

Day 2 on 3.3

I. Condense the expression to a single quantity.

Ex 1) $\frac{1}{2}\log_{10} x + 3\log_{10} (x+1)$

$$\begin{aligned} &= \log_{10} x^{\frac{1}{2}} + \log_{10} (x+1)^3 \\ &= \log_{10} x^{\frac{1}{2}} (x+1)^3 \\ &= \log_{10} \sqrt{x} (x+1)^3 \end{aligned}$$

Ex 2) $2\ln (x + 2) - \ln x$

$$\begin{aligned} &= \ln(x+2)^2 - \ln x \\ &= \ln\left(\frac{(x+2)^2}{x}\right) \end{aligned}$$

$$\text{Ex 3) } \ln x - 2 [\ln(x+2) + \ln(x-2)]$$

$$= \ln x - 2 [\ln(x+2)(x-2)]$$

$$= \ln x - 2 [\ln(x^2-4)]$$

$$= \ln x - 2 \ln(x^2-4)$$

$$= \ln x - \ln(x^2-4)^2$$

$$= \ln \left[\frac{x}{(x^2-4)^2} \right]$$

$$\text{Ex 4) } (1/3) [\log_2 x + \log_2(x-4)]$$

$$= \frac{1}{3} \log_2 x + \frac{1}{3} \log_2(x-4)$$

$$= \log_2 x^{\frac{1}{3}} + \log_2(x-4)^{\frac{1}{3}}$$

$$= \log_2 x^{\frac{1}{3}} \cdot (x-4)^{\frac{1}{3}}$$

$$= \log_2 \sqrt[3]{x(x-4)}$$