

ASSN DAY 44 §3.1 - 3.4 RULES. CLEAN UP DAY
 RULES REVIEW (Power-Exponential-Product-Quotient-Chain)

PP. 180-181 # 1, 4, 10, 24, ~~28~~, 50, ~~53~~, 58, 59, 68

① $w = (t^2 + 1)^{100}$ CHAIN-POWER

$$\frac{dw}{dt} = 100(t^2 + 1)^{99} \cdot (2t)$$

$$\frac{dw}{dt} = 200t(t^2 + 1)^{99}$$

④ $y = \frac{\sqrt{t}}{t^2 + 1}$ QUOTIENT SIMPLIFY OR MAX FRACTION W/ LCD

$$\frac{dy}{dx} = \frac{(t^2 + 1) \left(\frac{1}{2\sqrt{t}}\right) - (\sqrt{t})(2t)}{(t^2 + 1)^2} \cdot \frac{(2\sqrt{t})}{(2\sqrt{t})}$$

$$\frac{dy}{dx} = \frac{(t^2 + 1) - 4t^2}{(t^2 + 1)^2 (2\sqrt{t})}$$

$$\frac{dy}{dx} = \frac{-3t^2 + 1}{(t^2 + 1)^2 (2\sqrt{t})}$$

⑩ $y = \sqrt{\theta} \left(\sqrt{\theta} - \frac{1}{\sqrt{\theta}} \right)$

Rewrite $y = (\theta - 1)$ Power Rule

$$\frac{dy}{d\theta} = 1$$

②④ $f(t) = \frac{t^2 + t^3 - 1}{t^4} = t^{-2} + t^{-1} - t^{-4}$ Rewrite & Power Rule

$$f'(t) = -2t^{-3} - t^{-2} + 4t^{-5}$$

$$f'(t) = \frac{-2}{t^3} - \frac{1}{t^2} + \frac{4}{t^5}$$

$$f'(t) = \frac{-2t^2 - t^3 + 4}{t^5}$$

⑤ $y = \frac{e^{2x}}{x^2 + 1}$

QUOTIENT RULE SIMPLIFY

$$\frac{dy}{dx} = \frac{(x^2 + 1)(2e^{2x}) + (e^{2x})(2x)}{(x^2 + 1)^2}$$

$$\frac{dy}{dx} = \frac{2e^{2x}(x^2 + 1 + x)}{(x^2 + 1)^2}$$

$$\frac{dy}{dx} = \frac{2e^{2x}(x^2 + x + 1)}{(x^2 + 1)^2}$$

⑤③ skip we haven't learned $\ln x$ yet

⑤⑧ $g(z) = \frac{z^7 + 5z^6 - z^3}{z^2}$

Rewrite then Power Rule

$$g(z) = z^5 + 5z^4 - z$$

$$g'(z) = 5z^4 + 20z^3 - 1$$

⑤⑨ $f(z) = (\ln 3)z^2 + (\ln 4)e^z$

Power Exponential coefficients get to hang out

$$f'(z) = 2 \ln 3 z + \ln 4 e^z$$

$$f'(z) = (\ln 9)z + (\ln 4)e^z$$

⑥⑧ $f(y) = (4^y)(2 - y^2)$

Product Rule w/ exp & power SIMPLIFY

$$f'(y) = (\ln 4)4^y(2 - y^2) + (4^y)(-2y)$$

$$4^y [(\ln 4)(2 - y^2) - 2y]$$

②⑧ skip we have not learned arcsin yet.