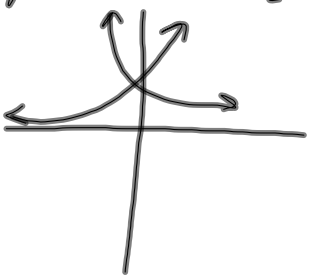
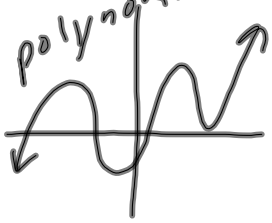
Exponential Equations



polynomial



Product Rule: Exponents

$$q^m q^n = q^{m+n}$$

same base, base

$$2^3 \cdot 2^2 = 2^{3+2} = 2^5$$

$$2^3 \cdot 5^2 = 2^3 5^2$$

Power Rule - Mutiply the exponents

$$(q^m)^n = q^{m \cdot n}$$

$$x^6 = (x^3)^2 = (x^3)(x^3) = x^6$$

$$(x \cdot x \cdot x)^2 = (x \cdot x \cdot x)(x \cdot x \cdot x) = x^6$$

Quotient Rule:

$$\frac{q^m}{q^n} = q^{m-n}$$

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

$$q^{-m} = \frac{1}{q^m}$$

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

$$\downarrow$$

$$x^{3+(-2)} = x \qquad = x$$

Ex: $\frac{X^3 Y^2 Z^{-2}}{X^2 Y^{-3}}$

Subtraction

Adding the opposite

$2-3=-1$

$2-(-3)=5$

$X Y^5 Z^{-2}$

$\Downarrow$

$\frac{X Y^5}{Z^2}$

$3^0 = 1$

$X^0 = 1$

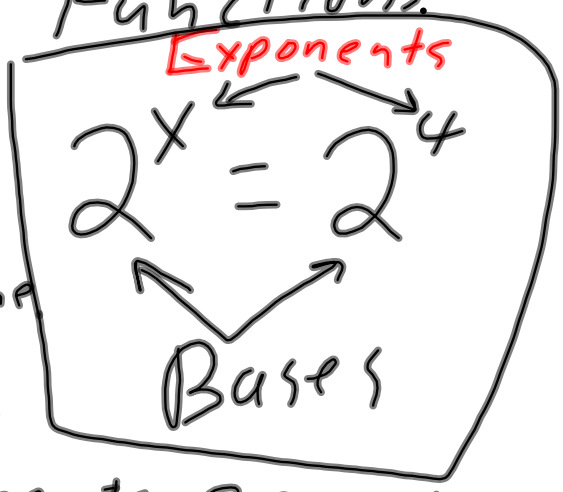
Solving Basic Exponential Functions

Steps:

1) Make sure the bases are the same

2) Cancel the Bases and set the exponents equal

3) Solve



$$2^x = 2^4$$
$$x = 4$$

$2^{x+2} = 2^4$

$x+2=4$

$-2 \quad -2$

$x=2$

$3^{5x-3} = 3^{2x}$

$5x-3 = 2x$

$-5x \quad -5x$

$-3 = -3x$

$\frac{-3}{-3} \quad \frac{-3x}{-3}$

$1 = x$