

Algebra 2

Monday 10-22-12

Class Notes

Exponential Function

$$y = f(x) = ab^x$$

parent
function
 $a=1$

GRAPH $y = 2^x$
 $y = \left(\frac{1}{2}\right)^x$

$$b > 0$$

$$b \neq 1$$

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Ch. 4-1 Exponential Functions, Growth and Decay

$$A(t) = A_0(1 \pm r)^t$$

↑
Starting
Amount

↑
CHANGE
rate

↑
Number of
changes

$+$ = growth ($\text{base} > 1$)

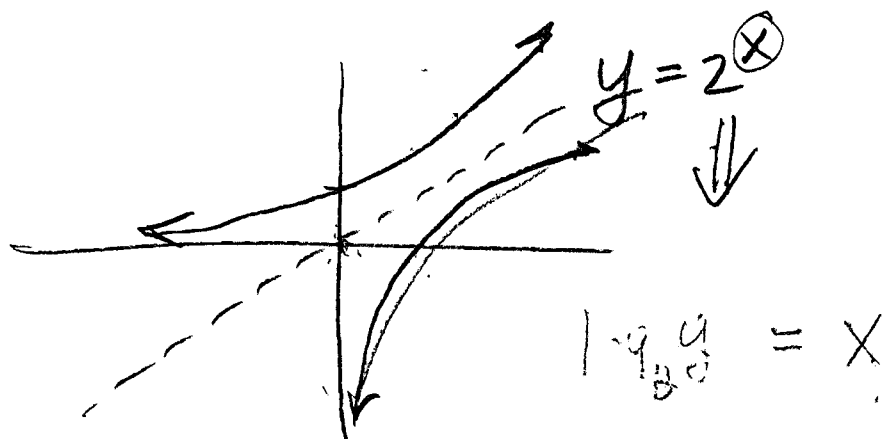
$-$ = decay ($0 < \text{base} < 1$)

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Ch. 4-2 Inverse Functions

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Ch 4-3 Logarithmic Functions



Ex $3^3 = 27$

$\log_3 27 = 3$

Ex $18^2 = 324$

$\log_{18} 324 = 2$

$y = 2^x$

$\log_2 y = x$ $f^{-1}(x)$

$\log_2 x = y$

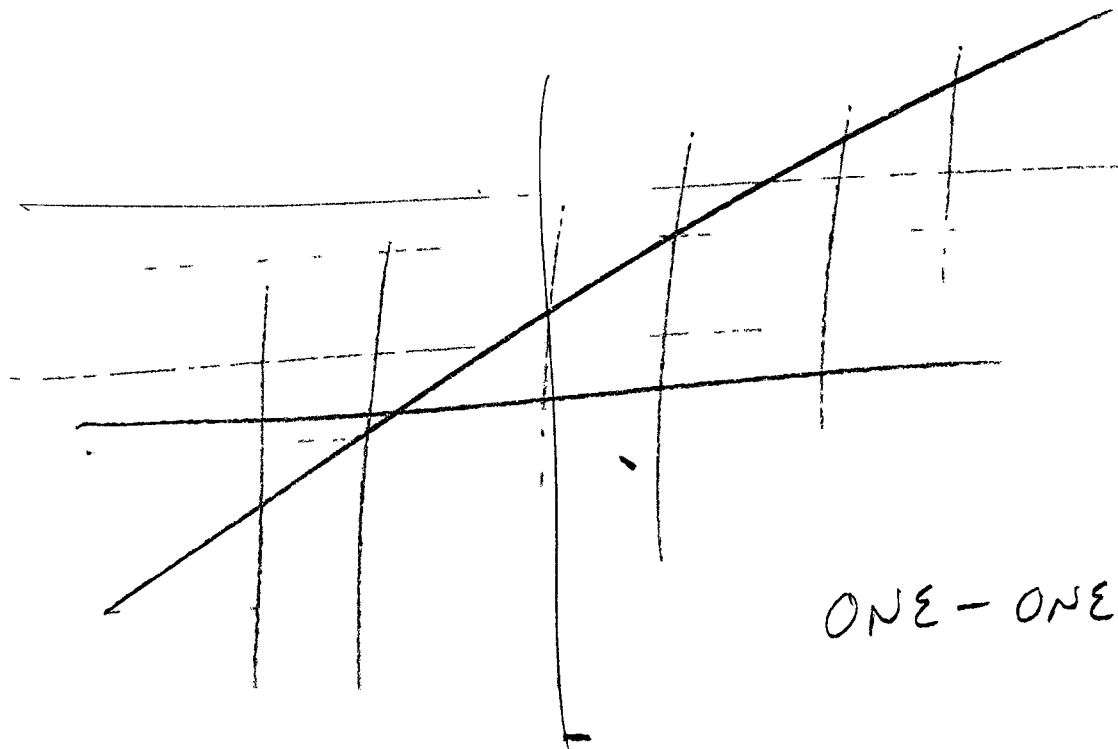
Ex $\log_{12} 144 = 2$

$12^2 = 144$

$\log 144 = ?$

UNDERSTOOD TO BE BASE 10
"Common log"

$10^x = 144$



Exponential function

A function where the independent variable, x is in the exponent

$$A = A_0 b^x$$

$$C = C_0 b^x$$

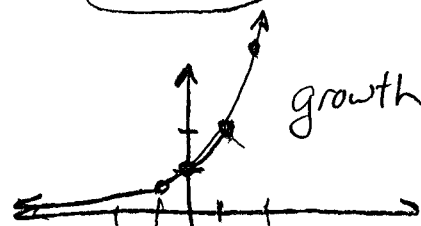
↑

$$y = ab^x$$

↑
STARTING VALUE

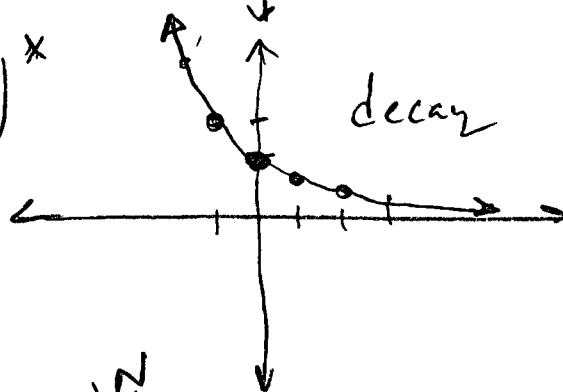
$$\begin{cases} b \neq 1 \\ b > 0 \end{cases}$$

$$y = 2^x$$



$$\left(\frac{1}{2}\right)^{-1} = \frac{1}{\frac{1}{2}}$$

$$y = \left(\frac{1}{2}\right)^x$$



$$y = 2^x$$

$$A = A_0 (1 \pm r)^N$$

↑
STARTING
VALUE

↑
RATE
OF
CHANGE
AS DECIMAL

↑
N, # of changes

$$A = 1(1 + 1.0)^x$$

$$f(x) = \{1, 3\}, \{-2, 6\}, \{5, 4\}$$

$$\{3, 1\}, \{6, -2\}, \{4, 5\}$$

$$y = f(x) = 2x + 3$$

$$f^{-1}(x) = y = 2x + 3$$

$$f^{-1}(x) \Rightarrow x = 2y + 3$$

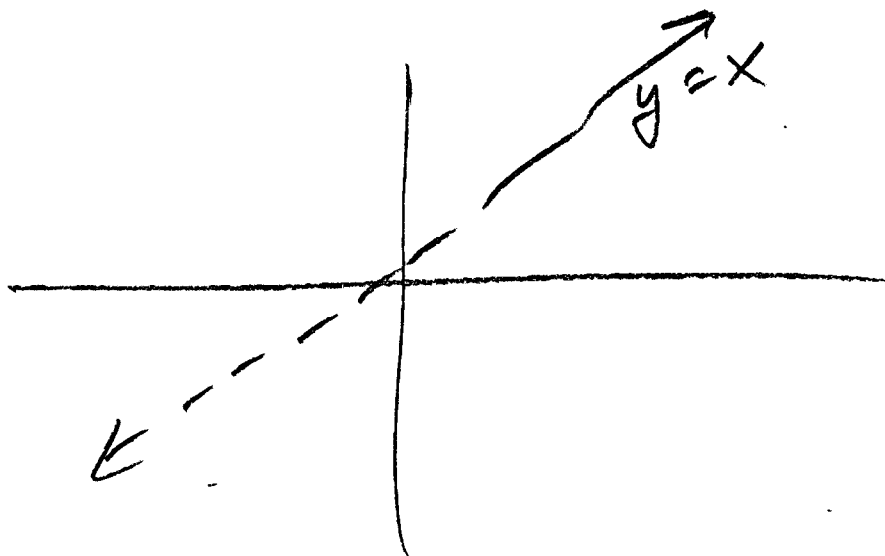
$$\frac{x-3}{2} = \frac{2y}{2}$$

$$f^{-1}(x) = y = \frac{x-3}{2}$$

$$\text{or } \frac{1}{2}x - \frac{3}{2}$$

$$f(x) = \overset{\text{test}}{(9, 21)}$$

$$f^{-1}(x) = \overset{\text{test}}{(21, 9)}$$



$$\log_6 216 = \boxed{3}$$

$$\log_2 \left(\frac{1}{8}\right) = -3$$

$$2^{-1} = \frac{1}{2^1}$$

$$2^{-2} = \frac{1}{2^2}$$

$$2^x = \boxed{\frac{1}{8}}$$

$$2^{\boxed{-3}} = \frac{1}{8} \quad \checkmark$$

$\frac{1}{2^3}$

$$\log_{125} (25) = ?$$

$$125^x = 25$$

$$x = \frac{2}{3}$$

$$125^{\frac{2}{3}} = \left(\sqrt[3]{125}\right)^2$$

(ex) $\log_{16} 4 = ?$

$$16^x = 4$$

$$16^{\frac{1}{2}} = 4$$

$$\boxed{\frac{1}{2}}$$

(ex) $\log_3 9 = 2$

(ex) $\log_4 1 = 0$

$$4^x = 1$$

(ex) $\log_2 4 = 2$

(ex) $\log_4 \left(\frac{1}{2}\right)$

$$4^x = \frac{1}{2}$$

$$4^{\boxed{\frac{1}{2}}} = \frac{1}{4^{\frac{1}{2}}} \checkmark$$