W3 – 7.3 – Product and Quotient Laws of Logarithms
MHF4U

1) Simplify using laws of logarithms and then evaluate.

a) $\log 9 + \log 6$ **b)** $\log 48 - \log 6$ **c)** $\log_3 7 + \log_3 3$

2) Simplify each algebraic expression.

a) $\log x + \log y + \log(2z)$ **b)** $\log_2 a + \log_2(3b) - \log_2(2c)$ **c)** $2\log m + 3\log n - 4\log y$

3) Evaluate using the product law of logarithms.

a) $\log_6 18 + \log_6 2$ **b)** $\log 40 + \log 2.5$ **c)** $\log_{12} 8 + \log_{12} 2 + \log_{12} 9$

4) Evaluate using the quotient law of logarithms.

a) $\log_3 54 - \log_3 2$ **b)** $\log 50\,000 - \log 5$ **c)** $\log_4 320 - \log_4 5$

5) Evaluate, using the laws of logarithms

a) $3\log_{16} 2 + 2\log_{16} 8 - \log_{16} 2$

b) $\log 20 + \log 2 + \frac{1}{3}\log 125$

6) Write as a sum or difference of logarithms. Simplify, if possible.

a) $\log_7(cd)$ **b)** $\log_3\left(\frac{m}{n}\right)$ **c)** $\log(uv^3)$ **d)** $\log\left(\frac{a\sqrt{b}}{c^2}\right)$ **e)** $\log_2 10$

7) Simplify

a) $\log\left(\frac{x^2}{\sqrt{x}}\right)$

b) $\log\sqrt{k} + \log\left(\sqrt{k}\right)^3 + \log\sqrt[3]{k^2}$

c) $\log(x^2 - 4) - \log(x - 2)$

d) $\log(x^2 - x - 6) - \log(2x - 6)$