Lesson 59 Objective: SWBAT condense logs.

Kickoff- Expand each of the following:

1) $\log_4(a \cdot b \cdot c)$ $\log_4 a + \log_4 b + \log_4 c$

2) $\log_8(x^3 \cdot y)^2$ $6\log_8 x + 2\log_8 y$

3) $\log_9(z\sqrt{x \cdot y})$ $\log_9 z + \frac{1}{2}\log_9 x + \frac{1}{2}\log_9 y$

4) $\log_2\left(\frac{a}{b^4}\right)^2$ $2\log_2 a - 8\log_2 b$

Properties of Logs:

Type	Condensed Log Form	Expanded Log Form
Product	$\log_b AC$ $\ln AC$	$\log_b A + \log_b C$ $\ln A + \ln C$
Quotient	$\log_b \frac{A}{C}$ $\ln \frac{A}{C}$	$\log_b A - \log_b C$ $\ln A - \ln C$
Power	$\log_b A^c$ $\ln A^c$	$C \bullet \log_b A$ $C \bullet \ln A$ *Drop it like it's hot!

Condense each expression.

1) $\log_4 a + \frac{1}{2}\log_4 b$ $\log_4 a\sqrt{b}$

2) $\log_4 a - \frac{1}{2}\log_4 b \to \sqrt{b}$ $\log_4 \frac{a}{\sqrt{b}}$

3) $\frac{1}{3}(\log_7 a - \log_7 b)$ $\log_7 \sqrt[3]{\frac{a}{b}}$

4) $\frac{1}{2}[4\ln a + \ln b - 4\ln c]$ $\ln\sqrt{\frac{a^4 b}{c^4}}$

5) $6(4\ln a + \ln b)$ $\ln(a^4 b)^6$

6) $2\log_c a + 5\log_c b - \frac{1}{2}\log_c d$ $\log_c \frac{a^2 b^5}{\sqrt{d}}$

7) $\log x - (4\log y + 5\log z)$ $\log \frac{x}{y^4 z^5}$

8) $2(\ln x + 4\ln y) - 5\ln z$ $\ln\frac{(xy^4)^2}{z^5}$

9) $3\ln x - \ln(x-3)$ $\ln\frac{x^3}{x-3}$

10) $\ln(x-4) + 2\ln(2x+5)$ $\ln(x-4)(2x+5)^2$

11) $3\log(2x+9) + \frac{1}{2}\log(x+4)$ $\log(2x+9)^3\sqrt{x+4}$

12) $2\ln(x) - [\ln(x+9) + 4\ln(x-2)]$ $\ln\frac{x^2}{(x+9)(x-2)^4}$