

Solving Exponential Equations

1) Make sure it is the same base.

2) Cancel the Base and set the exponents equal.

$$2^x = 2^3$$

Diagram illustrating the equation $2^x = 2^3$ with annotations:

- Red arrows point from the word "exponents" to the x and 3 .
- Green arrows point from the word "Base" to the 2 on both sides.

3) Solve

$$3^{1-2x} = 243$$

$$\cancel{3}^{1-2x} = \cancel{3}^5$$

$$\begin{array}{r} 1-2x = 5 \\ -1 \quad -1 \\ \hline -2x = 4 \\ \quad \quad \quad \underline{-2} \quad \underline{-2} \end{array}$$

$$\boxed{x = -2}$$

$$16^{2p-3} \cdot 4^{-2p} = 2^4$$

$$(2^4)^{2p-3} \cdot 4^{-2p} = 2^4$$

$$2^{4(2p-3)} \cdot (2^2)^{-2p} = 2^4$$

Power Rule

$(2^m)^n = 2^{m \cdot n}$

$$2^{8p-12} \cdot 2^{-4p} = 2^4$$

$$2^{(8p-12)+(-4p)} = 2^4 \quad X^2 \cdot X^3 = X^5$$

$$2^{4p-12} = 2^4$$

$$4p - 12 = 4$$

$$\begin{array}{r} 4p - 12 = 4 \\ +12 \quad +12 \\ \hline \end{array}$$

$$4p = 16$$

$$\cdot \cdot \cdot \frac{4}{4} \cdot \frac{4}{4} \dots \cdot \cdot \cdot$$

$p = 4$

Exponential Functions

$$y = ab^x \quad b > 0 \text{ and } b \neq 1$$

← exponent
← base

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

2 types of Exp. Behavior

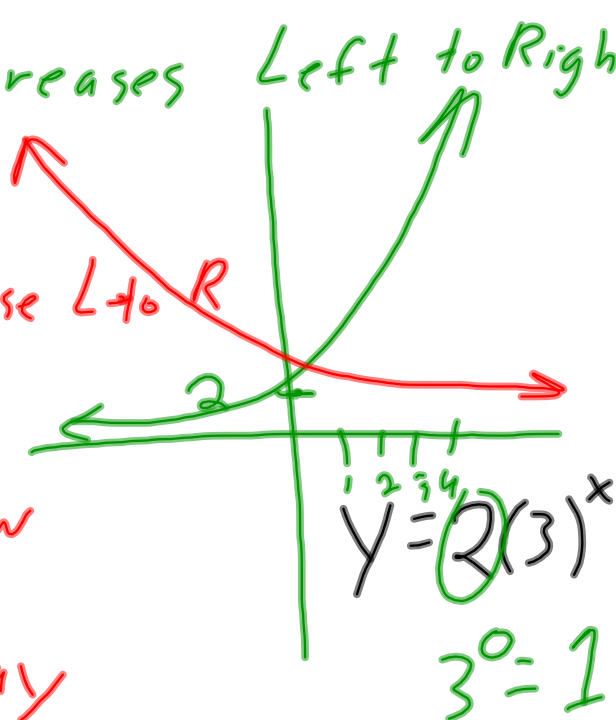
Growth - increases Left to Right

Decay - decrease L to R

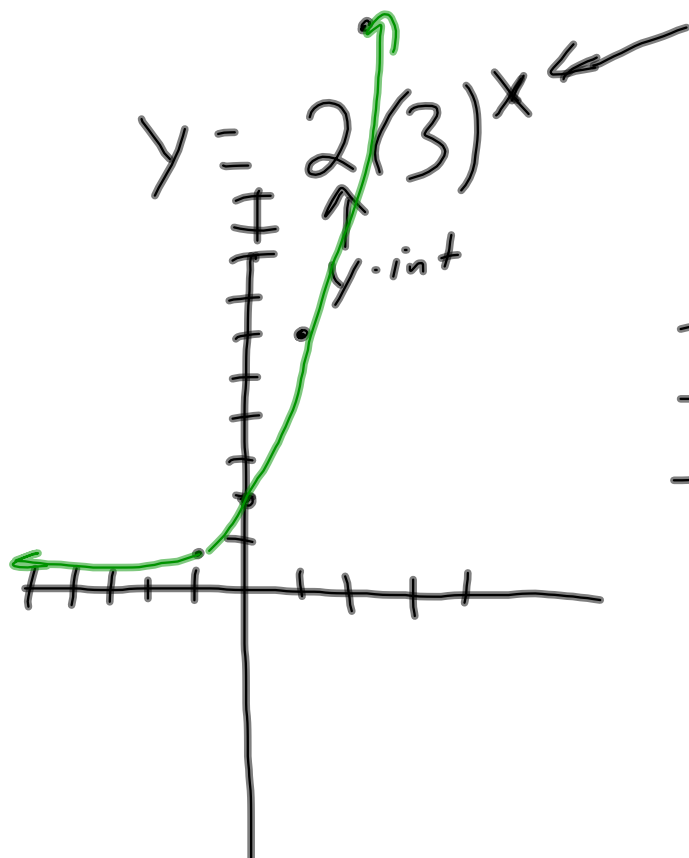
$$y = ab^x$$

$b > 1$ Grow

$0 < b < 1$ Decay



a = represents the y -intercept.



x	$2(3)^x$	y
-1	$2(3)^{-1}$	$\frac{2}{3}$
0	$2(3)^0$	2
1	$2(3)^1$	6
2	$2(3)^2$	18
3	$2(3)^3$	54