Properties of Logarithms

Definition:
Properties of Logarithms –

Product Property: $\quad log_b mn =$ _____

Quotient Property: $\quad log_b \dfrac{m}{n} =$ _____

Power Property: $\quad log_b m^n =$ _____

Expand the following logs using the properties of logarithms.

$\log_8 \left(\dfrac{a}{b^6}\right)^6$ $\qquad\qquad\qquad\qquad$ $\log_9 (a^5 b^6)^2$ $\qquad\qquad\qquad\qquad$ $\log_5 \left(c^4 \sqrt[3]{a}\right)$

Condense each expression into a single logarithm.

$\ln x + \ln y + 4 \ln z$ $\qquad\qquad\qquad\qquad\qquad$ $6 \log_2 x + 2 \log_2 y$

$4 \log_5 x - 4 \log_5 y$ $\qquad\qquad\qquad\qquad\qquad$ $3 \log_4 z + \dfrac{\log_4 x}{3}$

Use the properties of logarithms and the logarithms provided to rewrite each logarithm in terms of the variables given.

$\log_3 7 = X$ $\log_5 11 = U$

$\log_3 10 = Y$ $\log_5 4 = V$

$\log_3 4 = Z$ $\log_5 6 = W$

Find $\log_3 \dfrac{5}{2}$ Find $\log_5 \dfrac{5}{121}$