# Warm Up

Simplify:

$$\left(\frac{5x^3y^4}{35x^{13}y^7}\right)^2$$

$$\left(\frac{1}{7x^{10}y^3}\right)^2$$

$$\frac{1}{49x^{20}y^6}$$

Always simplify in parentheses first

When you are done, pile your GGG books in the center of your table group.

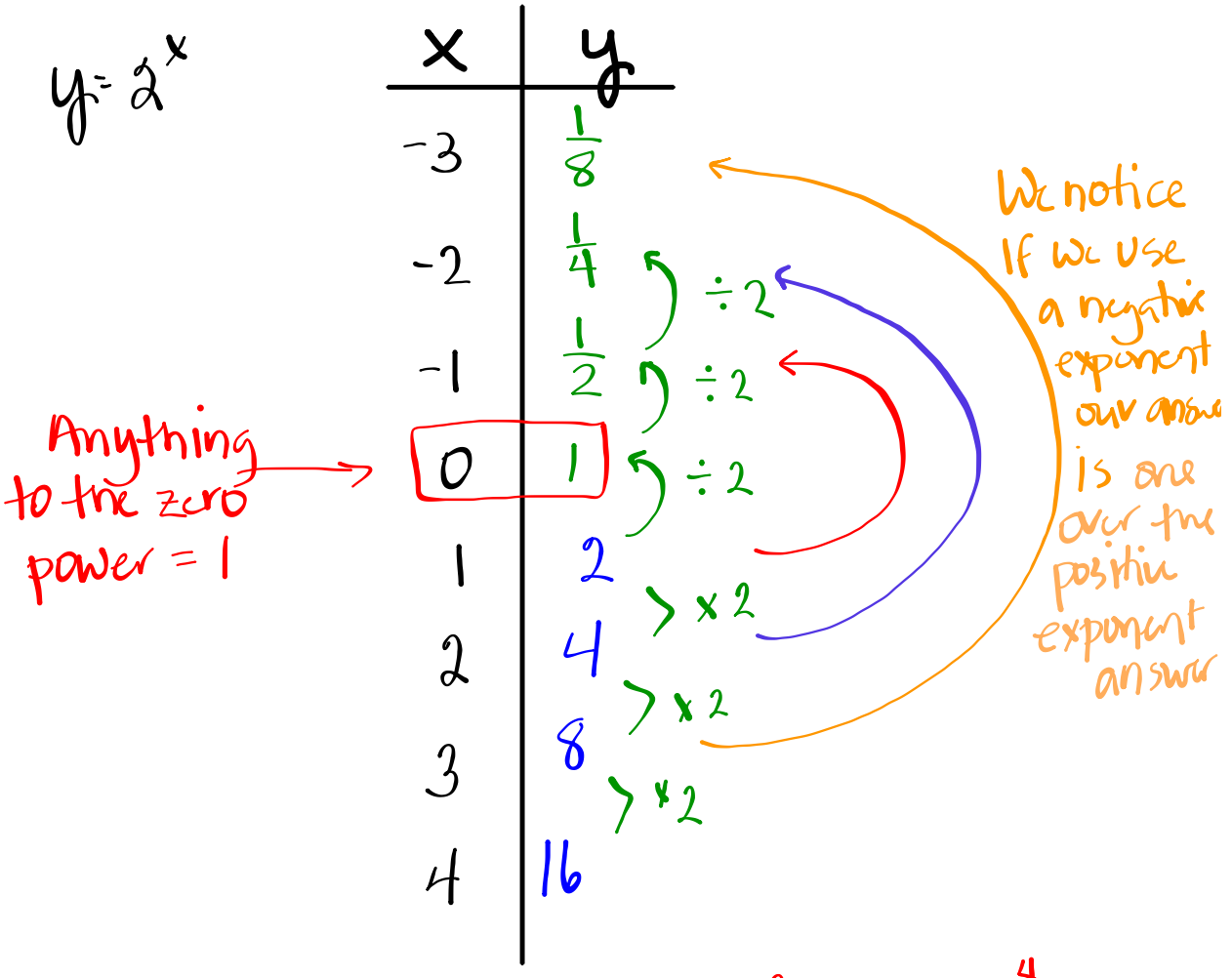
What does an exponent mean?

$x^3$

$x \cdot x \cdot x$

The exponent tells me how many times I need to multiply the base

# What does a negative exponent mean?




$x^{-2} = \frac{1}{x^2}$

$2^2 = 4$ $\quad 2^4 = 16$

$2^{-2} = \frac{1}{4}$ $\quad 2^{-4} = \frac{1}{16}$

multiply 3 times

$2^3$

$2 \cdot 2 \cdot 2$

opposite

so....
divide 3 times

$2^{-3}$

$\frac{1}{2 \cdot 2 \cdot 2}$ ← division bar

Positive exponent

How many we multiply by the base

Negative exponent

How many times we divide by the base

When we divide by a term, the term goes to the other side of the division bar.

Divide 12 by 2 $12 \div 2 = \frac{12}{2} = 6$

2 is on the other side of the division bar

$\frac{y^{-8}}{1} = \frac{1}{y^8}$

$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$

$5m^{-3} = \frac{5}{m^3}$ $\quad \not\frac{1}{5m^3}$ -3 exponent only applies to the m

Dividing by this

$(a^{-2})(b^3) = \frac{1}{a^2} \cdot \frac{b^3}{1} = \frac{b^3}{a^2}$

$\frac{b^3}{a^2}$

$x^3 \cdot x^{-1} = x^2$

$\frac{x^3}{x}$

$-6x^{-4}y^{6} = \dfrac{-6y^{6}}{x^{4}}$

$\dfrac{3^{4}}{3^{-2}} = \dfrac{3^{4}\cdot 3^{2}}{1} = 3^{6}$ $\qquad \dfrac{3^{4}}{3^{-2}} = 3^{4-(-2)} = 3^{6}$

$\dfrac{k^{-3}}{k^{5}} = \dfrac{1}{k^{5}\cdot k^{3}} = \dfrac{1}{k^{8}}$

$\dfrac{12x^{5}}{4x^{-2}} = \dfrac{3x^{5}\cdot x^{2}}{1} = 3x^{7}$

Start with ODD Numbers

# 8–3 Practice

NAME _____ DATE _____ PERIOD _____

Student Edition
Pages 347–351

## Negative Exponents

***Write each expression using positive exponents. Then evaluate the expression.***

1. $2^{-6}$
2. $5^{-1}$
3. $8^{-2}$
4. $10^{-3}$

***Simplify each expression.***

5. $g^{-6}$
6. $s^{-1}$
7. $q^{0}$
8. $a^{-2}b^{2}$
9. $m^{5}n^{-1}$
10. $p^{-1}q^{-6}r^{3}$
11. $x^{-3}y^{2}z^{-4}$
12. $a^{-2}b^{0}c^{-1}$
13. $12m^{-6}n^{4}$
14. $7xy^{-8}z$
15. $x^{-3}(x^{2})$
16. $b^{3}(b^{-5})$
17. $\frac{b^{3}}{b^{6}}$
18. $\frac{y^{3}}{y^{-2}}$
19. $\frac{m^{5}n^{3}}{m^{6}n^{2}}$
20. $\frac{xy^{2}}{xy^{3}}$
21. $\frac{a^{7}b^{4}}{a^{9}b^{2}}$
22. $\frac{rs^{-3}}{r^{2}s^{4}}$
23. $\frac{16c^{8}}{4c^{10}}$
24. $\frac{9x^{-5}y^{5}}{36x^{4}y^{3}}$
25. $\frac{7p^{2}q^{6}}{21p^{-3}q^{7}}$
26. $\frac{-6m^{5}n^{2}q^{-1}}{36m^{-2}n^{4}q^{-1}}$
27. $\frac{4a^{3}b^{2}c^{2}}{6a^{5}b^{3}c}$
28. $\frac{28x^{5}y^{-3}z}{-4x^{4}yz^{3}}$

**Homework**

Finish classwork,
and complete EVEN numbers