EXPONENTIAL EQUATIONS

$\left(\frac{1}{9}\right)^{4x} = 27^{x+2}$

Make common bases!

$\left(\frac{1}{3^2}\right)^{4x} = \left(3^3\right)^{x+2}$

$\left(3^{-2}\right)^{4x} = \left(3^3\right)^{x+2}$

$3^{-8x} = 3^{3x+6}$

$-8x = 3x + 6$

$+8x \quad +8x$

$\frac{-6}{11} = \frac{11x}{11}$

* Solve exp. equations
* e!
* Intro to logs
* Evaluate logs
* Graph logs??

$$\sqrt[3]{4^x} = \left(\frac{1}{8}\right)^{5-x}$$

$$\sqrt[3]{2^{2x}} = \left(\frac{1}{2^3}\right)^{5-x}$$

$$2^{\frac{2x}{3}} = \left(2^{-3}\right)^{5-x}$$

$$2^{\frac{2x}{3}} = 2^{-15+3x}$$

$$3\left[\frac{2x}{3} = -15 + 3x\right]$$

$$2x = -45 + 9x$$

$$\frac{45}{7} = \frac{7x}{7}$$

$$\frac{45}{7} = x$$

$$7^{x+2} = 5^{3x-1}$$

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e

Leonard Euler (Oiler)

$e = \left(1 + \frac{1}{n}\right)^n \approx 2.718$

$n=1 \quad \left(1+\frac{1}{1}\right)^1 = 2^1 = 2$

$n=2 \quad \left(1+\frac{1}{2}\right)^2 = 2.25$

$n=3 \quad \left(1+\frac{1}{3}\right)^3 = 2.37$

$n=4 \quad \left(1+\frac{1}{4}\right)^4 = 2.44$

Nature number

$2e^2 \cdot e^5 = 2e^7$

$\frac{4e^4}{28e^{9.4}} = \frac{1}{7e^5}$

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LOGARITHMS - used to solve for exponents!

Exp Func

$y = b^x$

$b > 0, b \neq 1$

Logarithms - inverse of an exp func

$y = b^x$

$x = b^y$

$y = \log_b x$

John Napier
1614 - astronomer

$\log_7 49 = 2$ ← argument

$7^2 = 49$

$y = x^3 - 4$

$x = y^3 - 4$

$\sqrt[3]{x+4} = \sqrt[3]{y^3}$

$2^5 = 32$

$5 = \log_2 32$

Logarithms represent EXPONENTS!

$5^3 = 125$

$3 = \log_5 125$

$\log_7 49 = 2$

$8^{\log_8 4}$

Evaluate.

$\log_6 36 = \log_6 6^2 = 2$

$\log_2 16 = \log_2 2^4 = 4$

$\log_3 \sqrt[5]{3^1} = \log_3 3^{1/5} = \frac{1}{5}$

$\log_{12} \frac{1}{144} = \log_{12} \frac{1}{12^2} = \log_{12} 12^{-2} = -2$

$\log_{11} \sqrt[3]{\frac{1}{121}} = \log_{11} \sqrt[3]{\frac{1}{11^2}} = \log_{11} \sqrt[3]{11^{-2}}$

$= \log_{11} 11^{-2/3}$

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

Common Logs	Natural Logs
$\log_{10} x = \log x$	$\log_e x = \ln x$

$\log_{10} 1000 = \log_{10} 10^3 = 3$

$\log 0.01 = \log_{10} 10^{-2} = -2$

$\ln e^8 = 8$

$\ln e^{2.63} = 2.63$

$e^{\ln 17} = 17$

$10^{\log 47} = 47$