

WED 1/30

Exponents and Radical Expressions

P-2

I. Positive Integer Exponents e.g. 2^3

II. Zero as an Exponent e.g. 2^0

III. Negative Integer Exponents e.g. 2^{-3}

IV. Rational (Fractional) Exponents e.g. $8^{\frac{2}{3}}$, $27^{-\frac{4}{3}}$

* NEED SCIENTIFIC CALCULATOR.



Exponents and Radical Expressions

P-2

I. Positive Integer Exponents

e.g. 2^3 ← exponent / power.
 ← base.

use a base 2 as a factor (for multiplication) for 3 times.

$$(1), 2^3 = 2 \cdot 2 \cdot 2 = 8$$

$$(2), 5x^3 = 5(x \cdot x \cdot x)$$

↑ "5" is a coefficient.

* The base is the factor immediately adjacent to the exponent UNLESS a parenthesis tells you differently.

$$(3), xy^3 = x \cdot (y \cdot y \cdot y)$$

$$(xy)^3 = (xy) \cdot (xy) \cdot (xy)$$

calculator example:

$$\text{Q } (3.279)^4 = 115.6020849 \approx 115.60$$

$$\boxed{3.279} \boxed{x^4} \boxed{4} \boxed{=}$$

$\boxed{\wedge}$ (if you have a CASIO)

$$\text{Q } -2^4 = -16$$

coefficient = -1, base = 2, power = 4

$$(\text{neg})^{\text{even}} = \text{pos.}$$

$$\frac{(-)(-)}{(+)} \frac{(-)(-)}{(+)} \rightarrow (+)$$

$$(\text{neg})^{\text{odd}} = \text{neg.}$$

$$\frac{(-)(-)}{(+)} \frac{(-)(-)}{(+)} (-) \rightarrow (-)$$

$$(1)^{425} = 1.$$

$$(-1)^{379} = -1.$$

FIRST PROPERTY OF EXPONENT.

$$x^3 \cdot x^2 = (x \cdot x \cdot x) \cdot (x \cdot x) = x^5 = x^{(3+2)}$$

same base

$$2x^4 \cdot 5x^3 = 10x^7 = (2 \cdot 5) x^{(4+3)}$$

$$a^3 \cdot a^7 \cdot a = a^{11} = a^{(3+7+1)}$$

if no visible exponent, then the base is raised to the 1st power

$$4xy^2z^3 \cdot 5x^2y^2z \cdot 2xyz = (4 \cdot 5 \cdot 2) \cdot x^{(1+2+1)} \cdot y^{2+2+1} \cdot z^{3+1+1}$$
$$= 40x^4y^5z^5$$

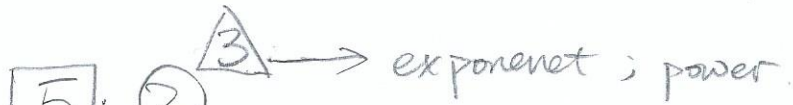
$$a^4 \cdot b^3 = a^4 \cdot b^3$$

THEY DO NOT HAVE THE SAME BASE
THEREFORE DO NOT ADD EXPONENTS.

QUIZ: T F T F T F T F T T

WEBASSIGN - P2. EXPONENTS AND RADIC

• POSITIVE INTEGER EXPONENT.



base: defined as the factor immediately adjacent to the exponent UNLESS a parenthesis tells you otherwise
 coefficient

This expression equals $5 \cdot (2 \cdot 2 \cdot 2)$

USE THE BASE AS A FACTOR TO MULTIPLY FOR (exponent) NUMBER OF TIMES.

e.g. $5 \cdot x^3 = 5 \cdot (x \cdot x \cdot x)$

$x \cdot y^3 = x \cdot (y \cdot y \cdot y)$

$(xy)^3 = (xy) \cdot (xy) \cdot (xy)$

RULE:

DO EXPONENT FIRST.

THEN MULTIPLY BY THE COEFFICIENT.

-2 ⁴	$(-2)^4$	
$-2^4 = -16$	$(-2)^4 = 16$	
2	-2	base
4	4	power
-1	1	coefficient

PROPERTY OF EXPONENT

(1).

$$\text{e.g. } x^3 \cdot x^2 = (x \cdot x \cdot x) \cdot (x \cdot x) = x^5$$

\ /
same base

$$2x^4 \cdot 5x^3 = 10x^7$$

$$a^3 \cdot a^7 \cdot a = a^{11} \quad \star \text{ no visible exponent, it is 1.}$$

$$4x^4y^2z^3 \cdot 5x^2y^2z \cdot 2xyz = 40x^4y^5z^5$$

$$\rightarrow \star a^4 \cdot b^3 = a^4b^3 \quad \rightarrow \text{NOT THE SAME BASE, DO NOT ADD EXPONENTS}$$