

EXPONENTIAL EQUATIONS

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

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

$$(3^{-2})^{4x} = 3^{3x+6}$$

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

$$-8x = 3x + 6$$

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

$$y = b^x$$

$$b > 0, b \neq 1$$

Make
Common
bases!

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

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

Make common bases!

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

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

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

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

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

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

$$e \approx 2.718$$

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

$$\frac{\cancel{A}^7}{\cancel{28}^7 e^{9-7}} = \left(\frac{1}{7e^2}\right)$$

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

LOGARITHMS - used to

Exp
Func

$$y = b^x$$

$$b > 0, b \neq 1$$

Logarithms -
inverse of an
exp func

$$y = b^x$$

$$x = b^y$$

$$y = \log_b x$$

log, base b, of x

John Napier
1614
- astronomer

Exponential Form

$$y = b^x$$

Logarithmic Form

$$x = \log_b y$$

$$2^5 = 32$$

$$5 = \log_2 32$$

$$\log_7 49 = 2$$

$$7^2 = 49$$

Logarithms
represent
EXPONENTS!

$$5^3 = 125$$

$$3 = \log_5 125$$

$$\log_2 \frac{1}{8} = -3$$

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

$$8^{\log_8 4} = 4$$

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

Make
common
bases!

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

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

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

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

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

Common Logs

$$\log_{10} x = \log x$$

Natural Logs

$$\log_e x = \ln x$$

~~ln~~
ln

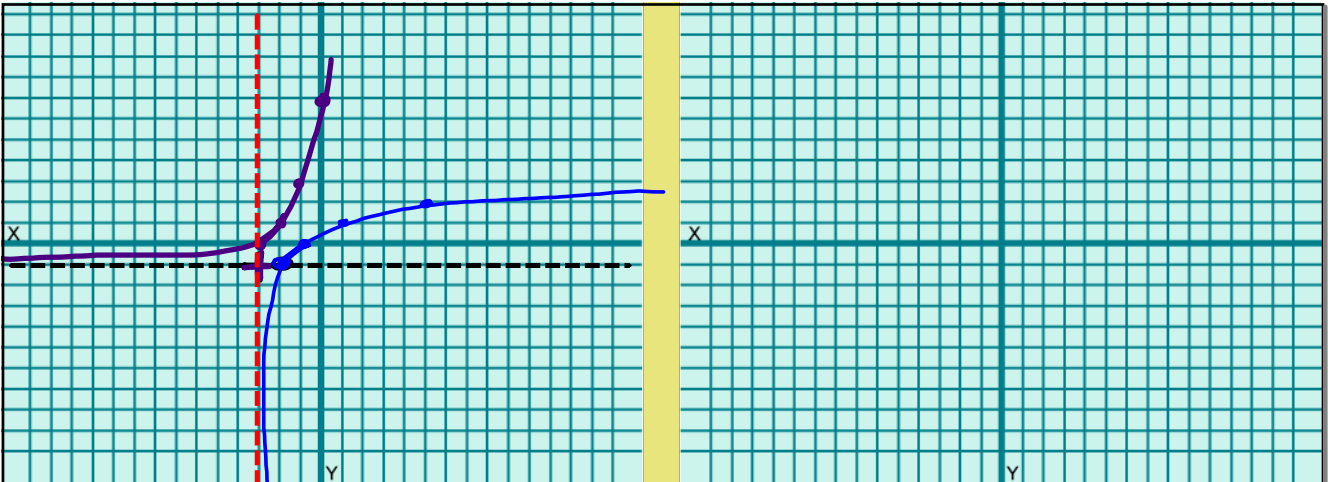
$$\log_{10} 1000 = \log_{10} 10^3 = 3$$

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

$$\ln e^8 = 8$$

$$\ln e^{2.63} = 2.63$$

$$e^{\ln 17} = 17$$



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

Left ₃ Down ₁

| | |
|---|---|
| 0 | 1 |
| 1 | 2 |
| 2 | 4 |
| 3 | 8 |

$$y = \log_2(x+3) - 1$$

Left ₃ Down ₁

| | |
|---|---|
| 1 | 0 |
| 2 | 1 |
| 4 | 2 |
| 8 | 3 |