Math 112 Monday 11-5-12 Class Notes

(Ch 11-1)

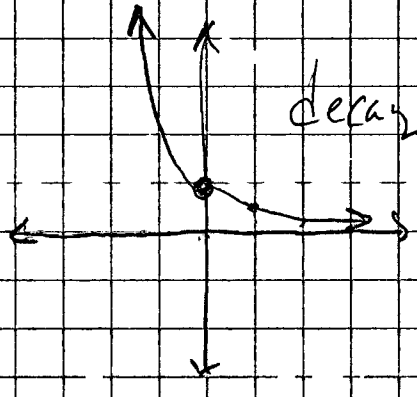
$y = f(x) = b^x$ EXPONENTIAL FUNCTION

$b \neq 1$

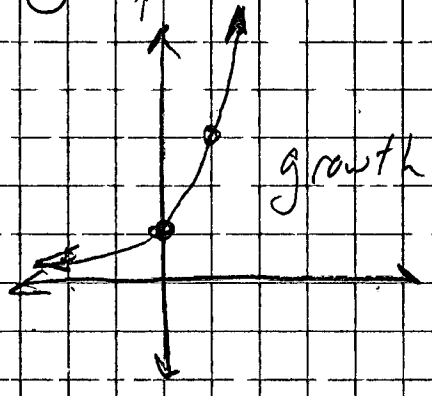
$b > 0$

$0 < b < 1$ | $b > 1$

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



$y = 2^x$



$b^x = b^y$ $x = y$

$8 = 2^x$

$2^3 = 2^x$ $x = 3$

Ex Pg 489

$8 = 2^3$ exp. form

$\log_2 8 = 3$ log form

$\frac{1}{27} = \left(\frac{1}{3}\right)^3$

$\log_{\frac{1}{3}}\left(\frac{1}{27}\right) = 3$

(Ex) $\log_4(-6) = ?$

↑

UNDEFINED

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

$\log_4\left(\frac{1}{16}\right) = -2$

(EX) $\log_5 25 = 2$ / $5^2 = 25$

(Pg 489) (EX) $\log_3 3 = 1$

(EX) $\log_6 1 = 0$

(EX) $7^{\log_7 5} = 5$

(EX) $\log_4 4^2 = 2$

(EX 1 PG 490) ① $\log_4 64 = x$

$4^x = 64$

$\boxed{x = 3}$

$\log 6 = ?$

↑ UNDERSTOOD TO BE 10

"COMMON LOGARITHM" log

$\ln 6 = ?$

↑ UNDERSTOOD TO be e

$\approx 2.718281828...$

$\log_4 21 = ?$ COB formula

$$2.19616 = \frac{\log 21}{\log 4} = \frac{\ln 21}{\ln 4}$$

$$4^{2.19616} \approx 21$$

Exp rule: MR for expo

$$a^m \cdot a^N = a^{M+N}$$

Log rule #1

$$\log_b m + \log_b N = \log_b (m \cdot N) \quad *$$

Exp rule: DR

$$\frac{a^m}{a^N} = a^{m-N}$$

Log rule #2

$$\log_b m - \log_b N = \log_b \left(\frac{m}{N}\right) \quad *$$

Exp rule: PPR

$$(a^m)^N = a^{m \cdot N}$$

Log rule #3

$$\log_b (m^N) = N \log_b (m) \quad *$$

(EX) PG495

$$\log_2(x) + \log_2(x+2) = 3$$

$$\log_2[(x)(x+2)] = 3$$

$$\log_2(x^2+2x) = 3$$

$$2^3 = x^2 + 2x$$

$$8 = x^2 + 2x$$

$$x^2 + 2x - 8 = 0$$

sum = 2
prod = −8
−2, +4

$$x = \{-4, 2\}$$

$x = -4$

$\log_2(-4) + \cdots$

↑ UNDEF

$x = 2$

$\log_2(2) + \log_2(2+2) \stackrel{?}{=} 3$

$1 + 2 \stackrel{?}{=} 3$

$\boxed{x = 2}$