

SC Algebra 1
8.3 Negative Exponents

Warm Up: Complete ¹⁰ 3 Minute Check-Up *in McGraw Hill!*

Powers Quick Review:

Product Rule - $a^2 \cdot a^5 = a^7$

Power of a Power - $(a^2)^5 = a^{10}$

Power of a Product - $(2a^2b^3c)^5 = 32a^{10}b^{15}c^5$

Quotient Rules - $\frac{a^5}{a^2} = a^3$

Power of a Quotient - $\left(\frac{a^2}{b^3}\right)^5 = \frac{a^{10}}{b^{15}}$

Zero Exponents:

"If your exponent is zero, 1 will always be your hero."

$$a^2 \cdot a^{-2} = a^0$$

$$\frac{a^2}{a^2} = a^0 \quad \frac{4^2}{4^2} = 4^0 = 1$$

$$\frac{3^2}{3^2} = 3^0 = 1$$

Example 1:

Simplify each expression. Assume no denominator equals zero.

$$n^0 = 1$$

$$(-387)^0 = 1$$

$$\left(-\frac{8m^2np^8}{9k^2mn^4}\right)^0 = 1$$

$$\frac{a^4b^0}{a^2} = \frac{a^4 \cdot 1}{a^2} = \frac{a^4}{a^2} = a^2$$

$$\left(\frac{5q^3r^5t^2}{11rt^2}\right)^0 = 1$$

$$\frac{6u^2v^6w^0}{2uv^3}$$

$$\frac{6u^2v^6}{2uv^3} = 3uv^3$$

Negative Exponents:

"When your exponent is negative, although it's not typical! To do the math you need to flip to the reciprocal."

How can I meet today's standards?

I can apply the properties of exponents when simplifying expressions with **negative** and **zero exponents**.

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Example 2:

Simplify each expression. Assume that no denominator equals zero.

$$\frac{n^5}{n^5}$$

$$(3)^{-2} = \frac{1}{3^2} = \frac{1}{9}$$

$$\frac{m^4 p^{-2}}{1} = \frac{1}{p^2} = \frac{m^4}{p^2}$$

reciprocal $\rightarrow$ flip

$$\frac{1}{2} \rightarrow \frac{2}{1} \quad 3 \rightarrow \frac{1}{3}$$

$$x \rightarrow \frac{1}{x}$$

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

$$\frac{-c^4 f^{-2}}{d^7 e^3} = \frac{-c^4 d^7}{e^3 f^2}$$

$$\frac{3g^{-3}h^2}{-36g^3hj^4} = \frac{-12g^3h^2}{36g^3hj^4} = \frac{-1}{3h}$$

Put Rule In Own Words:

Challenge Problem:

Simplify each expression. Assume that no denominator equals zero.

$$\begin{aligned} & -\frac{8r^0t^{-3}v^{-10}}{2rt^2v^{-5}} \\ & = \frac{4}{rt^3t^2v^{10}} = \frac{-4v^5}{rt^5} = \frac{-4}{rt^5v^5} \end{aligned}$$