Expanding and Condensing Logarithmic Expressions

Name _____

Date _____ Period _____

Product Property

$$\log_b m \cdot n = \log_b m + \log_b n$$

Power Property

$$\log_b m^x = x \cdot \log_b m$$

Quotient Property

$$\log_b \frac{m}{n} = \log_b m - \log_b n$$

Special Log Properties

$$\log_b b = 1 \qquad \log_b 1 = 0$$

Inverse Properties

$$\log_b b^x = x \qquad b^{\log_b x} = x$$

Product Property

$$\log_b m \cdot n = \log_b m + \log_b n$$

Expand →

Quotient Property

$$\log_b \frac{m}{n} = \log_b m - \log_b n$$

Expand →

Power Property

$$\log_b m^x = x \cdot \log_b m$$

Expand →

Expand the following logarithmic expressions

$\log_7 3x$

$\log_2 5y^3$

$\log 6x^2y^4$

Product Property	Quotient Property	Power Property
$\log_b m \cdot n = \log_b m + \log_b n$	$\log_b \frac{m}{n} = \log_b m - \log_b n$	$\log_b m^x = x \cdot \log_b m$
Expand →	Expand →	Expand →

Expand the following logarithmic expressions

$\log_3 \frac{5x}{7}$ $\log_4 \frac{3x^2}{7y^4}$

Product Property	Quotient Property	Power Property
$\log_b m \cdot n = \log_b m + \log_b n$	$\log_b \frac{m}{n} = \log_b m - \log_b n$	$\log_b m^x = x \cdot \log_b m$
← Condense	← Condense	← Condense

Condense the following into one logarithmic expression

$\log_3 5 + \log_3 x$ $\log_5 3 + 2 \cdot \log_5 x$ $\log 5 + 3 \cdot \log a + 5 \cdot \log b$

Product Property

$\log_b m \cdot n = \log_b m + \log_b n$

Condense

Quotient Property

$\log_b \frac{m}{n} = \log_b m - \log_b n$

Condense

Power Property

$\log_b m^x = x \cdot \log_b m$

Condense

Condense the following into one logarithmic expression

$\log_4 2 + \log_4 y - \log_4 5$

$\log 2 - 2 \cdot \log y - \log 5 + 3 \cdot \log x$

Product Property

$\log_b m \cdot n = \log_b m + \log_b n$

Power Property

$\log_b m^x = x \cdot \log_b m$

Quotient Property

$\log_b \frac{m}{n} = \log_b m - \log_b n$

Special Log Properties

$\log_b b = 1 \quad \log_b 1 = 0$

Inverse Properties

$\log_b b^x = x \qquad b^{\log_b x} = x$