



Objective: Understanding Negative and Zero Exponents

Homework RX5 – NYA p.433 #1 – 21 (odd only)

Do Now: Solve

$$1. 1^5 = \quad 2. (-2)^4 = \quad 3. (-3)^2 = \quad 4. -4^2 =$$

Exam Prep: Which has the greatest value?

A) 2^4 B) 386^0 C) 1^{125} D) $(-2)^5$



Sometimes things are not as they seem, negative exponents are not negative numbers....

Exploration: A list of numbers that is infinite in both directions...

$$\dots \frac{1}{27}, \frac{1}{9}, \frac{1}{3}, 1 \text{ or } 1, 3, 9, 27 \dots$$

- 1) What number follows 27? What number precedes 1/27?
- 2) Write 27, 9, and 3 using integer exponents and the same base.
- 3) Use the pattern to write the exponential forms of 1, 1/3, 1/9, and 1/27.

For any number “a” not equal to 0 and any integer “b”

$$a^0 = 1 \quad \text{and} \quad a^{-b} = \frac{1}{a^b} = \left(\frac{1}{a}\right)^b$$

Examples

$$2^0 = 1 \quad 8^{-3} = \frac{1}{8^3} = \left(\frac{1}{8}\right)^3 = \frac{1}{512}$$

$$0.25^0 = 1 \quad (-5)^{-5} = \frac{1}{(-5)^5} = -\frac{1}{3125}$$

Practice: Compute

a) 4^{-1}	b) -5^{-3}	c) 1.43536326^0
d) $\left(\frac{2}{3}\right)^{-2}$	e) $\left(\frac{1}{4}\right)^{-3}$	f) 7^{-2}

Sorting

1. Consider these numbers.

$$3^2 \quad 3^{-2} \quad \left(\frac{1}{3}\right)^2 \quad \frac{1}{3^2} \quad \frac{1}{9} \quad 9$$

a) Sort the numbers into two groups so that all the numbers in each group are equal to one another.

b) In which group does $\left(\frac{1}{3}\right)^{-2}$ belong?

2. Sort the numbers into two groups so that all the numbers in each group are equal to one another.

$$\left(\frac{2}{3}\right)^2 \quad \left(\frac{2}{3}\right)^{-2} \quad \left(\frac{3}{2}\right)^2 \quad \left(\frac{3}{2}\right)^{-2} \quad \frac{3^2}{2^2} \quad \frac{9}{4} \quad \frac{4}{9}$$

3. Sort the numbers into four groups so that all the numbers in each group are equal to one another.

$$10^3 \quad 10^{-3} \quad (-10)^{-3} \quad \frac{1}{(-10)^3} \quad \frac{1}{1000} \quad -1000 \quad \left(\frac{1}{10}\right)^{-3}$$

$$\left(\frac{1}{10}\right)^3 \quad \left(-\frac{1}{10}\right)^{-3} \quad \frac{1}{10^3} \quad 1000 \quad \left(-\frac{1}{10}\right)^3 \quad \frac{1}{1000} \quad (-10)^3$$

4. Which of these are equivalent to a^{-n}

$$\frac{1}{a^n} \quad -a^n \quad \left(\frac{1}{a}\right)^n \quad 1 \div a^n$$