Edgenuity®

Warm-Up | Numerical Expressions with Exponents
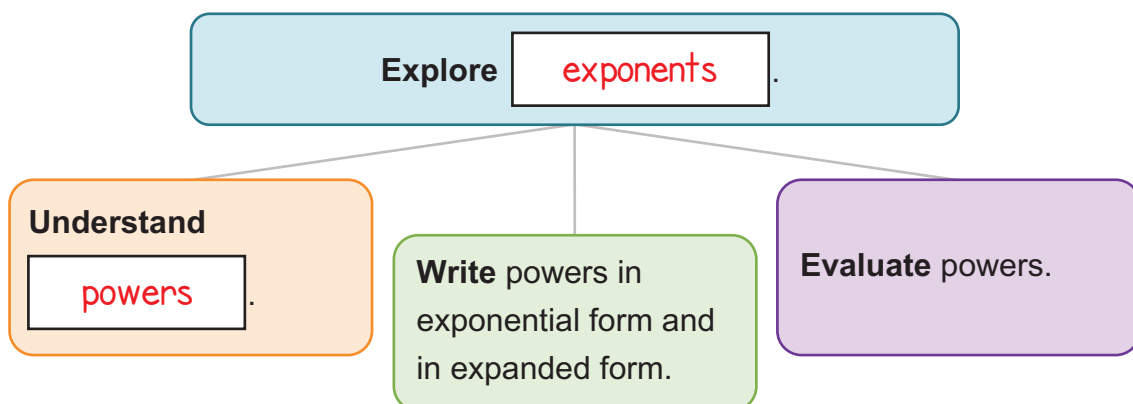
Lesson Question What are powers and exponents?

Lesson Goals

Explore exponents .

Understand powers .

Write powers in exponential form and in expanded form.

Evaluate powers.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

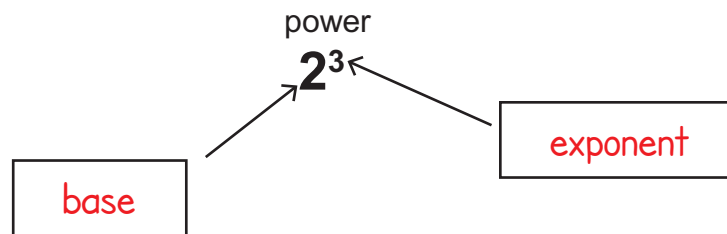| evaluate	to determine the value of
base	the number in an exponential expression that is being multiplied by itself
exponent	the number in an exponential expression that indicates how many factors of the base are being multiplied
power	a base raised to an exponent

Understanding Powers

A power is a base raised to an exponent.

power

2^3

exponent

base

The number 2^3 is " 2 raised to the third power" or "two cubed ."

A power is a shorter way to write repeated multiplication.

$$2^3 = 2 \times 2 \times 2$$

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

Writing Powers

Powers can be written in exponential form or in expanded form.

- Exponential form

  7^5

- Expanded form

  $7 \times 7 \times 7 \times 7 \times 7$

Instruction | Numerical Expressions with Exponents

Slide 4

Exponential Form		Expanded Form
7^5	$=$	$7 \times 7 \times 7 \times 7 \times 7$
$(0.5)^2$	$=$	$\boxed{0.5} \times \boxed{0.5}$
$\left(\boxed{\dfrac{1}{3}}\right)^4$	$=$	$\dfrac{1}{3} \times \dfrac{1}{3} \times \dfrac{1}{3} \times \dfrac{1}{3}$

Exponential Form of a Fractional Base

When the base is a fraction, both the $\boxed{\text{numerator}}$ and denominator are raised to the $\boxed{\text{exponent}}$.

- Exponential form of a fractional base:

$$\left(\frac{2}{3}\right)^4 = \left(\frac{2}{3}\right) \times \left(\frac{2}{3}\right) \times \left(\frac{2}{3}\right) \times \left(\frac{2}{3}\right)$$

- Not an exponential form of a fractional base:

$$\frac{\boxed{2^4}}{3} = \frac{2 \times 2 \times 2 \times 2}{3}$$

$$\frac{2}{3^4}$$

Neither one of these is the exponential form of a $\boxed{\text{fractional}}$ base.

Slide 7

Evaluating Powers

PROCEDURE

To **evaluate**, or find the value of, a power, follow these steps:

- Identify the base and the exponent.

- Write it in expanded form.

- Find the product .

base $\nearrow 2^4 \leftarrow$ exponent

$2 \times 2 \times 2 \times 2$

$4 \times 2 \times 2$

8×2

16

2^4 is equal to 16.

Slide 9

Evaluating Powers

To evaluate a power:

1. Identify the base and the exponent .

2. Write it in expanded form.

3. Find the product.

Evaluate $\left(\dfrac{3}{4}\right)^2$.

$$\left(\frac{3}{4}\right)^2 = \left(\frac{3}{4}\right)\left(\frac{3}{4}\right) = \frac{3 \times \boxed{3}}{4 \times \boxed{4}} = \frac{9}{\boxed{16}}$$

Slide

9

Evaluate $(0.2)^3$.

$$(0.2)^3 = \boxed{0.2} \times 0.2 \times 0.2$$

$$\boxed{0.04} \times 0.2$$

$$\boxed{0.008}$$

Summary | Numerical Expressions with Exponents

Lesson Question	What are powers and exponents?

Answer

A power is a base raised to an exponent. An exponent tells how many times to use the base as a factor.

Use this space to write any questions or thoughts about this lesson.