

Precalculus

3-03 Properties of Logarithms

Properties of Logarithms

- **Product Property:** $\log_b(uv) = \log_b u + \log_b v$
- **Quotient Property:** $\log_b\left(\frac{u}{v}\right) = \log_b u - \log_b v$
- **Power Property:** $\log_b u^n = n \log_b u$

Write each log in terms of $\ln 2$ and $\ln 5$.

$\ln 10$

$$\ln \frac{5}{32}$$

Expand

$\log 3x^2y$

$$\ln \frac{\sqrt{4x+1}}{8}$$

Condense

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

$$4 \ln(x - 4) - 2 \ln x$$

$$\frac{1}{5} (\log_3 x + \log_3(x - 2))$$

Change-of-Base Formula

$$\log_b c = \frac{\log_a c}{\log_a b}$$

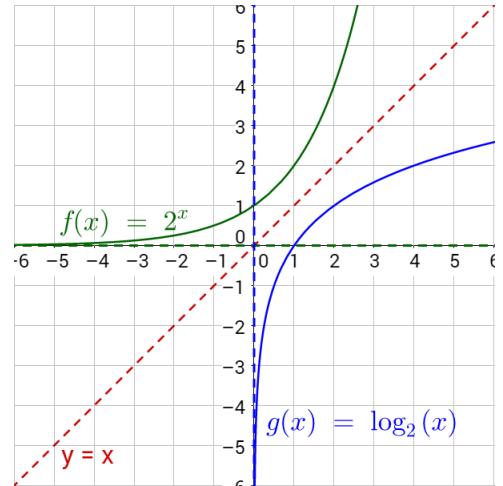
Evaluate $\log_3 17$

Graphing Logarithms

- Because logs are _____ of exponentials, the x and y are _____ and the graph is _____ over the line $y = x$.

$y = \log_b(x - h)$

- Domain: _____
- Range: _____
- VA: _____
- x -int: _____



To graph a logarithm

1. Find and graph the vertical _____
2. Make a _____
3. Use _____ formula
 $\log_b x = \frac{\log x}{\log b}$
4. Or use the _____ function on some TI graphing calcs
 MATH \rightarrow logBASE

Graph $y = \log_2(x + 1)$

