1.3 Negative Exponents

Reciprocals are numbers whose product equal 1.

Write the reciprocal.

a) $2 \rightarrow \frac{1}{2}$ $\quad (2)\left(\frac{1}{2}\right) = \frac{2}{2} = 1$

b) $-6 \rightarrow -\frac{1}{6}$ $\quad (-6)\left(-\frac{1}{6}\right) = \frac{6}{6} = 1$

c) $\frac{1}{2} \rightarrow 2$

d) $-\frac{101}{23} \rightarrow -\frac{23}{101}$

NEGATIVE EXPONENT LAW

$\frac{2^2}{2^5} = 2^{2-5} = 2^{-3}$ OR $\frac{2^2}{2^5} = \frac{2 \cdot 2}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2} = \frac{1}{2^3}$

By the transitive property... $2^{-3} = \frac{1}{2^3}$

Reciprocal of the base

Algebra: $x^{-n} = \frac{1}{x^n}$ where x can be any number but 0. $\quad x^{-n} = \left(\frac{1}{x}\right)^n = \frac{1}{x^n}$

Negative exponent: flip the base & write with positive exponent.

Example 1: Simplify.

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

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

c) $\frac{0.3^{-4}}{10} = \left(\frac{3}{10}\right)^{-4} = \left(\frac{10}{3}\right)^4 = \frac{10000}{81}$

Algebra: $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^{+n}$ where a, b can be any number but 0.

Negative exponent: flip the base & write with positive exponent.

Example 2: Simplify and evaluate.

a) $\left(\frac{5}{4}\right)^{-2} = \left(\frac{4}{5}\right)^2 = \frac{16}{25}$

b) $\left(-\frac{3}{4}\right)^{-3} = \left(-\frac{4}{3}\right)^3 = -\frac{64}{27}$

c) $\left(\frac{10}{3}\right)^{-3} = \left(\frac{3}{10}\right)^3 = \frac{27}{1000}$

HW: 1.3 WS

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