Dec. 3, 2012

Sect. 6-2

Logarithms

$\log_b c$, $b > 0, b \neq 1$

"log base bee of cee"

What is $\log_b c$ asking?

$\log_b c = ?$

$b^{?} = c$

Evaluate

$\log_2 8 = 3$

$\log_4 16 = 2$

$\log_3 81 = 4$

Logarithmic $\Leftrightarrow$ Exponential Form

$\log_2 8 = 3 \Leftrightarrow 2^3 = 8$

$\log_4 16 = 2 \Leftrightarrow 4^2 = 16$

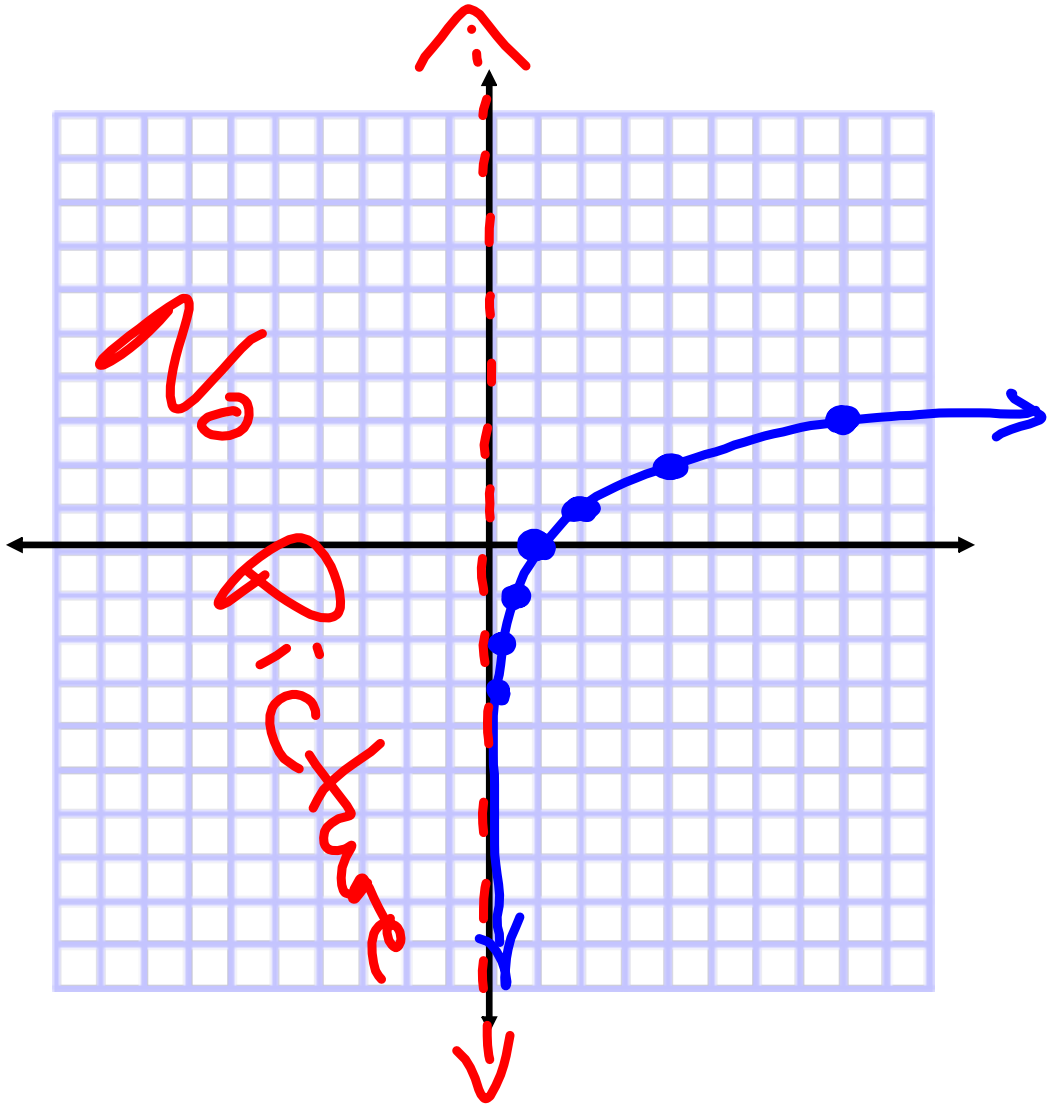
$\log_3 81 = 4 \Leftrightarrow 3^4 = 81$

Do Special Bases (Sect. 6-3) here.

Graphs

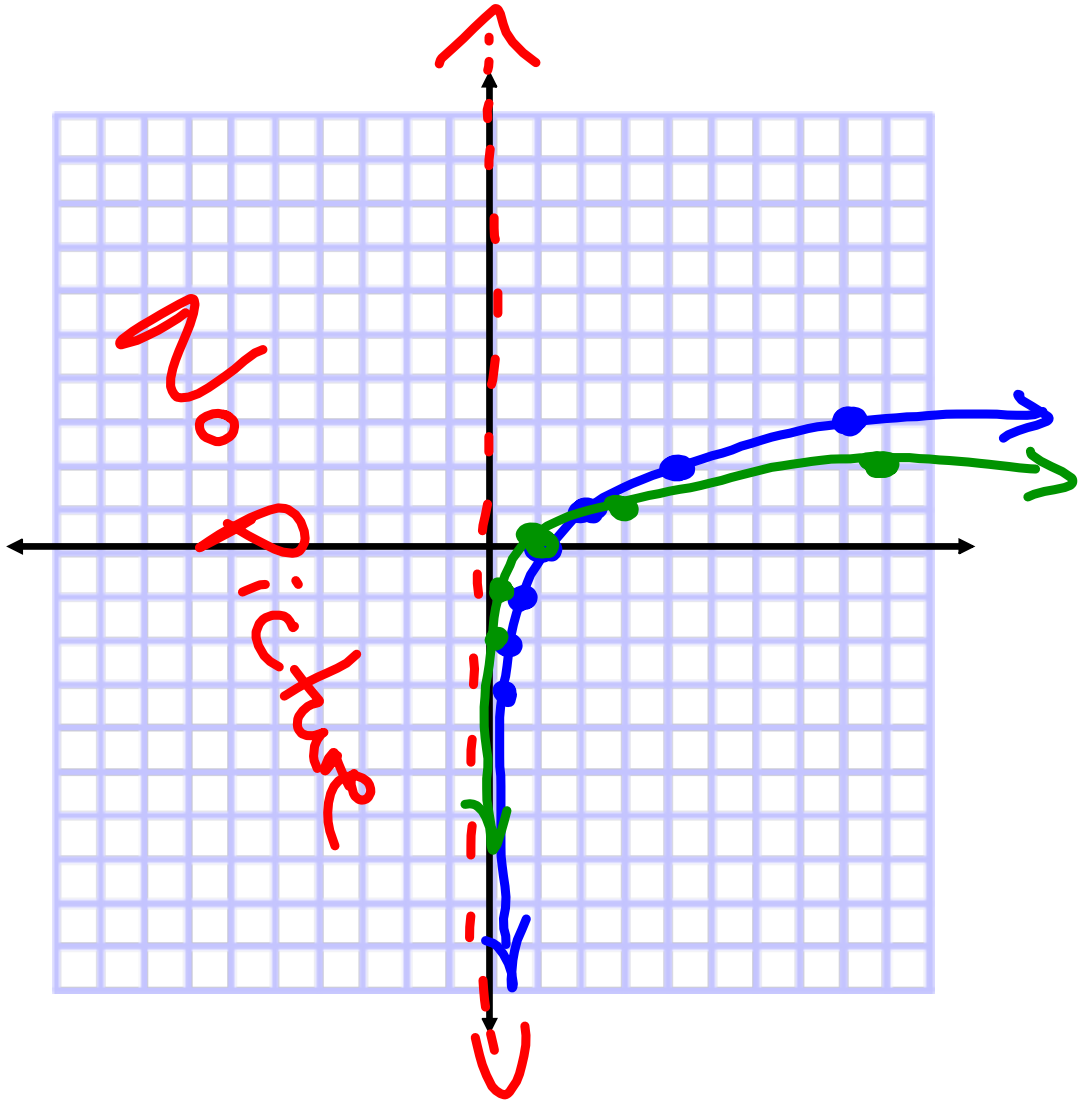
$y = \log_2 x = y$

x	y
$\frac{1}{4}$	-2
$\frac{1}{2}$	-1
1	0
2	1
4	2
8	3



$y = \log_3 x$

x	y
$\frac{1}{9}$	-2
$\frac{1}{3}$	-1
1	0
3	1
9	2



Basic Log Properties

$$\log_b 1 = 0$$

$$\log_b b^n = n$$

$$b^{\log_b n} = n$$

Other Log Properties

1. $\log_b a + \log_b c = \log_b ac$

2. $\log_b a - \log_b c = \log_b \left(\frac{a}{c}\right)$

3. $m \log_b c = \log_b c^m$

Write as a single log

$$\log_3 2 + \log_3 x + 4\log_3 y$$

$$\log_3 2 + \log_3 x + \log_3 y^4$$

$$\log_3 2xy^4$$

$$\log_5 3 - \log_5 x + 2\log_5 z - \frac{1}{3}\log_5 y$$

$$\log_5 3 - \log_5 x + \log_5 z^2 - \log_5 y^{\frac{1}{3}}$$

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

$$\log_5 \frac{3z^2}{x\sqrt[3]{y}}$$

Expand

$$\log_4 5x^3y$$

$$\log_4 5 + \log_4 x^3 + \log_4 y$$

$$\log_4 5 + 3\log_4 x + \log_4 y$$

$$\log_7 \frac{4x^2}{y}$$

$$\log_7 4 + \log_7 x^2 - \log_7 y$$

$$\log_7 4 + 2\log_7 x - \log_7 y$$

$$\log_2 \frac{\sqrt{3x-5}}{7} \qquad \sqrt{3x-5} = (3x-5)^{\frac{1}{2}}$$

$$\log_2 (3x-5)^{\frac{1}{2}} - \log_2 7$$

$$\frac{1}{2}\log_2 (3x-5) - \log_2 7$$

~~$\log_2 3x - \log_2 5$~~ Fin