Algebra 1

Exponents Check Day 2

Name_____

Date _____ Pd_____

1. Simplify $\frac{3^2 \cdot 3^3 \cdot 3^4}{3^6}$. $= \frac{3^9}{3^6} = 3^3$

A 3^3 B 3^4 C 3^6 D 3^8

2. Multiply $(8ab^2)(5a^4b^3)$.

A $40a^4b^5$ B $40a^5b^5$ C $40a^4b^6$ D $40a^5b^6$

$40a^5b^5$

3. What is the value of this expression?

$$\frac{5^0 \cdot 5^4}{5^3 \cdot 5^1} = \frac{5^4}{5^4}$$

A 0

B 1

C 5

D 25

4. The expression $3^4 \cdot 3^n$ is equivalent to 3^{20}. What must be the value of n?

A 4

B 5

C 16

D 24

$3^4 \cdot 3^n = 3^{20}$

5. If $\frac{2^7 \cdot 2^5}{2^p}$ simplifies to 2^3, what must be the value of p?

A 2

B 4

C 6

D 9

$\frac{2^7 \cdot 2^5}{2^p} = 2^3$

$\frac{2^{12}}{2^p} = 2^3$

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Exponent Rule #4:

Simplify by subtracting:

$\frac{x^5}{x^7} = x^{-2}$

Simplify by expanding out the fraction:

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

What can we determine from the above example?

Any base raised to a negative power is the same as the base raised to the positive power in the denominator of a fraction.

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

Examples: Simplify using positive exponents.

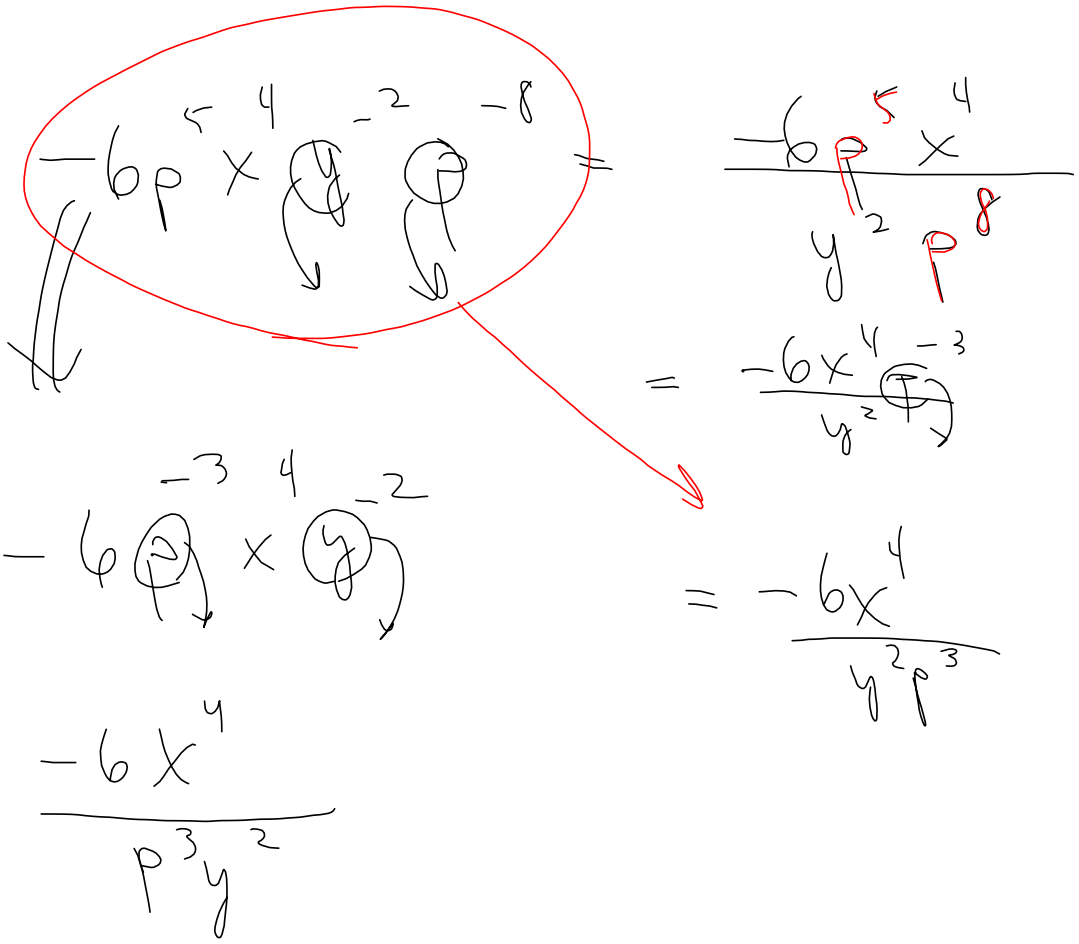
1. $4^{-2} = \frac{1}{4^2}$ 2. $m^{-2} = \frac{1}{m^2}$ 3. $5m^{-3} = \frac{5}{m^3}$ 4. $2p^{-2}g^{3}m^{-5} = \frac{2g^3}{p^2 m^5}$

5. $-6p^5x^4y^{-2}p^{-8} = \frac{-6p^5x^4}{y^2p^8} = \frac{-6x^4}{y^2p^3}$ 6. $\frac{w^5t^{-6}}{m^3p^2} = \frac{w^5}{m^3p^2t^6}$ 7. $\frac{6x^7m^{-5}}{9g^2m} = \frac{6x^7}{9g^2m^1m^5} = \frac{2x^7}{3g^2m^6}$

√ Understanding Check:

a. $7^{-5} = \frac{1}{7^5}$ b. $x^{-2} = \frac{1}{x^2}$ c. $6p^{-4} = \frac{6}{p^4}$ d. $3p^{-1}g^{-3}m^{6} = \frac{3m^6}{pg^3}$

e. $\frac{c^{-2}a^7}{n^2f^5} = \frac{a^7}{c^2n^2f^5}$ f. $\frac{4x^3p^3}{2m^2x^2} = \frac{2p^3}{mx^2x^3} = \frac{2p^3}{m^2x^5}$ g. $-7m^3n^4x^{-3}m^{-5} = \frac{-7n^4}{m^2x^3}$


$-6p^{-5}x^{4}y^{-2}p^{-8} = \frac{-6p^{5}x^{4}}{y^{2}p^{8}}$
$= \frac{-6x^{4}y^{-3}}{y^{2}}$
$-6p^{-3}x^{4}y^{-2}$
$= \frac{-6x^{4}}{y^{2}p^{3}}$
$\frac{-6x^{4}}{p^{3}y^{2}}$

√ Understanding Check:

a. $7^{-5} = \frac{1}{7^5}$ b. $x^{-2} = \frac{1}{x^2}$ c. $6p^{-4} = \frac{6}{p^4}$ d. $3p^{-1}g^{-3}m^6 = \frac{3m^6}{pg^3}$

e. $\frac{c^{-2}a^7}{n^2f^5} = \frac{a^7}{c^2n^2f^5}$ f. $\frac{4x^{-3}p^3}{2m^2x^2} = \frac{2p^3}{m^2x^5}$ g. $-7m^3n^4x^{-3}m^{-5} = \frac{-7m^3n^4}{x^3m^5} = \frac{-7n^4}{x^3m^2}$

* or $-7m^{-2}n^4x^{-3}$

Song to help you remember the rule:

If the base has a negative power, send it down…(as a positive)
If the base has a negative power, send it down…(as a positive)
If the base has a negative power, don't run, and cry, and cower,
If the base has a negative power, send it down…(as a positive)

MyExponentSongMusicOnly

What if the negative exponent is in the denominator already?:

Examples: Simplify using positive exponents.

1. $\frac{1}{4^{-3}} = 4^3$ or 64 2. $\frac{1}{m^{-2}} = m^2$ 3. $\frac{2}{x^{-4}} = 2x^4$ 4. $\frac{3^{-2}x^{-5}m}{2m^{-2}p} = \frac{m \cdot m^2}{3^2 \cdot 2 \cdot p \cdot x^5} = \frac{m^3}{18px^5}$

√ Understanding Check:

a. $\frac{1}{5^{-4}} = 5^4$ or 625 b. $\frac{1}{x^{-6}} = x^6$ c. $\frac{3}{g^{-2}} = 3g^2$ d. $\frac{5x^{-5}p^{-3}}{7^{-1}m^{-2}p}$

7 · x⁵

· 7 · m²

· x⁵ · p³

$= \frac{35m^2}{x^5p^4}$

d. $\dfrac{5x^{-5}p^{-3}}{7^{-1}m^{-2}p}$ $= \dfrac{5 \cdot 7\, m^2}{x^5 p^3 p}$

$= \dfrac{35\, m^2}{x^5 p^4}$

Exponent Rule #5:

Examples: Simplify using positive exponents,(simplify completely)

1. $(3^5)^4$ = $3^5 \cdot 3^5 \cdot 3^5 \cdot 3^5$ or $3^{5+5+5+5}$ or $3^{5(4)}$ = 3^{20}

2. $(y^2)^3$ = $y^2 \cdot y^2 \cdot y^2$ or y^{2+2+2} or $y^{2(3)}$ = y^6

3. $(2a^4)^2$ = $2^1a^4 \cdot 2^1a^4$ or 2^2a^{4+4} or 2^2a^8 = $4a^8$ or _____

Jump to just multiplying exponents

4. $(3mp^5)^3$ = $3^3 \cdot m^3 \cdot p^{15}$ = $27m^3p^{15}$ or _____

5. $(-2g^2n^3)^2$ = $(-2)^2 g^4 n^6$ = $4g^4n^6$ = _____

Homework:

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