Review of Exponential Notation

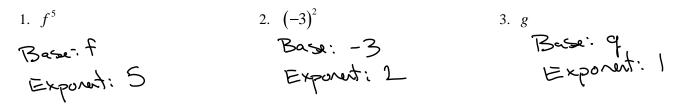
An exponent is used to show repeated multiplication of the base.

Definition of b^n Let *b* represent any real number and *n* represent a positive integer. Then $b^n = \underbrace{b \cdot b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdot b \cdot b \cdots b}_{a \to a} \underbrace{b \cdot b \cdots b}_{a \to a} \underbrace$

n factors of b

Note: If no exponent is explicitly written for an expression, then the expression has $\frac{4}{2} \times \frac{1}{2}$ an implied exponent of 1. For example, $x = x^1$.

For exercises 1 - 3, identify the base and the exponent.



4. What is the exponent for the factor of 3 in the expression $3c^8$.

For exercises 5 - 7, write the expression using exponents.

5.
$$-3 \cdot m \cdot m \cdot m \cdot m$$

 $-3m^{4}$
(5a)(5a)(5a)
7. $\frac{2 \cdot x \cdot x \cdot x}{(y+3)(y+3)}$
 $\frac{2m^{3}}{(y+3)^{2}}$

Evaluating Expressions with Exponents

For exercises 8 and 9, evaluate the two expressions and compare the answers. Do the expressions have the same value?

$$4 = 8 \cdot (-4)^{2} \text{ and } -4^{2} \quad 4 = 16$$

$$(-4)^{2} = (-4)(-4) = 16$$

$$Base: -4$$

$$-4^{2} = -(4)(4) = -16$$

$$Base: 4$$

$$O-3^{2} = 0-9 = -9$$

$$Base: 4$$

$$O-3^{2} = 0-9 = -9$$

Note:
$$(-1) = (-2)(-2)(-2)(-2)(-2)(-2) = 4(4)(4) = 16(4) = 64$$

 $(-2)^{5} = (-2)(-2)(-2)(-2)(-2) = 4(4)(-2) = -32$

$$E_{X}: (-10)^{2} = (-10)(-10) = \overline{100}$$

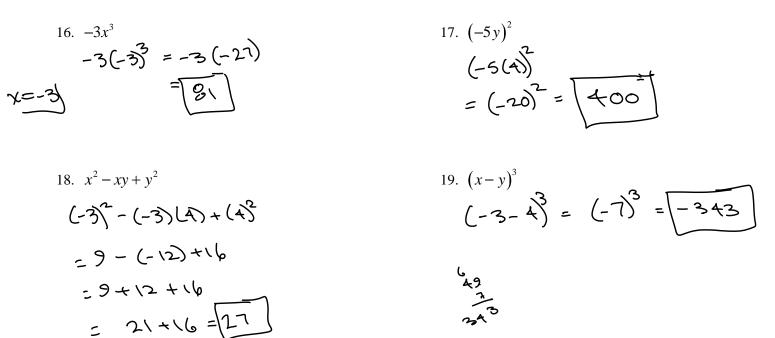
$$= -10^{2} = -(10)(10) = \overline{-100}$$

For exercises 10 - 12, evaluate the expressions.

10.
$$22^{1}$$

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For exercises 16 - 19, evaluate each expression for x = -3 and y = 4.



Multiplying and Dividing Expressions with Common Bases

Multiplication of Expressions with Like Bases

$$E_{X}$$
, $\chi^{2}\chi^{3} = (\chi \chi)(\chi \chi \chi) = \chi^{5}$

Assume that *b* is a real number and that *m* and *n* represent positive integers. Then, $b^m b^n = b^{m+n}$

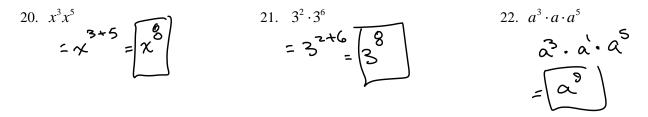
Assume that $b \neq 0$ is a real number and that *m* and *n*

Division of Expressions with Like Bases

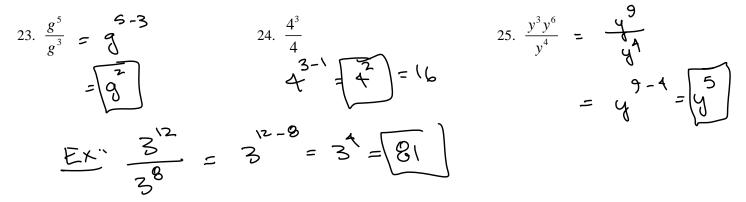
Also:

represent positive integers. Then, $\frac{b^m}{b^n} = b^{m-n}$

 $(b^{n})^{n} = b^{nn}$ (power to a power you multiply $(x^{2})^{3} = (xx)^{3} = (xx)(xx)(xx) = x^{6}$ For exercises 20 - 22, simplify the expressions. Write the answers in exponent form.



For exercises 23 - 25, simplify the expressions. Write the answers in exponent form.



Simplifying Expressions with Exponents

For exercises 26 - 29, use the commutative and associative properties of real numbers and the properties of exponents to simplify the expressions.

