

Sec 3.3 Properties of Log pg 244 # 30-65 (*s), 73-93 odd

#30) $\log_{10} \frac{y}{2}$
 $\log_{10} y - \log_{10} 2$

#35) $\ln xyz$
 $\ln x + \ln y + \ln z$

#40) $\ln \sqrt{\frac{x^2}{y^3}}$
 $\frac{1}{2} \left[\ln \frac{x^2}{y^3} \right]$

-5)

#45) $\log_b \frac{x^2}{y^2 z^3}$

#50) $\ln y + \ln z$
 $\ln yz$

$\frac{1}{2} [2 \ln x - 3 \ln y]$
 $\ln x - \frac{3}{2} \ln y$

$\log_b x^2 - \log_b y^2 z^3$

$2 \log_b x - [\log_b y^2 + \log_b z^3]$

#55) $\frac{1}{3} \log_3 7x$
 $\log_3 (7x)^{1/3}$
 $\log_3 \sqrt[3]{7x}$

#60) $3 \ln x + 2 \ln y - 4 \ln z$
 $\ln x^3 + \ln y^2 - \ln z^4$
 $\ln \frac{x^3 y^2}{z^4}$

$2 \log_b x - 2 \log_b y - 3 \log_b z$

#65) $\frac{1}{3} [\ln y + 2 \ln(y+4)] - \ln(y-1)$

#73) $\log_3 9$
 $\log_3 3^2$
 $2 \log_3 3$
 2

$\frac{1}{3} [\ln y(y+4)^2] - \ln(y-1)$

$\ln \sqrt[3]{y(y+4)^2} - \ln(y-1)$

$\ln \frac{\sqrt[3]{y(y+4)^2}}{y-1}$

#77) $\log_2 (-4)$
 is undefined
 -4 is not in the
 domain of
 $f(x) = \log_2 x$.

#79) $\log_5 75 - \log_5 3$
 $\log_5 \frac{75}{3}$
 $\log_5 25$
 $\log_5 5^2 = 2 \log_5 5$
 2

#75) $\log_4 16^{3.4}$

$3.4 \log_4 16$

$3.4 \log_4 (4^2)$

$2(3.4) \log_4 4$

6.8

#83) $\log_{10} 0$

is undefined.
 0 is not in the
 domain of $\log_{10} x$.

#85) $\ln e^{8.5}$

$= 8.5$

#81) $\ln e^3 - \ln e^7$

$3 - 7$

-4

* book answer

#87) $\log_4 8$

$$\log_4 2^3$$

$$3 \log_4 2$$

$$3 \log_4 \sqrt{4}$$

$$3 \log_4 4^{1/2}$$

#93) $\ln(5e^6)$

$$\ln 5 + \ln e^6$$

$$\ln 5 + 6$$

*
#89) $\log_7 \sqrt{70}$

$$\log_7 70^{1/2}$$

$$\frac{1}{2} \log_7 70$$

$$\frac{1}{2} \log_7 (10 \cdot 7)$$

$$= \frac{1}{2} \log_7 10 + \frac{1}{2} \log_7 7$$

$$= \frac{1}{2} \log_7 10 + \frac{1}{2}$$

#91) $\log_5 \left(\frac{1}{250}\right)$

$$\log_5 1 - \log_5 250$$

$$- \log_5 (125 \cdot 2)$$

$$- \log_5 (5^3 \cdot 2)$$

$$= -(\log_5 5^3 + \log_5 2)$$

$$= -(3 \log_5 5 + \log_5 2)$$

$$= -(3 + \log_5 2)$$

$$= -3 - \log_5 2$$

