February 08, 2016

Review Exponents

Properties of Exponents

1. $a^n \cdot a^m = a^{n+m}$

Ex $3^2 \cdot 3^7 = 3^9$

Ex $3^{\sqrt{2}} \cdot 3^{\pi} = 3^{\pi+\sqrt{2}}$

2. $(a^n)^m = a^{nm}$

Ex $(a^3)^7 = a^{21}$

Ex $(a^{\pi})^2 = a^{2\pi}$

note: not the same as a^{n^m}

Ex $a^{3^7} = a^{2187}$

3. $a^{-1} = \frac{1}{a}$

Ex $3^{-1} = \frac{1}{3}$

Ex $3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

4. $\frac{a^n}{a^m} = a^n \cdot \frac{1}{a^m} = a^n \cdot a^{-m} = a^{n-m}$

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

5. $a^0 = 1$ if $a \neq 0$

Fractional Exponents

$2^1 = 2$
$2^2 = 4$
$2^3 = 8$
$2^4 = 16$

$2^0 = 1$
$2^{-1} = 1/2$

$2^{1/2} = \sqrt{2}$

$\sqrt{4} = 2$
$\sqrt{2^2} = 2$
$(2^2)^{1/2} = 2$

$2^{1/2} \cdot 2^{1/2} = 2^1$

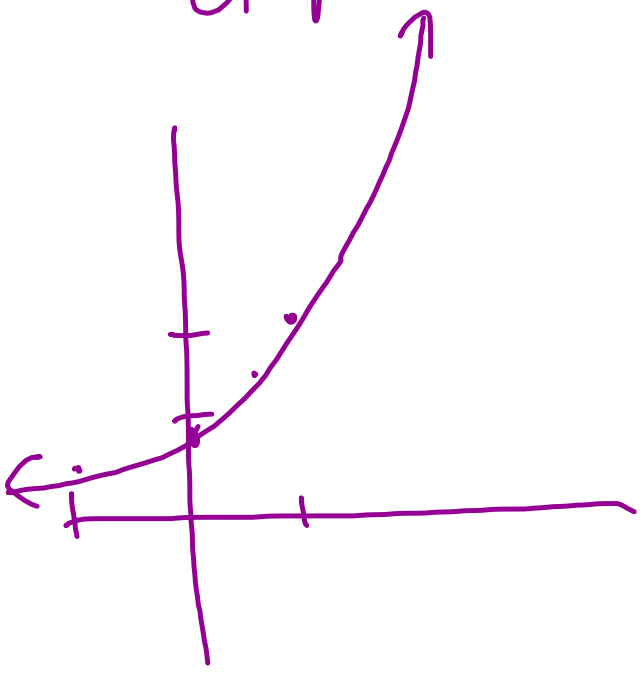
$2^{1/3} \cdot 2^{1/3} \cdot 2^{1/3} = 2^1$

$2^{1/3} = \sqrt[3]{2} \rightarrow 2^{1/n}$ nth root of 2: $\sqrt[n]{2}$

Ex $2^{2/3} = (2^{1/3})^2 = (\sqrt[3]{2})^2$

$\hookrightarrow (2^2)^{1/3} = \sqrt[3]{2^2}$

Graph out:



x	$y = 2^x$
0	1
$\frac{1}{2}$	$\sqrt{2}$
1	2
2	4
3	8

Binomial Theorem

$$(a+b)^n = a^n + \binom{n}{1}a^{n-1}b^1 + \binom{n}{2}a^{n-2}b^2 + \binom{n}{3}a^{n-3}b^3 + \cdots + \binom{n}{n-1}a^1 b^{n-1} + \binom{n}{n}b^n$$