

Objective 28-29

Evaluate an integer raised to a whole number, negative, or zero exponent

Vocab:

Power or Exponent- number of times a given number is used as a factor in repeated multiplication

Negative Exponent- Reciprocal of that number with a positive exponent

$$a^{-n} = \frac{1}{a^n}$$

Zero Power- Any number raised to the power of zero is 1: $a^0 = 1$

Example 1: $(-2)^4$

Step 1: Write the expression $(-2)^4$ as a repeated multiplication with -2 used as a factor 4 times.

$$(-2)^4 = (-2)(-2)(-2)(-2)$$

Step 2: Multiply the factors together. *Watch your negatives and follow order of operations!!!!*

$$(-2)^4 = (-2)(-2)(-2)(-2) = 16 \quad \leftarrow \quad \boxed{\text{Answer is 16}}$$

Example 2: -3^6

$$\text{Step 1: } -3^6 = -(3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3)$$

$$\text{Step 2: } -3^6 = -(3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3) = -(729) \quad \leftarrow \quad \boxed{\text{Answer is -729}}$$

Example 3: $(-5)^{-4}$

$$\text{Step 1: } (-5)^{-4} = \frac{1}{(-5)^4} \quad \text{Notice that the exponent is now positive because it is in the denominator}$$

$$\text{Step 2: } \frac{1}{(-5)^4} = \frac{1}{(-5) \cdot (-5) \cdot (-5) \cdot (-5)} = \frac{1}{625} \quad \leftarrow \quad \boxed{\text{Answer is } \frac{1}{625}}$$

Example 4: 7^0

$$\text{Step 1: } 7^0 = 1 \quad \leftarrow \quad \boxed{\text{Answer is 1}}$$

Independent Practice

1. $(-12)^3 =$

5. $(-12)^{-1} =$

9. $2^0 =$

2. $(-6)^4 =$

6. $(-\frac{1}{2})^{-4} =$

10. $\frac{6}{10}^0 =$

3. $-(-9)^2 =$

7. $-3^{-2} =$

11. $7^1 =$

4. $-\frac{3^5}{5} =$

8. $-4^{-3} =$

12. $5^2 =$

Additional Help:

<http://www.themathpage.com/alg/exponents.htm>

<https://www.youtube.com/watch?v=vBMYNH-Bi8s>