HINDU-ARABIC NUMERALS

hindu-arabic numerals

Exponents

exponent or power

$$b^n = \underbrace{b \cdot b \cdot b}_{\text{b appears as a factor n times}}$$

base

expression	read	evaluation
8^1	8 to the first power	$8^1 = 8$
5^2	5 squared	$5^2 = 5 \cdot 5 = 25$
6^3	6 cubed	$6^3 = 6 \cdot 6 \cdot 6 = 216$
10^4	10 to the fourth power	$10^4 = 10 \cdot 10 \cdot 10 \cdot 10 = 10{,}000$
2^5	2 to the fifth power	$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$

examples

In Expanded Form

- The place value of the first digit on the right is 1
- The place value of the second digit from the right is 10.

The place value of the third digit from the right is 100 or 10^2.

$$663 = (6 \times \underset{10^2}{\underset{\uparrow}{10^2}}) + (6 \times \underset{10}{\underset{\uparrow}{10^1}}) + (3 \times \underset{1}{\underset{\uparrow}{1}})$$

Begin by showing all powers of 10, starting with the highest exponent given. Any power of 10 that is left out is expressed as 0 times that power of 10.

$$7054 = (7 \times 10^3) + (0 \times 10^2) + (5 \times 10^1) + (4 \times 1)$$

$$600{,}080 = (6 \times 10^5) + (0 \times 10^4) + (0 \times 10^3) + (0 \times 10^2) + (8 \times 10^1) + (0 \times 1)$$

The Babylonian Numeration System

The Babylonians left a space to distinguish that various place values in a numeral from one another.

$$\overset{\vee}{\downarrow} \qquad \overset{\angle}{\downarrow} \qquad \overset{\vee\vee}{\downarrow}$$

$$= (1 \times 60^2) + (10 \times 60^1) + (1+1) \times 1$$

$$= (1 \times 3600) + (10 \times 60) + (2 \times 1)$$

$$= 3600 + 600 + 2 = 4202$$

$\angle\angle = (10+10)$

$\vee = +1$

$\vee\vee = (1+1)$

$\angle\angle\vee = (10+10+1)$