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 $f(x) = \tan x$ at $x = \frac{\pi}{4}$. Use the approximation to estimate $f\left(\frac{3}{4}\right)$.

SCORE: ___ / 4 POINTS

$L(x) = f(\frac{\pi}{4}) + f'(\frac{\pi}{4})(x - \frac{\pi}{4})$

$= \underbrace{\tan\frac{\pi}{4}}_{\frac{1}{2}} + \underbrace{(\sec^2\frac{\pi}{4})}_{\frac{1}{2}}\underbrace{(x-\frac{\pi}{4})}_{\frac{1}{2}}$

$= \underbrace{1}_{\frac{1}{2}} + \underbrace{2(x-\frac{\pi}{4})}_{\frac{1}{2}}$

$f(\frac{3}{4}) \approx L(\frac{3}{4}) = \underbrace{1 + 2(\frac{3}{4} - \frac{\pi}{4})}_{1}$

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

$= \underbrace{\frac{5-\pi}{2}}_{\frac{1}{2}}$

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 $\sqrt[4]{79}$.

SCORE: ___ / 6 POINTS

$\underbrace{f(x) = x^{\frac{1}{4}}}_{1}$

$\underbrace{x_0 = 81}_{1}$

$L(x) = f(x_0) + f'(x_0)(x - 81)$

$= \underbrace{81^{\frac{1}{4}}}_{\frac{1}{2}} + \underbrace{\frac{1}{4}(81)^{-\frac{3}{4}}}_{\frac{1}{2}}\underbrace{(x-81)}_{\frac{1}{2}}$

$= 3 + \frac{1}{4}\frac{1}{27}(x-81)$

$= \underbrace{3}_{\frac{1}{2}} + \underbrace{\frac{1}{108}}_{\frac{1}{2}}(x-81)$

$\sqrt[4]{79} = f(79) \approx L(79) = \underbrace{3 + \frac{1}{108}(79-81)}_{1}$

$= 3 - \frac{1}{54}$

$= \underbrace{2\frac{53}{54} \text{ OR } \frac{161}{54}}_{\frac{1}{2}}$