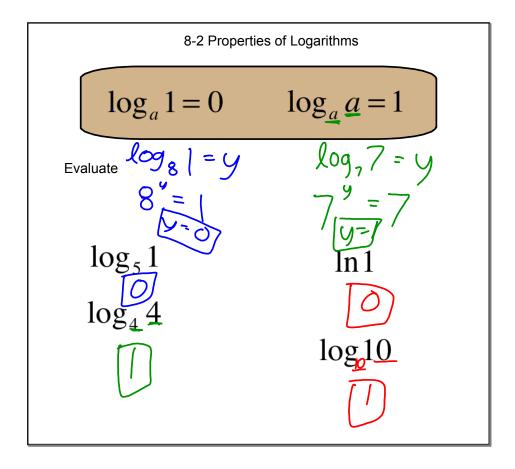
$f(x) = log_{3} \times \sqrt{27}$ y=log3 J27  $3^{*} = \sqrt{27} \rightarrow 3^{*} = 27^{2}$ 3"= 3]=  $\mathcal{Z}^{(c)}$ 

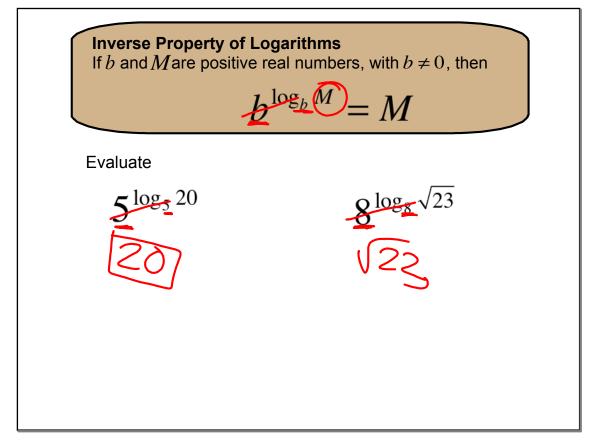
Y=209,6356 9 3  $\int \overline{4}$ = 43

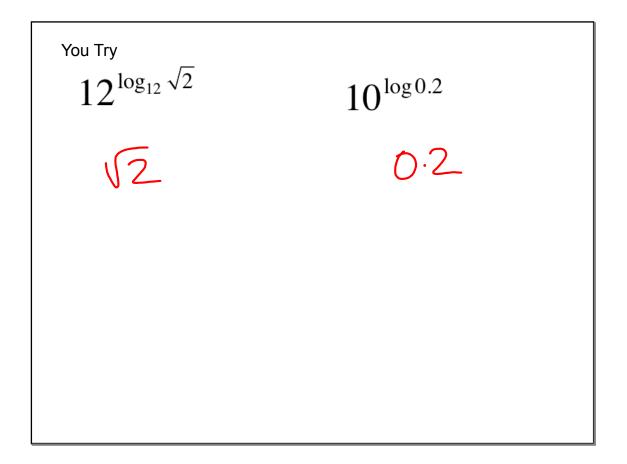
a.  $lhe^2 = y$  $e' = e^2$ 75. 9=2 log7 **D** $log_{10} y = log_{10}^{7}$ 

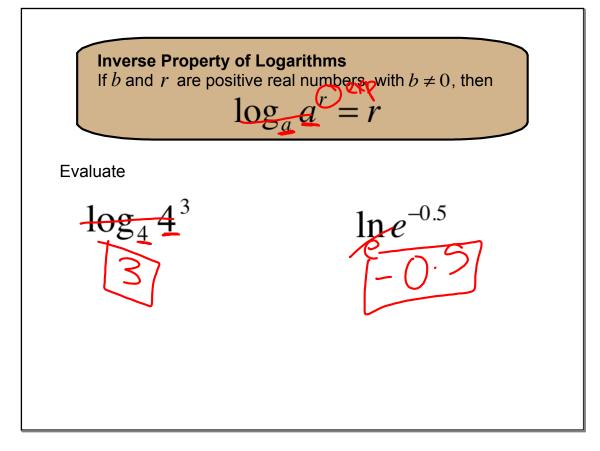
16. 9 0999 = 1.279ln19=2.944

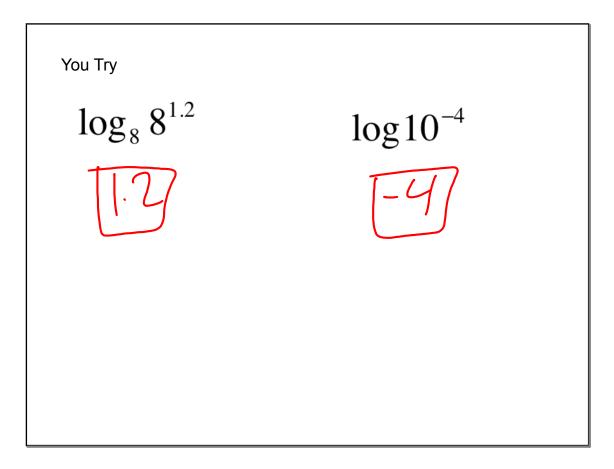
36. 10.log (10-10 intensity In-12 20 dB





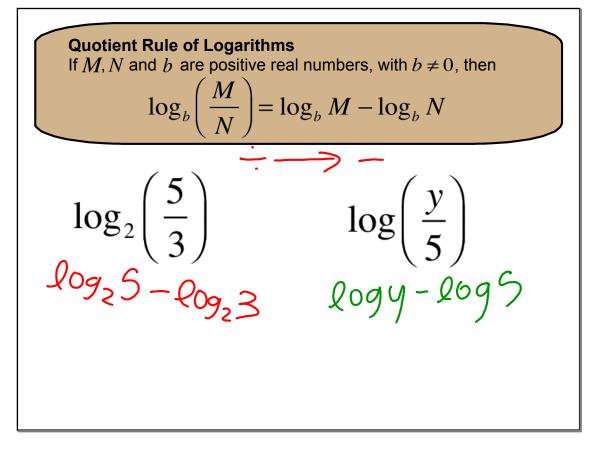


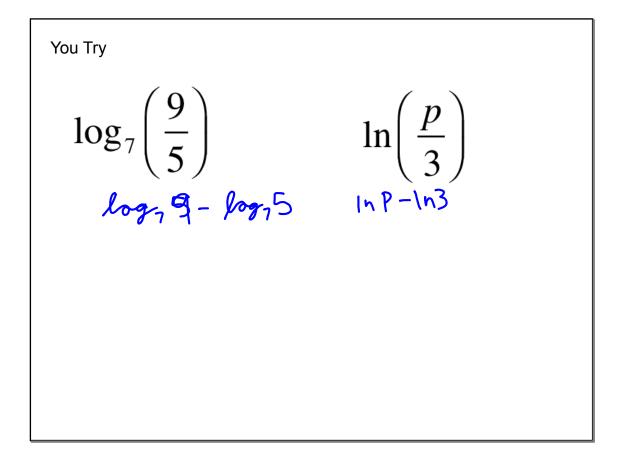


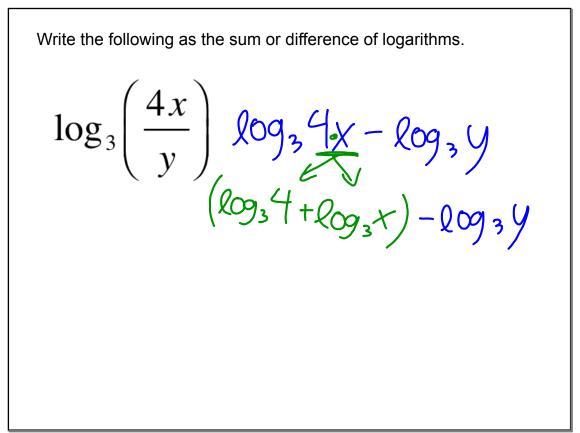


**Product Rule of Logarithms** If M, N and b are positive real numbers, with  $b \neq 0$ , then  $\log_{h}(MN) = \log_{h} M + \log_{h} N$ Write each of the following logarithms as the sum of logarithms.  $\frac{\log_2(5\cdot 3)}{\log_2 5 + \log_2 3} \frac{\ln(6z)}{\ln(2 + \ln 2z)}$ 

You Try  $\log_4(9\cdot 5)$  $\log(5w)$ log # 9+ log 45 log105 + log10W







You Try  

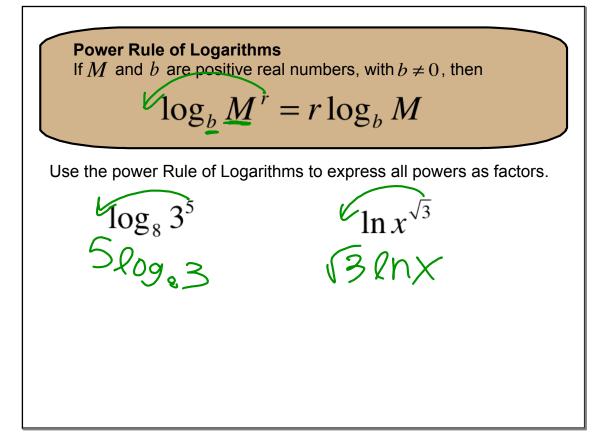
$$\log_{3}\left(\frac{3m}{n}\right) \qquad \log_{3}\left(\frac{q}{3p}\right)$$

$$\log_{3}\left(\frac{q}{3p}\right) \qquad \log_{3}\left(\frac{q}{3p}\right)$$

$$\log_{3}\left(\frac{q}{3p}\right) \qquad \log_{3}\left(\frac{q}{3p}\right)$$

$$\log_{3}\left(\frac{q}{3p}\right) \qquad \log_{3}\left(\frac{q}{3p}\right)$$

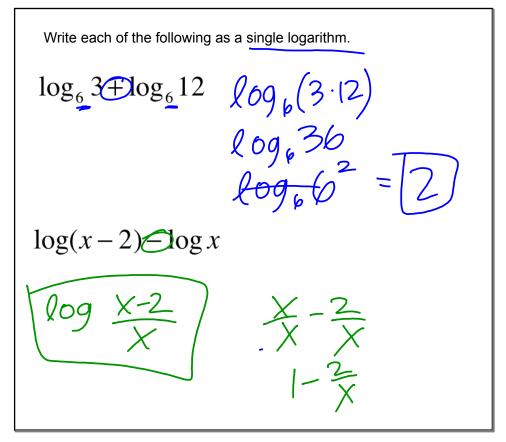
$$\log_{3}\left(\frac{q}{3p}\right) \qquad \log_{3}\left(\frac{q}{3p}\right) \qquad \log_{3}\left(\frac{q}{3p}$$



You Try  $\log_2 5^{1.6}$  $|\cdot 6\log_2 5$ log b<sup>5</sup> Slogb

 $\frac{\log_2(x^2y^3)}{\log_2 \chi^2 + \log_2 y^3} \quad \log\left(\frac{100x}{\sqrt{y}}\right)$   $\frac{\log_2(x^2y^3)}{\sqrt{y}} \quad \log\left(\frac{100x}{\sqrt{y}}\right)$   $\frac{\log_2(x^2y^3)}{\sqrt{y}} \quad \log\left(\frac{100x}{\sqrt{y}}\right)$  $\frac{(\log 100 + \log x) - \log 1y}{(\log 100 + \log x) - \log 1y}$   $\frac{(\log 10^{2} + \log x) - \log y}{2 + \log x) - \log y}$ 

You Try  $\log_4(a^2b)$  269 y  $\alpha^2$  + logy b Zlog, a + log, b  $\log_{3}\left(\frac{9m^{4}}{\sqrt[3]{n}}\right) \log_{3}(9m^{4} - \log_{3}\sqrt[3]{n}) + \log_{3}\sqrt[3]{n} + \log_{3}$ 



You try  

$$\log_{8} 4 + \log_{8} 16 \quad \log_{8} (4 \cdot 16)$$

$$\log_{8} 64 \rightarrow$$

$$\log_{8} 64 \rightarrow$$

$$\log_{8} 8^{2} = 1000$$

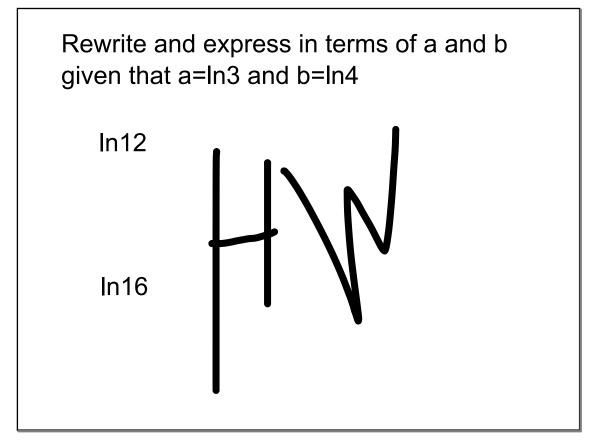
$$\log_{3} (x+4) = \log_{3} (x-1)$$

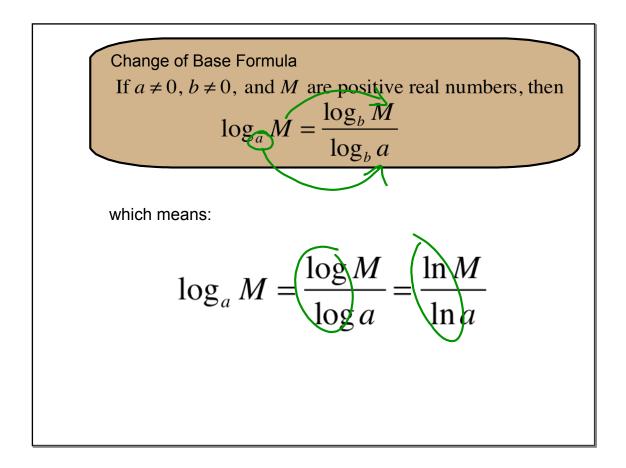
$$\log_{3} (x+4) = \log_{3} (x-1)$$

Write each of the following as a single logarithm.  $2 \log_{2}(x-1) + \frac{1}{2} \log_{2} x$  $\log_{2}(x-1)^{2} + \log_{2} x^{\frac{1}{2}}$  $\log_{2}(x-1)^{2} + \log_{2} x^{\frac{1}{2}}$ 5X  $-\frac{1}{2}\log x$  $\log(x-1) \oplus \log(x+1)$ log(x-X+1)]OlogX3 )(X+1)

You Try  

$$\log_5 x - 3\log_5 2$$
  
 $\log_2(x+1) \oplus \log_2(x+2) - 2\log_2 x^2$   
 $\log_2(x+1)(x+2) \oplus \log_2 x^2$   
 $\log_2(x+1)(x+2) \oplus \log_2 x^2$   
 $\log_2(x+1)(x+2) \oplus \log_2 x^2$ 





Use your calculator to approximate the following:  $log_{4} 45 = 2.75$  log 45 = 2.75 log 46 = 2.75 ln 46 = 2.75ln 46 = 2.75

Summary of Properties  

$$\log_{a} a^{r} = r \qquad b^{\log_{b} M} = M$$

$$\log_{b} (MN) = \log_{b} M \oplus \log_{b} N$$

$$\log_{b} \left(\frac{M}{N}\right) = \log_{b} M \oplus \log_{b} N$$

$$\log_{b} M^{r} = r \log_{b} M$$

$$\log_{a} M = \frac{\log_{b} M}{\log_{b} a}$$

a=en2 b=<u>en3</u> en9 21. In 9 ln(3:3) = ln3 + ln3p+b

Jen2 ln6 ln(3.2) = ln3 + ln2piq いっ