ALLOWED

Knock knock ! Is anyone out there ? I'm trapped inside a black bar and no one seems to notice I'm here.

Find the linear approximation of $f(x) = e^{3x}$ at $x = \ln 2$. Use the approximation to estimate $f(1)$. **SCORE: ___ / 4 POINTS**

$L(x) = f(\ln 2) + f'(\ln 2)(x - \ln 2)$

$= \underbrace{e^{3\ln 2}}_{\frac{1}{2}} + \underbrace{3e^{3\ln 2}}_{\frac{1}{2}}(x - \ln 2)$ $\frac{1}{2}$

$= \underbrace{8}_{\frac{1}{2}} + \underbrace{24(x - \ln 2)}_{\frac{1}{2}}$

$f(1) \approx L(1) = \underbrace{8 + 24(1 - \ln 2)}_{1}$

$= \underbrace{32 - 24\ln 2}_{\frac{1}{2}}$

Knock knock ! Is anyone out there ? I'm trapped inside a black bar and no one seems to notice I'm here.

Use an appropriate linear approximation to estimate $\sec 1$. **SCORE: ___ / 6 POINTS**

$\underbrace{f(x) = \sec x}_{1}$

$\underbrace{x_0 = \frac{\pi}{3}}_{1}$

$L(x) = f(x_0) + f'(x_0)(x - \frac{\pi}{3})$

$= \underbrace{\sec\frac{\pi}{3}}_{\frac{1}{2}} + \underbrace{(\sec\frac{\pi}{3}\tan\frac{\pi}{3})}_{\frac{1}{2}}\underbrace{(x - \frac{\pi}{3})}_{\frac{1}{2}}$

$= \underbrace{2}_{\frac{1}{2}} + \underbrace{2\sqrt{3}(x - \frac{\pi}{3})}_{\frac{1}{2}}$

$\sec 1 = f(1) \approx L(1) = \underbrace{2 + 2\sqrt{3}(1 - \frac{\pi}{3})}_{1}$

$= \underbrace{2 + 2\sqrt{3} - \frac{2\sqrt{3}\pi}{3}}_{\frac{1}{2}}$

IF YOU USED $x_0 = \frac{\pi}{4}$, DO NOT GIVE YOURSELF THE POINT FOR x_0

YOUR $L(x) = \sqrt{2} + \sqrt{2}(x - \frac{\pi}{4})$

$L(1) = \sqrt{2} + \sqrt{2}(1 - \frac{\pi}{4}) = 2\sqrt{2} - \frac{\sqrt{2}}{4}\pi$

} SINCE $\frac{\pi}{3}$ IS MUCH CLOSER. GIVE YOURSELF THE CORRESPONDING POINTS