Prof. Kincade

April 2 - Section 6.6

→ Equations with logs

- $\log_{(x+6)} 1 = 1$ look at your log rule!

→ $10^1 = x+6 \Rightarrow x = 4$

- $2\log_5 x = 3\log_5 4$

→ $2\log_5 x - 3\log_5 4$

→ $\log_5 x^2 - \log_5 64 = 0$

→ $\log_5 \left(\frac{x^2}{64}\right) = 0$

→ $5^0 = \frac{x^2}{64} \Rightarrow 1 = \frac{x^2}{64} \Rightarrow 64 = x^2 \Rightarrow x = +8, -8$ (-8) NO NEGATIVE LOG ARGUMENTS

32) $\log_a x + \log_a (x-2) = \log_a (x+4)$

→ $\log_a (x) + \log_a (x-2) - \log_a (x+4) = 0$

→ $\log_a \left(\frac{(x)(x-2)}{x+4}\right) = 0 \Rightarrow a^0 = \Rightarrow 1 = \frac{x^2-2x}{x+4}$

$x+4 = x^2-2x \Rightarrow 0 = x^2 - 3x - 4$

$= (x+1)(x-4)$

→ $x=-1$ (X), $x=4$ ✓

$x \neq -4 \neq 4$

4 is not -8, so it is ok to use.

Quadratic-Like Equations

→ $3^{2x} + 3^x - 2 = 0$ {SOLVE! ... but how?

☆ $a(x^2) + b(x) + c = 0$
→ the key unknown

→ $(3^x)^2 + 1(3^x)^1 - 2 = 0$

→ $(3^x + 2)(3^x - 1) = 0$

• $3^x = -2$; $3^x = 1$

• $\ln 3^x = \ln -2$ $\quad \ln 3^x = \ln 1$

• $x \cdot \ln 3 = \ln -2$ $\quad x \cdot \ln 3 = 0$

$x = \frac{\ln -2}{\ln 3}$ ✗ $\quad x = 0$ ✓

$\ln -2$ is undefined!

→ $36^x - 6 \cdot 6^x = -9$

$(6^2)^x - 6 \cdot 6^x + 9 = 0$

$(6^x)^2 - 6 \cdot 6^x + 9 = 0$

→ $(6^x - 3)(6^x - 3) = 0$

$6^x - 3 = 0 \Rightarrow \ln 6^x = \ln 3$

$x \cdot \ln 6 = \ln 3$

$x = \frac{\ln 3}{\ln 6}$

• $\ln x = x^3 - 1 \Rightarrow f(x) = \ln x \Rightarrow y_1$

$g(x) = x^3 - 1 \Rightarrow y_2$

} Graph em! Follow Along!