MATH 1216 HW #2 Batu Sensoy

Section 2.4:

(2) $f(x) = x\cos x + 2\tan x \rightarrow x^{1}\cdot\cos x + (\cos x)^{-\sin x}\cdot x + 2\sec^2 x$

$f'(x) = \cos x - \sin x \cdot x + 2\sec^2 x$ //

(4) $y = 2\sec x - \csc x$

$y' = 2\sec x\tan x + \csc x \cot x$ //

(14) $y = \dfrac{\sin t}{1+\tan t}$

$y' = \dfrac{(\sin t)'(1+\tan t) - (1+\tan t)'(\sin t)}{(1+\tan t)^2}$

$y' = \dfrac{\cos t\,(1+\tan t) - \sec^2 t(\sin t)}{(1+\tan t)^2}$

(21) $y = \sin x + \cos x, \quad (0,1)$

$f'(x) = \cos x - \sin x$

$y - 1 = (\cos x - \sin x)(x-0)$

$m = f'(0) = \cos(0) - \sin(0)$

$1 - 0 = 1 \Rightarrow y - 1 = 1\,(x-0)$ //

Section 2.5

(10) $g(x) = (2 - \sin x)^{3/2}$ $\quad g'(x) = \frac{3}{2}(2-\sin x)^{\frac{1}{2}} \cdot (-\cos x)$

(24) $v(y) = \left(\frac{y^4+1}{y^2+1}\right)^5$ $\quad v'(y) = 5\left(\frac{y^4+1}{y^2+1}\right)^4 \cdot \left(\frac{y^4+1}{y^2+1}\right)'$

$$= 5\left(\frac{y^4+1}{y^2+1}\right)^4 \cdot \frac{4y^3(y^2+1) - 2y(y^4+1)}{(y^2+1)^2}$$

(33) $y = \sin\sqrt{1+x^2}$

$y' = \cos\left(\sqrt{1+x^2}\right)\left(\sqrt{1+x^2}\right)'$

$\Downarrow$

$\left((1+x^2)^{\frac{1}{2}}\right)'$

$\Downarrow$

$\frac{1}{2}(1+x^2)^{-\frac{1}{2}}(1+x^2)'$

$\Downarrow$

$2x$

$y' = \cos\left(\sqrt{1+x^2}\right)\frac{1}{2}(1+x^2)^{\frac{-1}{2}}2x$

(39) $f(t) = \tan(\sec(\cos t))$

$f'(t) = \sec^2(\sec(\cos t))\left(\sec(\cos t)\right)'$

$\Downarrow$

$\sec(\cos t)\tan(\cos t)(\cos t)'$

$\Downarrow$

$(-\sin t)$

$f'(t) = \sec^2(\sec(\cos t))\sec(\cos t)\tan(\cos t)(-\sin t)$