
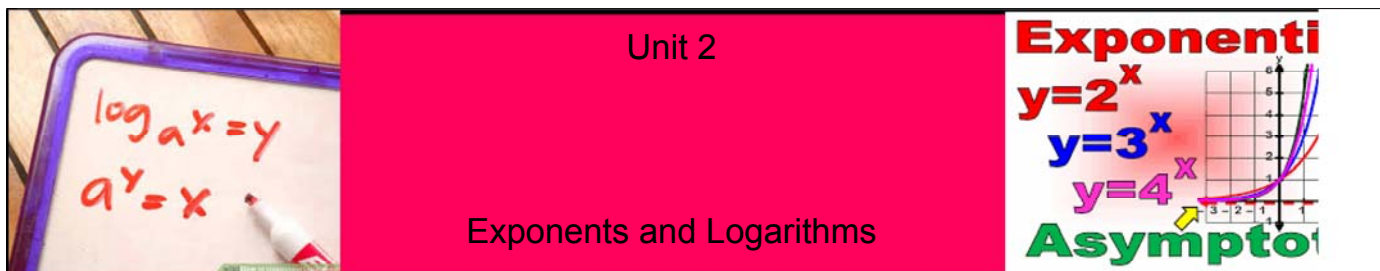
	<p>Unit 2</p> <p>Exponents and Logarithms</p>	<p><b>Exponents</b></p> <p><math>y=2^x</math>  <math>y=3^x</math>  <math>y=4^x</math></p>  <p><b>Asymptote</b></p>
<p><b>4.8 Log Laws</b></p> <p>Ex.) <math>\log(3) + \log 5 = 1.17\dots</math>  <math>\log 15 = 1.17\dots</math></p> <p>Ex.) <math>\log 25 - \log 5 = 0.698\dots</math>  <math>\log 5 = 0.698\dots</math></p> <p>Ex.) <math>\log(3^2) = 0.954\dots</math>  <math>2\log 3 = 0.954\dots</math></p>	<p><i>Exponents and Logarithms</i></p> $y = a^x \leftrightarrow x = \log_a y$ $\log_b c = \frac{\log_a c}{\log_a b}$ <p><i>Laws of Logarithms</i></p> $\log_b(M \cdot N) = \log_b M + \log_b N$ $\log_b\left(\frac{M}{N}\right) = \log_b M - \log_b N$ $\log_b(M^n) = n \log_b M$ <p><i>Exponential functions</i></p> $y = a \cdot b^x$	



The banner features a whiteboard on the left with the equations  $\log_a x = y$  and  $a^y = x$  written in red. The center has a red background with the text "Unit 2" and "Exponents and Logarithms". The right side shows a graph with exponential curves for  $y=2^x$ ,  $y=3^x$ , and  $y=4^x$ , with the word "Asymptote" written in green below the graph.

Ex.) Use log laws to determine the value of each of the following expressions.

show work

a)  $\log_6 3 + \log_6 12$

$$= \log_6 (3 \cdot 12)$$

$$= \boxed{\log_6 36} \text{ simplified}$$


$$= \boxed{2} \text{ evaluated}$$

b)  $\log 520 - \log 52$

$$= \log \left( \frac{520}{52} \right)$$


$$= \log_{10} 10$$

$$= \boxed{1}$$



Unit 2

Exponents and Logarithms



**Exponenti**  
 $y=2^x$   
 $y=3^x$   
 $y=4^x$   
**Asymptote**

Ex.) Write the following as a single logarithmic expression where  $b > 1$ ,  $x > 0$ , and  $y > 0$ . positive

a)  $\log_b(2x) + \log_b(3x)$

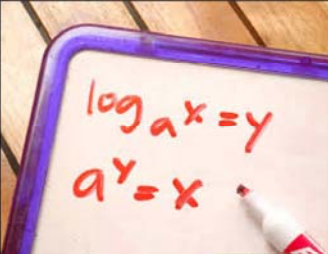
$= \log_b(2x \cdot 3x)$

$= \boxed{\log_b(6x^2)}$

b)  $2\underline{\log_b x} - \log_b y$

$= \log_b(x^2) - \log_b y$

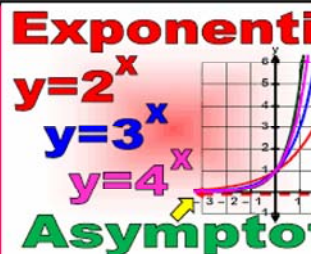
$= \boxed{\log_b\left(\frac{x^2}{y}\right)}$



$\log_a x = y$   
 $a^y = x$

Unit 2

Exponents and Logarithms



**Exponenti**  
 $y=2^x$   
 $y=3^x$   
 $y=4^x$   
**Asymptote**

Ex.) Simplify the following expressions into a single logarithm:

a)  $\log_2 16 - \log_2 4$

$$= \log_2 \left( \frac{16}{4} \right)$$

$$= \boxed{\log_2 4}$$

$$= \boxed{2}$$

b)  $\log_6 9 + \log_6 8 - \log_6 2$

$$= \log_6 \left( \frac{9 \times 8}{2} \right)$$

$$= \boxed{\log_6 36}$$


$$= \boxed{2}$$

c)  $\log_2 2 + \log_2 3 - \log_2 6 - \log_2 8$

$$= \log_2 \left( \frac{2 \times 3}{6 \times 8} \right)$$

$$= \boxed{\log_2 \left( \frac{1}{8} \right)}$$

$$= \boxed{-3}$$



Unit 2

Exponents and Logarithms


**Exponenti**

$y=2^x$

$y=3^x$

$y=4^x$

**Asymptote**



d)  $\log_3 x + \log_3 2x - \log_3 y - \log_3 x^2$

$= \log_3 \left( \frac{\cancel{x} \cdot 2\cancel{x}}{y \cdot \cancel{x}^2} \right)$

$= \boxed{\log_3 \left( \frac{2}{y} \right)}$


$\log_3 (2y^{-1})$

e)  $\ln(a+b) + \ln(a-b)$   $\ln x = \log_e x$

$= \ln \left( \frac{a+b}{a-b} \right)$

$= \ln(a^2 - \cancel{ab} + \cancel{ab} - b^2)$

$= \boxed{\ln(a^2 - b^2)}$




$\log_a x = y$   
 $a^y = x$

Unit 2

$\sqrt[2]{x} = x^{\frac{1}{2}}$      $\sqrt[3]{x} = x^{\frac{1}{3}}$

Exponents and Logarithms



**Exponenti**  
 $y=2^x$   
 $y=3^x$   
 $y=4^x$   
**Asymptote**

f)  $\frac{1}{2}\log_2 16 - \frac{1}{3}\log_2 8$

$$= \log_2(16^{\frac{1}{2}}) - \log_2(8^{\frac{1}{3}})$$

$$= \log_2 \sqrt{16} - \log_2 \sqrt[3]{8}$$

$$= \log_2 4 - \log_2 2$$

$$= \log_2 \left(\frac{4}{2}\right)$$

$$= \log_2 2$$

$$= \boxed{1}$$

g)  $2\ln 5 + 2\ln 2$

$$= \ln 5^2 + \ln 2^2$$

$$= \ln 25 + \ln 4$$

$$= \ln(25 \times 4)$$

$$= \boxed{\ln 100}$$

$$\approx 4.605$$

h)  $4\log x - \log x^3$

$$= \log x^4 - \log x^3$$

$$= \log \left(\frac{x^4}{x^3}\right)$$

$$= \boxed{\log x}$$

Pg. 446 # 1-20.