

8-1 Zero and Negative Exponents

1. Fill in the table with the value of the power in simplest form.

2^x	5^x	10^x
$2^4 =$ _____	$5^4 =$ _____	$10^4 =$ _____
$2^3 =$ _____	$5^3 =$ _____	$10^3 =$ _____
$2^2 =$ _____	$5^2 =$ _____	$10^2 =$ _____

2. Look at the values you just calculated. What pattern do you see as you go down each column?

_____ | _____ | _____

3. Continue filling in the table below with the value of the power in simplest form. **Write using Fractions instead of Decimals if necessary.**

2^x	5^x	10^x
$2^1 =$ _____	$5^1 =$ _____	$10^1 =$ _____
$2^0 =$ _____	$5^0 =$ _____	$10^0 =$ _____
$2^{-1} =$ _____	$5^{-1} =$ _____	$10^{-1} =$ _____
$2^{-2} =$ _____	$5^{-2} =$ _____	$10^{-2} =$ _____
$2^{-3} =$ _____	$5^{-3} =$ _____	$10^{-3} =$ _____

Finish the statement:

Any term raised to the 0 power equals _____

Any term raised to the 1 power equals _____

Practice:

$$\left(\frac{4}{17}\right)^0 =$$

$$(-y)^1 =$$

$$(4xy)^0 =$$

$$\left(\frac{y}{x^2}\right)^1 =$$

$$1,324,452^0 =$$

When possible, you can use the calculator to evaluate these expressions. Any expression that contains VARIABLES CANNOT BE EVALUATED USING THE CALCULATOR.

$$\left(\frac{2}{7}\right)^{-2} = \quad \quad \quad -(-6)^{-3} = \quad \quad \quad (-4)^2 = \quad \quad \quad (-3)^{-3}5^2 = \quad \quad \quad (-9)^23^{-3} =$$

Negative exponents are hard to work with when we are dealing with variables. So we want to simplify these expressions to make each variable have a positive exponent. Examine these completed examples to see if we can see how to deal with these expressions.

EX1:

Helpful Hints To Remember:

$$4a^2b^{-3} = \frac{4a^2}{b^3}$$

EX2:

$$\frac{w^5x^{-3}}{5y^{-6}} = \frac{w^5y^6}{5x^3}$$

EX3:

$$\frac{2^{-2}r^{-3}}{s^2} = \frac{1}{4r^3s^2}$$

Let's Try a Bunch

1. $\frac{5^{-2}}{p}$

2. $a^{-4}c^0$

3. $\frac{3x^{-2}}{y}$

4. $\frac{7ab^{-2}}{3w}$

5. $x^{-5}y^{-7}$

6. $x^{-5}y^7$

7. $\frac{8}{2c^{-3}}$

8. $\frac{7s}{5t^{-3}}$

9. $\frac{6a^{-1}c^{-3}}{d^0}$

10. $2^{-3}x^2z^{-7}$

11. $9^0y^7t^{-11}$

12. $\frac{7s^0t^{-5}}{2^{-1}m^2}$

Simplify each expression using positive exponents:

a) $4^{-2} =$

b) $(-3)^{-3} =$

c) $5^{-2} =$

d) $5m^3n^{-2}o^{-5} =$

e) $\frac{x^{-4}}{b^{-6}} =$

f) $\frac{a^{-3}}{2^7} =$

2. Simplify each expression:

a) $\left(\frac{4}{5}\right)^1 =$ _____

b) $(elephants)^0 =$ _____

c) $(-846)^0 =$ _____

3. Evaluate $5a^3b^{-2}$ for $a = 2$ and $b = 4$.

Challenge:

(Hint: If you get common denominators, you can add the fractions together)

4. $\frac{6}{m^2} + \frac{5m^{-2}}{3^{-3}}$