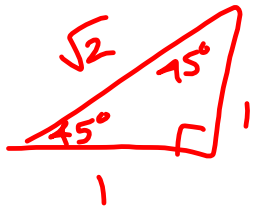
5.4 Find the equation of the tangent line to the graph of f at the indicated point.

78. $f(x) = \tan^2 x \ ; \ \left(\frac{\pi}{4}, 1\right)$



$f(x) = (\tan x)^2$

$f'(x) = 2\tan x \cdot \sec^2 x$

$f'\left(\frac{\pi}{4}\right) = 2\tan\frac{\pi}{4}\sec^2\frac{\pi}{4}$

$= 2 \cdot 1 \cdot \left(\frac{\sqrt{2}}{1}\right)^2$

$= 2 \cdot 1 \cdot 2$

$m = 4$

$y - y_1 = m(x - x_1)$

$y - 1 = 4\left(x - \frac{\pi}{4}\right)$

$y - 1 = 4x - \pi$

$y = 4x - \pi + 1$

5.1

58. $f(x) = \ln \sqrt[3]{\frac{x-1}{x+1}} = \ln\left[\left(\frac{x-1}{x+1}\right)^{1/3}\right]$

$\log M^p = p\log M$

$\log\frac{M}{N} = \log M - \log N$

$= \frac{1}{3}\ln\left(\frac{x-1}{x+1}\right) = \frac{1}{3}\left[\ln(x-1) - \ln(x+1)\right]$

$= \frac{1}{3}\ln(x-1) - \frac{1}{3}\ln(x+1)$

$f'(x) = \frac{1}{3}\cdot\frac{1}{(x-1)} - \frac{1}{3}\cdot\frac{1}{(x+1)}$

$\left(\frac{1}{3}\right)(\ln(x-1))$

$\left[\frac{1}{3}\cdot f(x)\right]' = \frac{1}{3}\cdot f'(x)$

5.8-ish

$f(x) = \arcsin(3x)$

$f'(x) = \frac{1}{\sqrt{1-(3x)^2}} \cdot 3$

$\frac{a}{b} \cdot c = \frac{ac}{b}$

$\frac{1}{x} \cdot y = \frac{y}{x}$

$x = \frac{x}{1}$

$f(x) = \arctan(\ln(2x))$

$f'(x) = \frac{1}{1+(\ln(2x))^2} \cdot \frac{1}{2x} \cdot 2$

$f(x) = \cot\left(5^{\arcsin(4x^3)}\right)$

$f'(x) = -\csc^2\left(5^{\arcsin(4x^3)}\right) \cdot 5^{\arcsin(4x^3)} \cdot \ln 5 \cdot \frac{12x^2}{\sqrt{1-(4x^3)^2}}$

$f(x) = 5\sqrt{3\csc^2(\log_4(\operatorname{arccsc}(7x^9)))}$

$= 5\left[3\left(\csc\left[\log_4(\operatorname{arccsc}[7x^9])\right]\right)^2\right]^{1/2}$

$f'(x) = \frac{5}{2}\left[3\left(\csc\left[\log_4(\operatorname{arccsc}[7x^9])\right]\right)^2\right]^{-1/2} \cdot$

$\cdot 6\csc\left[\log_4(\operatorname{arccsc}[7x^9])\right] \cdot$

$\cdot \left(-\csc\left[\log_4(\operatorname{arccsc}[7x^9])\right]\cot\left[\log_4(\operatorname{arccsc}[7x^9])\right]\right) \cdot$

$\cdot \frac{1}{\ln 4 \operatorname{arccsc}[7x^9]} \cdot \frac{-1}{|7x^9|\sqrt{(7x^9)^2-1}} \cdot 63x^8$

$$f(x) = \tan\left[\log_2\left(\sin\left[3^{5x}\right]\right)\right]$$

$$f'(x) = \sec^2\left[\log_2\left(\sin\left[3^{5x}\right]\right)\right] \cdot \frac{1}{\ln 2 \cdot \sin\left[3^{5x}\right]} \cdot \cos\left(3^{5x}\right) \cdot 3^{5x} \cdot \ln 3 \cdot 5$$

$$f(x) = -2^{\ln(\arctan(7x^5 - \cos 3x))}$$

$$f'(x) = -2^{\ln(\arctan(7x^5-\cos 3x))} \ln 2 \cdot \frac{1}{\arctan(7x^5-\cos 3x)} \cdot \frac{1}{1+(7x^5-\cos 3x)^2} \cdot (35x^4 + \sin 3x \cdot 3)$$

Homework for Test #2 on Derivatives

HW #4 (submitted Fri 12/05)

- 2.1 #1-23 odd Find the derivative by the limit process
- #29-32 all find the equation of the tangent line
- #61-69 odd Use the alternate form to find the derivative
- #71-79 odd Describe x-values where the function is differentiable (given graph)
- 2.2 #3-51 odd Find the derivative using the basic derivative rules
- #91-94 all; 101, 102 use the derivative to solve rate of change word problems

HW #5 (submitted Mon 12/15)

- 2.3 #1-53 odd, 63-69 odd, 75-81 all, 83-91 odd, 109-115 all — Product and quotient rules
- 2.4 #7-33 odd, #47-81 odd — Chain rule
- 5.1 #45-61, 71 — Logarithmic functions
- 5.4 #39-57 — Exponential functions
- 5.5 #41-55 — Log and exp functions with other bases
- 5.8 #41-59 — Inverse trig functions

HW #6 (due test day) - Practice problem handout (Prac Probs & Old Test from web site)

QUIZ NOW! **TEST #2 - WEDNESDAY? (OR WED/FRI)**