31) $\log_4 8 = \square = \frac{3}{2}$

$4^{\square} = 8$

$2^{2\square} = 2^3$

74) $2[3\ln x - \ln(x+1) - \ln(x-1)]$

$[\ln x^3 - \ln(x+1) - \ln(x-1)]$

$2\left[\ln \frac{x^3}{(x+1)(x-1)}\right]$

$2\left[\ln \frac{x^3}{x^2-1}\right]$

$2\ln\left(\frac{x^3}{x^2-1}\right)^2$

$\ln\left(\frac{x^3}{x^2-1}\right)^2$

$\ln \frac{x^6}{(x^2-1)^2}$

72) $4[\ln z + \ln(z+5)] - 2\ln(z-5)$

$4[\ln z(z+5)]$

$4\ln z(z+5)$

$\ln[z(z+5)]^4 - \ln(z-5)^2$

$\ln \frac{(z^2+5z)^4}{(z-5)^2}$

Section 3.3B Evaluate using properties of logarithms

Write each logarithm in terms of $\boxed{ln\ 2}$ and $\boxed{ln\ 3}$.

a) *ln* 6

$\ln(2\cdot 3)$

$\ln 2 + \ln 3$

b) *ln* (2/27)

$\ln \frac{2}{3^3} \Rightarrow \ln 2 - \ln 3^3$

$\ln 2 - 3\ln 3$

Write each logarithm in terms of *ln* 2 and *ln* 5 .

c) *ln* 10

$2\cdot 5$

$\ln 2 + \ln 5$

d) *ln* (5/32) $\ln \frac{5}{2^5}$

$\ln 5 - \ln 2^5$

$\ln 5 - 5\ln 2$

Write each logarithm in terms of log 3 and log 5 .

a) log 75

$5^2 \cdot 3$

$\log 5^2 + \log 3$

$2\log 5 + \log 3$

b) log (9/125)

$\log \frac{3^2}{5^3}$

$2\log 3 - 3\log 5$

Write each logarithm in terms of $\log_2 3$ and $\log_2 5$.

a) $\log_2 (5/3)$

$\log_2 5 - \log_2 3$

b) $\log_2 45$

$9 \cdot 5$

$2\log_2 3 + \log_2 5$

Use the properties of logarithms and the values below to find the logarithm indicated Do not use calculator to evaluate the logs.

a)
$\log 7 \approx 0.8$
$\log 8 \approx 0.9$
$\log 12 \approx 1.1$

Find $\log \frac{1}{49}$

$\log \frac{1}{7^2}$

$\log 1 - 2\log 7$

$0 - 2(.8)$

-1.6

b)
$\log 12 \approx 1.1$
$\log 8 \approx 0.9$
$\log 7 \approx 0.8$

Find $\log 84$

$12 \cdot 7$

$\log 12 + \log 7$

$1.1 + .8 = 1.9$

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

a) $\log_4 6 = X$
$\log_4 7 = Y$
$\log_4 10 = Z$

Find $\log_4 \frac{500}{3}$ (2) (2)

$\log_4 \frac{1000}{6}$

$\log_4 \frac{10^3}{6}$

$3\log_4 10 - \log_4 6$

$3Z - X$

b) $\log_a b = -1$
$\log_a c = 2$
$\log_a d = -3$

Find $\log_a \left(\frac{c^2\sqrt{d}}{b^5}\right)$

$\log_a c^2 + \log_a \sqrt{d} - \log_a b^5$

$2\boxed{\log_a c} + \frac{1}{2}\boxed{\log_a d} - 5\boxed{\log_a b}$

$2(2) + \frac{1}{2}(-3) - 5(-1)$

$9 - \frac{3}{2} = 7.5$

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

a) $\log_8 6 = R$
$\log_8 7 = S$
$\log_8 10 = T$
Find $\log_8 \frac{4}{5}$ (2) (2)

$\log_8 8 - \log_8 10$

$1 - T$

b) $\log_6 4 = P$
$\log_6 10 = Q$
$\log_6 9 = R$
Find $\log_6 \frac{1}{81}$

$\log_6 1 - 2\log_6 9$

$0 - 2R$

$-2R$

Section 3.3B WS