Shannon

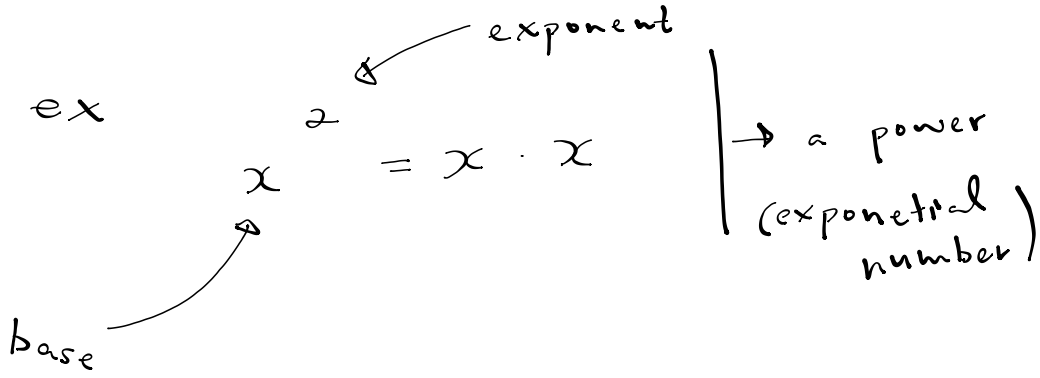
ressources

- website
- Shannon
- peers
- google/internet

- textbook – bookstore 6–6:30
  1st floor cash only
- Sally
- library

- name
- why are you taking math
- what energizes you?
- one interesting thing about yourself.

Unit 1: Laws of Exponents



ex $2^3 = 2 \cdot 2 \cdot 2 = 4 \cdot 2 = 8$

ex $\left(\frac{2}{3}\right)^2 = \frac{2}{3} \cdot \frac{2}{3} = \frac{4}{9}$

ex. 

Nota Bene: Brackets are important!

$-2^4 = -2 \cdot 2 \cdot 2 \cdot 2 = -16$

negative not part of base

$(-2)^4 = -2 \cdot -2 \cdot -2 \cdot -2 = 16$

because of the brackets, negative is part of the base

* if the power is odd, the base stays negative

$(-2)^3 = -2 \cdot -2 \cdot -2 = -8 = -2^3$

$4 \cdot -2$

1st Law of Exponents

$$a^m \times a^n = a^{m+n}$$

$$r\,a^m \times s\,a^n = r \cdot s\,a^{m+n}$$

e.x. $2^6 \times 2^3 = 2^{6+3} = 2^9$

$-7\,3x^2 \cdot 2x^{-1}$

$= 6x^{2+(-1)}$

$= 6x$

e.x. $x^4 \cdot x^2 =$

$2^2 \cdot 2^1 = 2^3$

$y^4 \cdot y^{-1} =$

$x^2 \cdot y^2 = x^2 y^2$

$2^4 \times 8 = 2^4 \times 2^3 = 2^{4+3} = 2^7$

↳ rewrite 8 as a power of 2!

e.x. $3^2 \cdot 27 = 3^2 \cdot 3^3 = 3^5$

e.x. $-2^2 \cdot 4 = -2^2 \cdot 2^2 = -2^4$

$(-2)^2 \cdot 4 = 2^2 \cdot 2^2 = 2^4$

2nd Law:

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

$$\frac{ra^m}{sa^n} = \frac{r}{s}a^{m-n}$$

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

BEDMAS

e.x. $\frac{2^2}{2^1} = 2^{2-1} = 2$

$\frac{6x^3}{3x^2} = 2x^{3-2} = 2x$

$\frac{3x^3 \cdot x}{x^2} = 3x^{4-2} = \frac{3x^4}{x^2} = 3x^2$

3rd Law

$$a^{-n} = \frac{1}{a^n} \qquad r\,a^{-n} = \frac{r}{a^n}$$

$$\frac{1}{a^{-n}} = a^n$$

ex. $\frac{4y^2 \cdot y}{y^5} = \frac{4y^3}{y^5}$

$= 4y^{3-5} = 4y^{-2}$

$= \frac{4}{y^2}$

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

4th Law :

$a^0 = 1$

$00^0 = 1$

5th Law

$$(a^m)^n = a^{m \times n}$$

ex. $(7^2)^3 =$

$(x^2)^{-1} =$

$(x^3)^4 =$

6th Law

$$(abc)^m = a^m b^m c^m$$

e.x. $(2x^2y)^4 \overset{(6)}{=} 2^4 (x^2)^4 y^4 \overset{(5)}{=} 2^4 x^{2\times 4} y^4$

$= 2^4 x^8 y^4$

e.x $(3x^2y^{-3})^2 \overset{(6)}{=} 3^2 (x^2)^2 (y^{-3})^2 \overset{(5)}{=}$

$= 3^2 x^4 y^{-6} \overset{(3)}{=}$

$= \frac{3^2 x^4}{y^6}$

SAMPLE

e.x. $(-2x^{-\frac{1}{3}}y^2)^3 \overset{(6)}{=} (-2)^3 (x^{-\frac{1}{3}})^3 (y^2)^3 \overset{(5)}{=}$

$= -2^3 x^{-\frac{1}{3}\times\frac{3}{1}} y^6 = -2^3 x^{-1} y^6 = \frac{-2^3 y^6}{x}$

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

7th Law

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

e.x. $\left(\frac{3^2}{x^5}\right)^3 = \frac{(3^2)^3}{(x^5)^3} = \frac{3^{2\times 3}}{x^{5\times 3}} = \frac{3^6}{x^{15}}$

---

e.x. $\left(\frac{3x^2}{xy}\right)^{-2}$

$\left(\frac{3x^{2-1}}{y}\right)^{-2}$

$\left(\frac{3x}{y}\right)^{-2} = \frac{(3x)^{-2}}{y^{-2}}$

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

SAME

$\left(\frac{4x^2\cdot x}{y^{-2}}\right)^3$

$\left(\frac{4x^3}{y^{-2}}\right)^3$

$\frac{4^3(x^3)^3}{(y^{-2})^3}$

$\frac{4^3x^9}{y^{-6}} = 4^3x^9y^6$

Salut! / Coucou!

Scientific Notation

(a way to rewrite extremely large (small) numbers)

ex.

$52,712,416.0$

* S.N. has one number infront of decimal point.

5.27×10^{7}

ex.

$0.000\,000\,000\,000\,246$

2.46×10^{-12}

Evaluate :

$1.60 \times 10^{5} \div 6.4 \times 10^{-8}$

$$\frac{1.60 \times 10^{5}}{6.4 \times 10^{-8}} = 0.25 \times 10^{5-(-8)}$$

$$= 0.25 \times 10^{13}$$

$$= 2.5 \times 10^{-1} \times 10^{13}$$

$$= 2.5 \times 10^{12}$$

$6.3 \times 10^{-6} \div 0.3 \times 10^{9}$

$2.3 \times 10^{4} \times 6.9 \times 10^{-2}$