Mid chapter recap of logs

$2^4 = 16$

? $2^x = 43$ Need logs to answer.

Choose apply $\log_2$ to both sides Alg 2.

$2^x = 43$

$\log_2 2^x = \log_2 43$

$x \cdot \log_2 2 = \log_2 43$

$x = \frac{\log 43}{\log 2}$

$x = 5.4263$

Properties

* $\log_b b = 1$

$\log_b 1 = 0$

$\log_2 43 = \frac{\log 43}{\log 2}$

$3^x = 951$

$x \cdot \log_3 3 = \log_3 951 \quad x = 6.2419$

$\frac{\log 951}{\log 3}$

$\log_3 3^x$

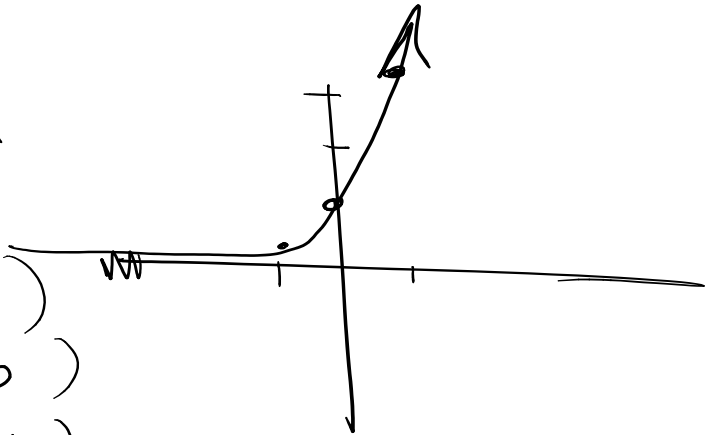
$x \cdot \log_3 3$

$.02^x = 17$

$y = 3^x$

$(0,1)$

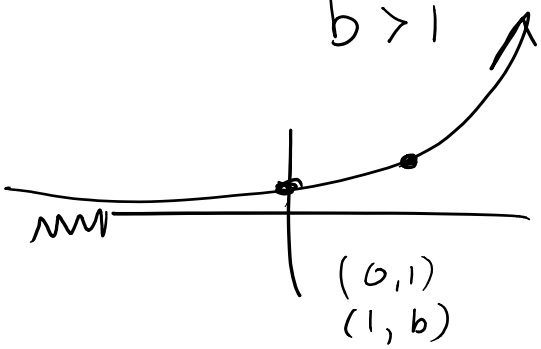
$(1,b)$



$(1, b)$
$(-1, \frac{1}{b})$

growth

$b > 1$

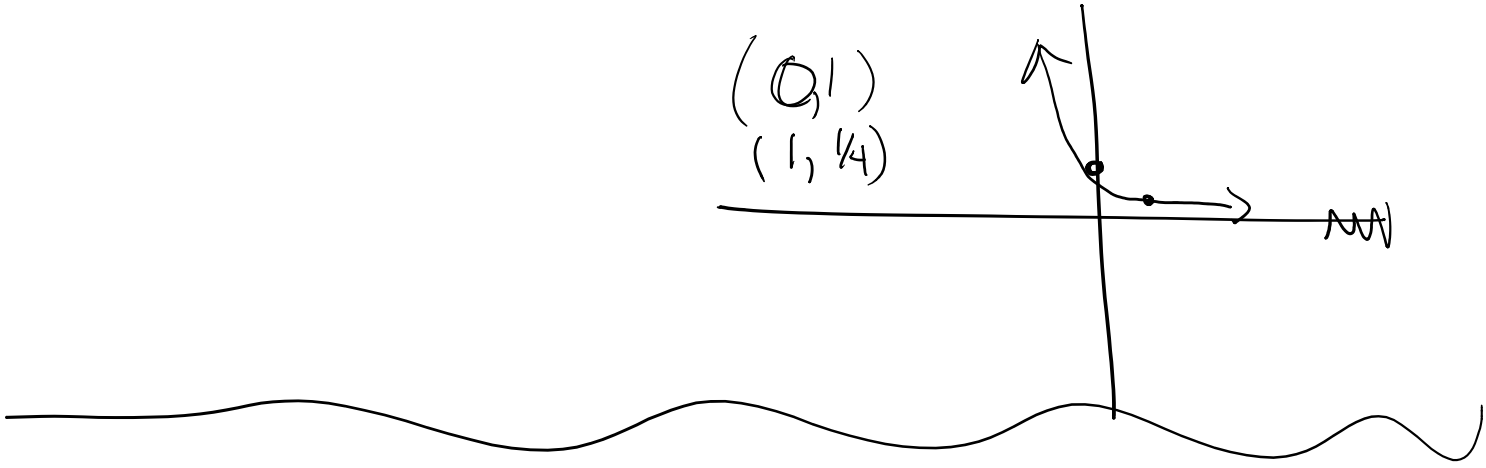


decay

$0 < b < 1$

$(0,1)$
$(1, b)$

$f(x) = \left(\frac{1}{4}\right)^x$



$$3^{x+7} = 27^{3x-4}$$

Solve.

$$3^{x+7} = \left(3^3\right)^{3x-4}$$

$3^{x+7} = 3^{9x-12}$

since bases are same

$x+7 = 9x-12$

$19 = 8x$

$19/8 = x$

$4^{7x} = 64^{2x-1}$

$4^{7x} = (4^3)^{2x-1}$

$4^{7x} = 4^{6x-3}$

$7x = 6x - 3$

$1x = -3$

$18^{x} = 5$

$\log_{18}$

$\log 18^{x} = \log 5$

$$\log_{18} 18^{X} = \log_{18} 5$$

$$X \cdot \log_{18} 18 = \log_{18} 5$$

$$X = \frac{\log 5}{\log 18}$$

0.5568

$$\log_3 7 + \log_3 10 = X$$

Property.

$$\log_b A + \log_b B = \log_b AB$$

$$\log_b A - \log_b B = \log_b \frac{A}{B}$$

$$\log_3 70 = X$$

Change of Base

day 1

Change of Base.

$$\frac{\log 70}{\log}$$

Change of Base.

$$\log_b M = \frac{\log M}{\log b}$$

$$X = \frac{\log 70}{\log 3}$$

$$X = 3.8672$$

$$f(x) = e^x$$

$$e^1 = 2.7183$$

$$\frac{1}{2} = e^{.02t}$$

use a $\log_e = \ln$

$$\ln .5 = \ln e^{.02t}$$

$$\frac{\ln .5}{.02} = \frac{.02t \cdot \ln e}{.02}$$

$\log_e = \ln$

$\log. = \log_{10}$

$\ln e = 1$

$\ln 1 = 0$

old Rules

$$-34.6573 = t$$

7.6 $\ln = \log_e$

old.

$$3^x = 5$$

$$\log_3 3^x = \log_3 5$$

$$x \cdot \log_3 3 = \log_3 5$$

$$e^x = 5$$

$$\ln e^x = \ln 5$$

$$x \cdot \ln e = \ln 5$$

$$57{,}000 = 10{,}000\, e^{.15t}$$

$$A = P \cdot e^{r \cdot t}$$

End Start rate

$$\frac{57{,}000 = 10{,}000\, e^{.15t}}{10{,}000}$$

$$5.7 = e^{.15t}$$

$$\ln 5.7 = \ln e^{.15t}$$

$$\frac{\ln 5.7}{.15} = \frac{.15t}{.15}$$

$$11.6031 \text{ yr.} = t$$

$$\boxed{11.6 \text{ yrs} = t}$$