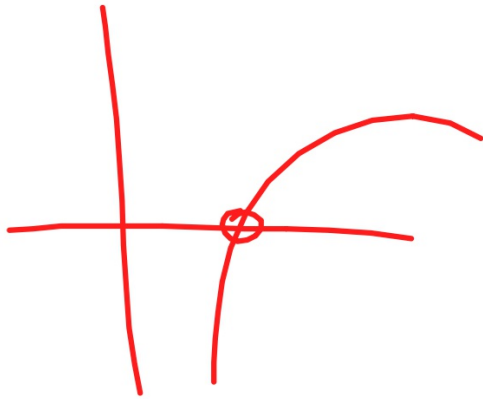


34.



$$87. A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = 100,000 \left(1 + \frac{.05}{12} \right)^{12 \cdot t}$$

5.5 B Derivatives / AD

WCID? I can differentiate logs

A. Definitions

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

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

$$\text{Ex. } \frac{d}{dx} [5^x] = 5^x \cdot \ln 5$$

$$\frac{d}{dx} [7^{\cos x}] = 7^{\cos x} \cdot \ln 7 \cdot (-\sin x)$$

$$\frac{d}{dx} [3^{2x+1}] = 3^{2x+1} \cdot \ln 3 \cdot 2$$

$$2. \frac{d}{dx} [\log_a x] = \frac{1}{x \ln a}$$

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

$$\begin{aligned} \text{Ex } \frac{d}{dx} [\log_{10}(\cos x)] &= \frac{1}{(\ln 10)(\cos x)} \cdot (-\sin x) \\ &= \frac{-\tan x}{\ln 10} \end{aligned}$$

$$B. \int a^x dx = \frac{1}{\ln a} \cdot a^x + C$$

$$\text{Ex. } \int 5^{-x} dx = -1 \int 5^u du$$

$$\begin{aligned} u &= -x \\ du &= -1 dx \end{aligned} \qquad = -\frac{5^u}{\ln 5} + C$$
$$= -\frac{5^{-x}}{\ln 5} + C$$

$$\text{Ex. } \int x \cdot 7^{x^2+4} dx$$

$$u = x^2 + 4$$

$$du = 2x dx$$

$$= \frac{1}{2} \int 7^u du$$

$$= \frac{1}{2} \cdot \frac{7^u}{\ln 7} + C$$

$$= \frac{7^{x^2+4}}{2 \ln 7} + C$$

5.5 37, 38, 49, 53, 54,
57, 61-63, 67,
69, 79, 91, 92