DAY 48 p.159 #3, 5, 7, 17, 19, 21, 28, 32, 41, 45

(3) $f(x) = \ln(5x^2+3)$

$f'(x) = \frac{1}{(5x^2+3)} \cdot (10x)$

$f'(x) = \frac{10x}{(5x^2+3)}$

(5) $y = \arcsin(x+1)$

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

(7) $P(x) = 3\ln(x^2+5x+3)$

$P'(x) = \frac{3}{(x^2+5x+3)} \cdot (2x+5)$

$P'(x) = \frac{3(2x+5)}{(x^2+5x+3)}$

(17) $h(w) = w^3 \cdot \ln(10w)$

$h'(w) = (3w^2) \cdot \ln(10w) + (w^3)\left(\frac{1}{10w}\right) \cdot (10)$

$h'(w) = 3w^2 \cdot \ln(10w) + w^2$

$h'(w) = (w^2)(3 \cdot \ln(10w) + 1)$

(19) $f(x) = e^{\ln(x)+1}$

$f(x) = (e^{\ln x}) \cdot e^1$

$f(x) = e \cdot x$ ← Rewrite $f(x)$

$f'(x) = e$

(21) $f(t) = \ln(e^{\ln t})$

$f(t) = \ln(t)$ ← Rewrite $f(x)$

$f'(t) = \frac{1}{t}$

(28) $h(w) = w \cdot \arcsin(w)$

$h'(x) = 1 \cdot \arcsin(w) + w \cdot \frac{1}{\sqrt{1-w^2}}$

$h'(x) = \arcsin(w) + \frac{w}{\sqrt{1-w^2}}$

(32) $f(x) = \cos(\arctan(3x))$

$f'(x) = -\sin(\arctan(3x)) \cdot \left(\frac{1}{(1+9x^2)}\right) \cdot (3)$

$f'(x) = \frac{-3\sin(\arctan(3x))}{(1+9x^2)}$

(41) $f(x) = \cos(\arcsin(x+1))$

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

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

(45) $\frac{d}{dx}(\log x)$ implicit differentiation

let $y = \log_{10}(x)$

$\frac{d}{dx}[10^y = x]$ ←

$(\ln 10)(10^y) \cdot \frac{dy}{dx} = 1$

$\frac{dy}{dx} = \frac{1}{\ln(10) \cdot (10^y)} = \frac{1}{\ln(10)(x)}$