

SM3-A Lesson 1-7 PROPERTIES of Exponents

Whole Number System is made up of zero and the positive “counting” numbers. 0, 1, 2, 3, 4, ...

Negative Exponent Property: a negative exponent can be changed to a positive exponent by taking the reciprocal of the base. $\left(\frac{2}{1}\right)^{-2} = \left(\frac{1}{2}\right)^2$

A whole number with a negative exponent becomes a fraction. A very large negative number exponent on a whole number is equivalent to a very small decimal number.

For example $2^{-5} = \frac{1}{2^5} = \frac{1}{32} = 0.03125$

Zero Exponent Property: any base with a zero exponent simplifies to the number ‘1’. $2^0 = 1$

$$f(x) = (2^{-1})^x$$

Exponent of a Power Property of Exponents: A power (a base with an exponent) that also has an exponent, can be simplified by multiplying the exponents.

For example: $(x^3)^4 = x^{12}$ Similarly: $3^{2x} = (3^2)^x$

This property explains why replacing ‘x’ with (-x) in the exponential function causes a reflection of the original function across the y-axis

$$g(x) = 2^x$$

$$f(x) = 2^{-x}$$

$$f(x) = (2^{-1})^x \quad f(x) = \left(\frac{1}{2}\right)^x$$

