Patterns with multiplying by 10

Exponential

Factors	Product	As a product of 10s	Exp. Form
10 x 1 =	10	10	10^1
10 x 10 =	100	10 x 10	10^2
10 x 100 =	1,000	10 X 10 X 10	10^3
10 x 1,000 =	10,000	10 x 10 x 10 X 10	10^4
10 x 10,000 =	100,000	10 x 10 x 10 x 10 x 10	10^5

$10^0 = 1$

$5^0 = 1$

$3^0 = 1$

$10^1 = 10$

$5^1 = 5$

$3^1 = 3$

10 is used as a factor six times.

$$1{,}000{,}000 = 10 \times 10 \times 10 \times 10 \times 10 \times 10$$

You can write the repeated multiplication of a number in exponential form.

$$1{,}000{,}000 = 10^6$$

The base is the number that is repeatedly multiplied.

The exponent or power is the number of times the base is used as a factor.

Vocabulary

exponential form: a value written with both a base and an exponent (power)

7^4 5^3 3^9

base: the part of a value written in exponential form that is repeatedly multiplied

exponent (power): the part of the a value written in exponential form that tells how many times to multiply the base by itself

exponential form	**exponential form** A way of writing repeated multiplication of a number using exponents. $2 \times 2 \times 2 = 2^3$
base	$5^2 = 5 \times 5$ **base** 2^3 A number multiplied by itself the number of times shown by an exponent.
exponent or power	$5^4 = 5^1 \times 5^2 \times 5^3 \times 5^4$ **exponent or power** The number of times the base is repeatedly multiplied. 3

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Vocabulary

10^5

10 is the base

5 is the exponent or power

We read this as, "ten to the fifth power."

It means 10 x 10 x 10 x 10 x 10.

Writing other values
in expanded form and
expanded form with exponents

Standard form: 42,367

Expanded Form: $40{,}000 + 2{,}000 + 300 + 60 + 7$

$(4 \times 10{,}000) + (2 \times 1000) + (3 \times 100) + (6 \times 10) + 7$

Expanded Form with exponents
(exponential form): $(4 \times 10^4) + (2 \times 10^3) + (3 \times 10^2) + (6 \times 10^1) + (7 \times 10^0)$