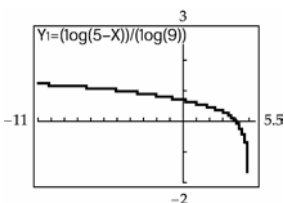


Section 4.4

6. $\log_b(x\sqrt[3]{y}) = \log_b x + \log_b y^{1/3}$
 $= \log_b x + \frac{1}{3}\log_b y$

12. $\frac{1}{2}\log_8(x+5) - 3\log_8 y = \log_8(x+5)^{1/2} - \log_8 y^3 = \log_8 \sqrt{x+5} - \log_8 y^3 = \log_8 \frac{\sqrt{x+5}}{y^3}$

26. $t(x) = \log_9(5-x) = \frac{\log(5-x)}{\log 9}$



34. False. $\log 10 \cdot \log 10 = 1 \cdot 1 = 1$
 but $\log 10 + \log 10 = 1 + 1 = 2$

36. False. $\log \frac{100}{10} = \log 10 = 1$
 but $\frac{\log 100}{\log 10} = \frac{2}{1} = 2$

39. False. $(\log 10)^2 = 1^2 = 1$ but $2\log 10 = 2(1) = 2$

42. $\log_5 20 \cdot \log_{20} 60 \cdot \log_{60} 100 \cdot \log_{100} 125 = \frac{\log 20}{\log 5} \cdot \frac{\log 60}{\log 20} \cdot \frac{\log 100}{\log 60} \cdot \frac{\log 125}{\log 100}$
 $= \frac{\cancel{\log 20}}{\log 5} \cdot \frac{\cancel{\log 60}}{\cancel{\log 20}} \cdot \frac{\cancel{\log 100}}{\cancel{\log 60}} \cdot \frac{\log 125}{\cancel{\log 100}} = \frac{\log 125}{\log 5} = \frac{\log 5^3}{\log 5}$
 $= \frac{3\log 5}{\log 5} = \frac{3\cancel{\log 5}}{\cancel{\log 5}} = 3$

44. $\ln\left(\frac{1}{50^{300}}\right) = \ln 50^{-300} = -300 \ln 50 \approx -1174$

$\ln\left(\frac{1}{151^{233}}\right) = \ln 151^{-233} = -233 \ln 151 \approx -1169$

$\frac{1}{50^{300}}$ is smaller.