PROPERTIES OF EXPONENTS

PRODUCT OF POWERS PROPERTY
$$a^m \cdot a^n = a^{m+n}$$

When the base is the same, add the exponents

Example: $3^2 \cdot 3^7 = 3^{2+7} = 3^9$

POWER OF A PRODUCT PROPERTY
$$(a \cdot b)^n = a^n \cdot b^n$$

To find a power of a product, find the power of each factor and multiply

Example: $(2 \cdot 3)^6 = 2^6 \cdot 3^6$

POWER OF A POWER PROPERTY
$$(a^m)^n = a^{m \cdot n}$$

To find a power of a power, multiply the exponents

Example: $(5^2)^4 = 5^{2 \cdot 4} = 5^8$

QUOTIENT OF POWERS PROPERTY
$$\left(\frac{a^m}{a^n}\right) = a^{m-n}$$

To divide powers with the same base, subtract the exponents

Example: $\left(\frac{3^7}{3^5}\right) = 3^{7-5} = 3^2$

POWER OF A QUOTIENT PROPERTY
$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

To find a power of a quotient, find the power of the numerator and the power of the denominator

Example: $\left(\frac{4}{5}\right)^3 = \frac{4^3}{5^3}$

ZERO EXPONENT RULE

$$a^0 = 1$$

$$a \neq 0$$

Example: $-2^0 = -1$ $\qquad$ $0^0 = Undefined$

NEGATIVE EXPONENT RULE

$$a^{-n} = \frac{1}{a^n}$$
$$a \neq 0$$

Negative exponents in the numerator get moved to the denominator and become positive exponents.

Negative exponents in the denominator get moved to the numerator and become positive exponents.

Only move negative exponents.

Example: $5^{-2} = \frac{1}{5^2}$ $\qquad\qquad$ $0^{-3} = Undefined$