Due Mon. 4/10 (8th)

- 2.4 #7-33 odd; 43-89 odd — Chain rule
- 5.1 #41-59 odd; 69,71 — Logarithmic functions

Due Tues 4/11 (8th)/Wed 4/12 (7th)

- 5.4 #33-51 odd; 59, 61 — Exponential functions
- 5.5 #37-69 odd — Log and exp functions with other bases
- 5.6 #39-63 odd — Inverse trig functions

~~TEST~~ Quiz: Wed 4/12 (8th)/ Thurs 4/13 (7th)

$$[e^x]' = e^x$$

$$[\ln x]' = \frac{1}{x}$$

$$\frac{d}{dx}[a^x] = a^x \cdot \ln a$$

$$\frac{d}{dx}[\log_a x] = \frac{1}{x \cdot \ln a}$$

Power Rule:

$$\frac{d}{dx}[x^n] = nx^{n-1}$$

d/dx [c]=0

Product Rule:

$$\frac{d}{dx}[f(x)g(x)] = f'(x)g(x) + f(x)g'(x)$$

Constant Multiple Rule:

$$\frac{d}{dx}[cf(x)] = c\frac{d}{dx}[f(x)]$$

Quotient Rule:

$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{f'(x)g(x) - f(x)g'(x)}{g^2(x)}$$

Sum & Difference:

$$\frac{d}{dx}[f(x) \pm g(x)] = f'(x) \pm g'(x)$$

Chain Rule:

$$\frac{d}{dx}[f(g(x))] = f'(g(x))g'(x)$$

Trig Functions:

$$\frac{d}{dx}[\sin x] = \cos x \qquad \frac{d}{dx}[\tan x] = \sec^2 x \qquad \frac{d}{dx}[\sec x] = \sec x \tan x$$

$$\frac{d}{dx}[\cos x] = -\sin x \qquad \frac{d}{dx}[\cot x] = -\csc^2 x \qquad \frac{d}{dx}[\csc x] = -\csc x \cot x$$

$$\log_a(MN) = \log_a M + \log_a N$$

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

$$\log_a M^p = p \log_a M$$

$$\log_a 1 = 0$$

$$\log_a a = 1$$

48. $y = \ln\left(\frac{1+e^x}{1-e^x}\right)$ $= \ln(1+e^x) - \ln(1-e^x)$

$$y' = \frac{1}{1+e^x}\cdot e^x - \frac{1}{1-e^x}\cdot(-e^x)$$

$$= \boxed{\frac{e^x}{1+e^x} + \frac{e^x}{1-e^x}}$$

$\log_a(a^x) = x$

$a^{\log_a x} = x$

58. $y = \ln e^x$ $= \log_e(e^x) = x$

$$y' = \boxed{1} \quad = \frac{1}{e^x}\cdot e^x$$

5.5

46. $f(t) = \frac{3^{2t}}{t}$ $= (3^{2t})(t^{-1})$

$$f'(t) = (3^{2t}\ln 3\cdot 2)(t^{-1}) + (3^{2t})(-t^{-2})$$

54. $y = \log_{10}\frac{x^2-1}{x}$ $= \log_{10}(x^2-1) - \log_{10}x$ *

$$= \log_{10}[(x-1)(x+1)] - \log_{10}x$$

$$y = \log_{10}(x-1) + \log_{10}(x+1) - \log_{10}x$$

$$y' = \boxed{\frac{1}{(x-1)\ln 10} + \frac{1}{(x+1)\ln 10} - \frac{1}{x\ln 10}}$$

$$* \; y' = \frac{2x}{(x^2-1)\ln 10} - \frac{1}{x\ln 10}$$

$[x^n]' = nx^{n-1}$

$[cf(x)]' = cf'(x)$

$[f(x) \pm g(x)]' = f'(x) \pm g'(x)$

$[f(x)g(x)]' = f'(x)g(x) + g'(x)f(x)$

$\left[\frac{f(x)}{g(x)}\right]' = \frac{f'(x)g(x) - g'(x)f(x)}{g^2(x)}$

$[f(g(x))]' = f'(g(x)) \cdot g'(x)$

$[e^x]' = e^x$

$[a^x]' = a^x \ln a$

$[\ln x]' = \frac{1}{x}$

$[\log_a x]' = \frac{1}{x \ln a}$

$[\sin x]' = \cos x$

$[\cos x]' = -\sin x$

$[\tan x]' = \sec^2 x$

$[\cot x]' = -\csc^2 x$

$[\sec x]' = \sec x \tan x$

$[\csc x]' = -\csc x \cot x$

$[\arcsin x]' = \frac{1}{\sqrt{1-x^2}}$

$[\arctan x]' = \frac{1}{1+x^2}$

$[\text{arcsec}\, x]' = \frac{1}{|x|\sqrt{x^2-1}}$

$[\arccos x]' = \frac{-1}{\sqrt{1-x^2}}$

$[\text{arccot}\, x]' = \frac{-1}{1+x^2}$

$[\text{arccsc}\, x]' = \frac{-1}{|x|\sqrt{x^2-1}}$