

Warm up

$$1. (-w^{10}) \cdot w^1$$

$$-1 \cdot w^{11}$$

$$2. (-2xy)^4$$

$$(-2)^4 x^4 y^4$$

$$16x^4y^4$$

$$3. -(2xy)^4$$

$$-1 \cdot 2^4 x^4 y^4$$

$$-16x^4y^4$$

$$4. (-3a)^5 \cdot (4a)^2$$

$$(-3)^5 a^5 \cdot 4^2 a^2$$

$$-243 a^5 \cdot 16 a^2$$

$$-3888 a^7$$

$$5. (-ab)(a^2b)^2$$

$$-1 \cdot a b a^4 b^2$$

$$-1 a^5 b^3$$

$$6. (-2wz^2)^5 (wz)^2$$

$$-32 w^7 z^{12}$$

Homework Questions?

Self Scoring Scale

4- I can *summarize* the concepts and explain it to others.

3- I can *apply* the concepts to answer questions correctly.

2- I can *apply* the concepts but with some *mistakes*.

1- I *need help* to know how to apply the concepts.

0- I *can't* apply the concepts even with help.

8.2 Zero and Negative Exponents

- Goals:**
- Evaluate powers that have zero and negative exponents.
 - Graph exponential functions.

EQ: How do you change negative exponents into positive exponents?

The Unit Organizer

NAME _____
DATE _____ Mo/Date/Year

④ BIGGER PICTURE Algebra 1.5 Concepts

② LAST UNIT/Experience Systems

① CURRENT UNIT Exponents & Exponential Functions

③ NEXT UNIT/Experience Quadratics

⑧ Student Activities or Assignments

⑤ UNIT MAP

⑧

8.1

8.2

8.3

8.4

8.5

8.6

8.7

⑦ UNIT SELF-TEST QUESTIONS

⑥ UNIT RELATIONSHIPS

⑦

1. What properties can be used to simplify & evaluate exponential expressions?

2. What do exponential graphs look like?

3. Can you write numbers in both decimal form and in scientific notation?

4. How can exponential growth and decay equations be used to represent and solve real world problems?

Simplify

Graph

Apply

Represent

Vocabulary

Exponential function:

ZERO AND NEGATIVE EXPONENTS

Let a be a nonzero number and let n be an integer.

• A nonzero number to the zero power is 1: $a^0 = 1, a \neq 0$

• a^{-n} is the reciprocal of a^n : $a^{-n} = \frac{1}{a^n}, a \neq 0$

$$10^3 = 1000$$

$$10^2 = 100$$

$$10^1 = 10$$

$$10^0 = 1$$

Negative Power means
Move That Factor
(cancel it's neg. sign)

Example 1: Powers with Zero and Negative Exponents

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

b. $(-5)^0 = 1$

c. $7^{-y} = \frac{1}{7^y}$

d. $\left(\frac{1}{9}\right)^{-1}$ Reciprocal

$$\frac{9}{1} = 9$$

e. $0^{-2} = \frac{1}{0^2}$

undefined

Not possible

Example 2: Simplifying Exponential Expressions

Rewrite with positive exponents.

$$\text{a. } \frac{7(4^{-y})}{1} = \frac{7}{4^y}$$

$$\text{b. } \frac{3x^{-4}y^{-5}}{1} = \frac{3}{x^4y^5}$$

$$\text{c. } (6d)^{-2} = 6^{-2}d^{-2}$$

$$= \frac{1}{6^2d^2} = \frac{1}{36d^2}$$

$$\text{d. } \frac{1}{c^{-2x}} = \frac{c^{2x}}{1} = c^{2x}$$

$$\frac{(6d)^{-2}}{1} = \frac{1}{(6d)^2} = \frac{1}{6^2d^2} = \frac{1}{36d^2}$$

Example 3: Evaluating Exponential Expressions

Evaluate the expression.

$$\text{a. } \underline{2^4} \cdot \underline{2^{-4}} = 2^{4+(-4)} = 2^0 = 1$$

$$\text{b. } (3^{-2})^{-2} = 3^{-2 \cdot -2} = 3^4 = 81$$

$$\text{c. } \frac{2^{-6}}{1} = \frac{1}{2^6} = \frac{1}{64}$$

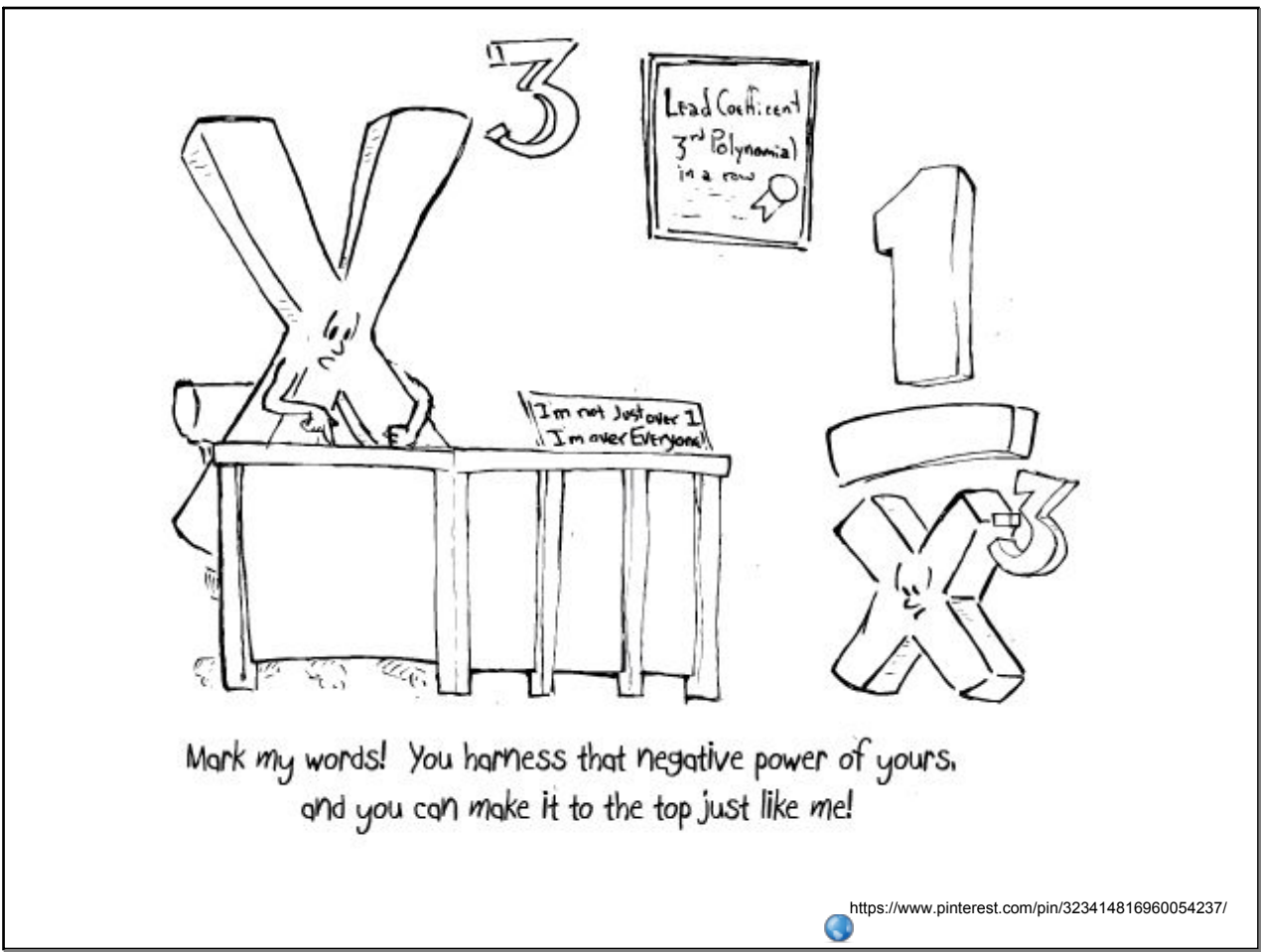
Try It Evaluate the exponential expression.
Write fractions in simplest form.

1. $2^{-5} = \frac{1}{2^5} = \frac{1}{32}$ 2. $4^{-3} = \frac{1}{4^3} = \frac{1}{64}$ 3. $\left(\frac{1}{7}\right)^{-1} = 7$

4. $15\left(\frac{1}{5}\right)^{-1} = 15 \cdot 5 = 75$ 5. $-12^0 = -1 \cdot 1 \cdot 1 = -1$ 6. $3 \cdot 3^{-3} = \frac{3}{3^3} = \frac{3}{27}$

7. $13^0 \cdot 0^{-2} = 1 \cdot \frac{1}{0^2}$ *undefined!* 8. $15^{-1} \cdot 15 = \frac{15}{15} = 1$

$15^{-1} \cdot 15^1 = 15^0 = 1$



<https://www.pinterest.com/pin/323414816960054237/>

8.2 Day 1 Homework

Negative Exponents wkst (p.34)

Warm Up

Week 10

1) x^3y^{-6}

2) $\frac{1}{11x^{-2}y^{-7}}$

3) $(2x^{-10})^7$

Homework Questions?

Ch.7 Test - Out of 80 pts

A - 72

B - 64

C - 56

D - 48

Rewrite the expression with positive exponents.

$$9. a^{-6} = \frac{1}{a^6}$$

$$10. \frac{1}{3y^{-4}} = \frac{y^4}{3}$$

$$11. (2x^{-2}y)^3$$

$$\frac{2^3 x^{-6} y^3}{x^6} = \frac{8y^3}{x^6}$$

$$12. \left(\frac{-3x^3}{6x^{-2}} \right)^{-1}$$

$$\frac{6x^{-2}}{-3x^3}$$

$$= \frac{6}{-3x^3 x^2}$$

$$= \frac{6 \div 3}{-3x^5} = \frac{-2}{x^5}$$

$$-3$$

$$\frac{3^{-1}}{1}$$

Example 4: Graphing an Exponential FunctionGraph the exponential function $y = 3^x$.

x	-2	-1	0	1	2
3^x	$\frac{1}{9}$	$\frac{1}{3}$	1	3	9

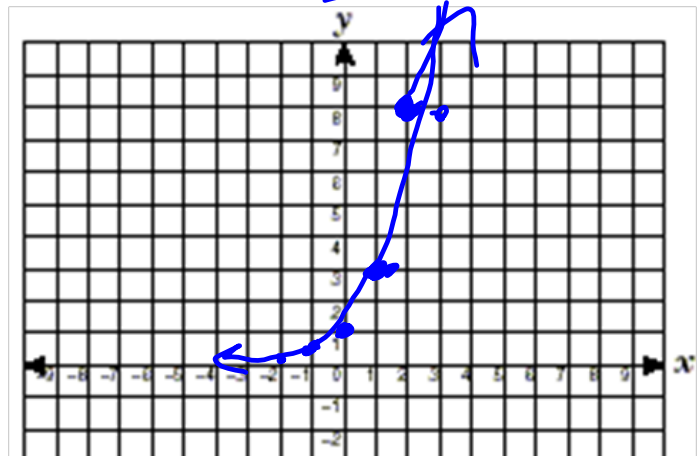
$$3^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

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

$$3^0 = 1$$

$$3^1 = 3$$

$$3^2 = 9$$

**Summary**

If "flip"
neg. exponents
they turn pos.

ex: 3^{-2}

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

8.2 Homework

Back Side of wkst #1-24
even

8.2 p.459 #14-44