

7.1 & 7.2

## Key

\* Complete the below chart & look for patterns. Simplify all answers. Do not use decimals; use fractions.

$-2^x$	$2^x$	$y^x$	$0^x$
$-2^4 = 16$	$2^4 = 16$	$y^4 = y^4$	$0^4 = 0$
$-2^3 = -8$	$2^3 = 8$	$y^3 = y^3$	$0^3 = 0$
$-2^2 = 4$	$2^2 = 4$	$y^2 = y^2$	$0^2 = 0$
$-2^1 = -2$	$2^1 = 2$	$y^1 = y$	$0^1 = 0$
$-2^0 = 1$	$2^0 = 1$	$y^0 = 1$	$0^0 = \text{undefined}$
$-2^{-1} = -\frac{1}{2}$	$2^{-1} = \frac{1}{2}$	$y^{-1} = \frac{1}{y}$	$0^{-1} = \text{undefined}$
$-2^{-2} = \frac{1}{4}$	$2^{-2} = \frac{1}{4}$	$y^{-2} = \frac{1}{y^2}$	$0^{-2} = \text{undefined}$

1. What do you notice as the exponents increase?  
 2. " " decrease?  
 3. What do you notice about a negative base?  
 4. What do you notice about a negative exponent?  
 5. What do you notice about the power of 1?  
 6. What do you notice about the power of 0?

## Answers

① As the exponents increase, the previous answer is being multiplied by the base again.

② As the exponents decrease, the previous answer is being divided by the base.

③ Negative bases follow the Integer Multiplication Rule:

→ An even amount of negative numbers multiplied together is a positive answer

$$(-2^4 = 16, -2^2 = 4, -2^0 = 1)$$

→ An odd amount of negative numbers multiplied together is a negative answer

$$(-2^3 = -8, -2^1 = -2)$$

④ A negative exponent is the reciprocal of a power exponent

$$(y^4 = y^4 \text{ and } y^{-4} = \frac{1}{y^4}) \rightarrow$$

$$(2^1 = 2, 2^{-1} = \frac{1}{2})$$

$$(2^3 = 8, 2^{-3} = \frac{1}{8})$$

(\*) Rule of Negative Exponents - For any

nonzero base (a) & any integer exponent (n),  $a^{-n}$  is the reciprocal of  $a^n$

$$\text{Ex: } \frac{8^2}{8^5} = \frac{\cancel{8} \cdot \cancel{8}}{\cancel{8} \cdot \cancel{8} \cdot \cancel{8} \cdot \cancel{8} \cdot \cancel{8}} = \frac{1}{8 \cdot 8 \cdot 8} = \frac{1}{8^3}$$

$$\frac{8^2}{8^5} = \overset{\text{OR}}{8^{-3}} = \frac{1}{8^3}$$

(5) Any number raised to the power of 1 is the base.

$$(-2^1 = -2, 2^1 = 2, y^1 = y, 0^1 = 0)$$

(6) \* Zero Exponent Rule: Any non-zero number raised to the zero power is ONE,

$$4^0 = 1, \quad 1,000^0 = 1, \quad \left(\frac{1}{2}\right)^0 = 1$$

$$0^0 = \text{undefined}$$