

"Square": 2nd power  
 "cube": 3rd power

# 1<sup>o</sup> Introduction to Exponents (Powers)

Multiplication (form of Addition)

ex)  $3 \times 4$  means  $3+3+3+3 = 12$

Powers (form of Multiplication)

"3 to the 4th power"

ex)  $3^4$  means  $3 \cdot 3 \cdot 3 \cdot 3 = 81$

$x^0$  or  $y^x$   
 or  $x^y$

ex)  $x^4$  means  $x \cdot x \cdot x \cdot x$

Mult exps

ex)  $x^4 \cdot x^3$  means  $x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x = x^7$

Rule: add exponents

div exps

ex)  $\frac{x^4}{x^3}$  means  $\frac{x \cdot x \cdot x \cdot x}{x \cdot x \cdot x} = x^1$

Rule: Subt exponents

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ex)  $\frac{x^5}{x^5}$  means  $\frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x \cdot x \cdot x \cdot x} = 1 = x^{5-5} = x^0$

zero exponent

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ex)  $\frac{x^2}{x^5}$  means  $\frac{x \cdot x}{x \cdot x \cdot x \cdot x \cdot x} = \frac{1}{x^3} = x^{2-5} = x^{-3}$

negative exponent

ex)  $x^{-1} = \frac{1}{x^1}$

ex)  $\frac{x^{-2} y^5}{x^3 y}$

$\frac{x^{-2} y y y y y}{x x x \cdot y}$

$\frac{y y y y y}{x x \cdot x x x \cdot y} = \frac{y^4}{x^5}$

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

$\frac{x^{-2-3} y^{5-1}}{x y}$

$\frac{x^{-5} y^4}{x y} = \frac{y^4}{x^6}$

- reciprocate (fraction) what?
- does not mean the answer is negative