

Math 8 Notes

Lesson 1 Introduction to Exponents

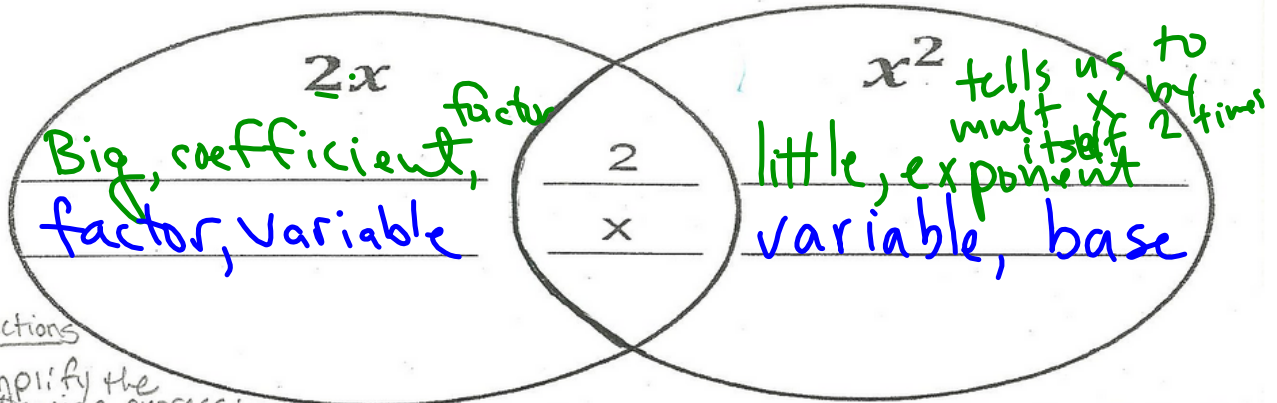
Goal: to read, write and evaluate expressions involving exponents

NAME: _____

Vocabulary

Exponent / **power** tells us how many times to use the base as a factor
 Base the factor being repeatedly multiplied

Compare the two expressions: $2x$ and x^2



Directions

Simplify the following expressions.

① $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5$
 $= 5^5$

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

③ $-2 \cdot -2 \cdot -2 \cdot -2$
 $= (-2)^4$

Big Idea: A single quantity can be represented by many different expressions.

How do I write expressions using powers?

$(-3) \cdot (-3) \cdot (-3) \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$
 $= (-3)^3 \cdot 2^5$

Use the properties of operations to rewrite and group like bases together.

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

Commutative

Always use parenthesis when expressing a fraction raised to a power!! $\frac{1}{2} * \frac{1}{2} * \frac{1}{2} * \frac{1}{2} * \frac{1}{2} = \left(\frac{1}{2}\right)^5$

Write each expression using exponents.

A) $8 * 9 * 9 * 9 * 8 * 8 * 8$ _____ B) $\frac{2}{3} * \frac{2}{3} * \frac{2}{3}$ _____

How do I evaluate expressions involving powers?

Evaluate $5^3 * 4$ _____

To evaluate an expression means to find its value.

When explaining how to evaluate the expression 3^4 , Martha said to Ty: "Just multiply 3 by itself 4 times"

Is she right? Explain. _____

Write the following examples in simplest form

① $(11 \cdot 11 \cdot 11 \cdot 11 \cdot 11 \cdot 11) \cdot (11 \cdot 11 \cdot 11 \cdot 11)$ ② $\frac{(6 \cdot 6 \cdot 6 \cdot 6 \cdot 6)}{(6 \cdot 6 \cdot 6)}$

③ $(y \cdot y \cdot y) \cdot (y \cdot y \cdot y \cdot y)$ ④ $\frac{(b \cdot b \cdot b \cdot b)}{(b \cdot b)}$

Answer the question: How can I write repeated multiplication using powers?

$$2^2 = \underline{2} \times \underline{2} \quad 2^3 = \underline{2} \times \underline{2} \times \underline{2}$$

$$\text{So, } (2^2)(2^3) = 2^5$$

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

$$(5^4)(5^2) = 5^{\boxed{6}}$$

$$3^0 \cdot 3^1 \cdot 3^2 = 3^{\boxed{3}}$$

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

$$\frac{2^6}{2^3} = \frac{\cancel{2} \times \cancel{2} \times \cancel{2} \times 2 \times 2 \times 2}{\cancel{2} \times \cancel{2} \times \cancel{2}} = 2^3$$

$$\frac{8^3}{8^1} = 8^{\boxed{2}}$$

$$\frac{2^5}{2^4} = 2^{\boxed{1}}$$

$$\frac{5^2}{5^2} = 5^{\boxed{0}}$$