Do Now:

1.) 2 + (-5)

2.) 1 + (-3)

3.) -5 - 7

4.) -4 + 2

Do Now: Simplify.

$x^{10-5}=x^5$ $\frac{30}{10}=\frac{3}{1}$

a.) $\frac{5x^4 * 6x^6}{10x^5} = \frac{30x^{10}}{10x^5} = \frac{3x^5}{1} = 3x^5$

$(5\cdot 6)(x^{4+6})$

b.) $\frac{f^3g^4}{fg^2} = \frac{f^3\cdot g^4}{f^1\cdot g^2} = f^{3-1}\cdot g^{4-2} = f^2g^2$

40

$\frac{p^{5-1}q^{9-5}}{p^{1-1}q^{5-5}} = p^{5-1}\cdot q^{9-5}$

p^0q^0

$1\cdot 1$

1

$= \frac{p^4q^4}{1} = p^4q^4$

4.7 Negative and Zero Exponents

7.NS
8.EE

- SWBAT work with negative and zero exponents.
- SWBAT understand patterns and how operations are related.

- Calculators: No

How can we simplify the fraction below?!

1.) $\frac{x^7}{x^5} = \frac{1\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot x\cdot x}{\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot 1} = \frac{x\cdot x}{1} = x^2$

Same

OR $x^{7-5} = x^2$

2.) $\frac{x^5}{x^7} = \frac{1\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}}{\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot\cancel{x}\cdot x\cdot x} = \frac{1}{x\cdot x} = \frac{1}{x^2}$

OR $x^{5-7} = x^{-2}$

Same

$\frac{x^{-2}}{1} = \frac{1}{x^2}$ Change location

$\frac{1}{x^{-2}} = \frac{x^2}{1}$ Change location

Complete the table.

2^3	
2^2	
2^1	
2^0	
2^{-1}	
2^{-2}	
2^{-3}	
2^{-4}	

Negative Exponents

- For any nonzero number and any integer n,

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

Evaluate: (Solve)

a.) $3^{-4} = \frac{3^{-4}}{1} = \frac{1}{3^4} = \frac{1}{\underset{9}{3\cdot3}\cdot\underset{9}{3\cdot3}} = \frac{1}{81}$

Change location

b.) $\frac{1}{3^{-4}} = \frac{3^4}{1} = \frac{3\cdot3\cdot3\cdot3}{1} = \frac{81}{1} = 81$

Change location

Evaluate:

a.) $\frac{g^{-2}}{1} = \frac{1}{g^2}$

b.) $\frac{1}{g^{-2}} = \frac{g^2}{1} = g^2$

Evaluate:

a.) $\frac{(-2)^{-5}}{1} = \frac{1}{(-2)^5} = \frac{1}{(-2)(-2)(-2)(-2)(-2)} = \frac{1}{-32}$

b.) $\frac{q^{-1}}{1} = \frac{1}{q^1} = \frac{1}{q}$

Evaluate the expression.

Add $2+(-5)$

$5^2 * 5^{-5} = 5^{2+(-5)} = \frac{5^{-3}}{1} = \frac{1}{5^3} = \frac{1}{125}$

$\frac{1}{3^7 * 3^{-10}} = \frac{1}{3^{7+(-10)}} = \frac{1}{3^{-3}} = \frac{3^3}{1} = \frac{27}{1} = 27$

Add

Evaluate the expression.

$\frac{1}{3^7 * 3^{-10}}$

Write the expression without using a fraction bar.

a.) $\frac{1}{16}$

b.) $\frac{a^2}{c^3}$

Write the expression without using a fraction bar.

a.) $\frac{1}{25}$

b.) $\frac{x^6}{y^2}$

Zero Exponents

- For any nonzero number a,

$$a^0 = 1$$

Examples:

a.) $45^0 = 1$

b.) $m^0 = 1$

Simplify. Write the expressions using only positive exponents.

a.) $-2^0 = -(2^0) = -(1) = -1$

a) $(-2)^0 = 1$

b.) $n^0 = 1$

c.) $-2n^0 = -2 \cdot (n^0) = -2(1) = -2$

d.) $-2^0n^0 = (-2)^0(n)^0 = 1(1) = 1$

e.) $(-2n)^0 = 1$

Simplify. Write the expressions using only positive exponents.

a.) 4^{-5}

b.) y^{-5}

c.) $4y^{-5}$

d.) $4^{-5}y^{-5}$

e.) $(4y)^{-5}$

Simplify. Write the expressions using only positive exponents.

a.) $\frac{8x^{-3}}{x}$

Simplify. Write the expressions using only positive exponents.

a.) $\frac{-5x^{0}}{3}$

b.) $2y^{-3}$

Exit Pass 4.7

Evaluate the expression.

1. 7^{-2} 2. $(-2)^{-5}$ 3. $6 * 6^{-3}$ 4. $10^{-5} * 10^{7}$

Simplify. Write the expression using only positive exponents.

5. $-6m^{-1}$ 6. $b^{2} * b^{-2}$

7. $\frac{5x^{4}}{x^{7}}$ 8. $\frac{10a^{-3}}{a^{4}}$

"Don't blame the sea if you cannot catch a fish."

Working individually or with a partner, complete the workbook.

Workbook pg.

Reflection of Today's Lesson

4.7 Negative and Zero Exponents

7.NS
8.EE

- SWBAT work with negative and zero exponents.
- SWBAT understand patterns and how operations are related.

- Calculators: No

Homework

pg. 203 #1,2, 9-20, 22-25