# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n =$$

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

$$(ab)^n = \underbrace{a \cdot a \cdots a}_{n-times} \cdot \underbrace{b \cdot b \cdots b}_{n-times}$$

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

$$\begin{aligned}(ab)^n &= \underbrace{a \cdot a \cdots a}_{n-times} \cdot \underbrace{b \cdot b \cdots b}_{n-times} \\ &= a^n \cdot b^n\end{aligned}$$

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

$$\begin{aligned}(ab)^n &= \underbrace{a \cdot a \cdots a}_{n-times} \cdot \underbrace{b \cdot b \cdots b}_{n-times} \\ &= a^n \cdot b^n\end{aligned}$$

Note: We are assuming here that $n$ is a positive integer, but this result can be shown for $n$ being any real number.

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

$$\begin{aligned}(ab)^n &= \underbrace{a \cdot a \cdots a}_{n-times} \cdot \underbrace{b \cdot b \cdots b}_{n-times} \\ &= a^n \cdot b^n\end{aligned}$$

Note: We are assuming here that $n$ is a positive integer, but this result can be shown for $n$ being any real number.

Example:

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

$$\begin{aligned}(ab)^n &= \underbrace{a \cdot a \cdots a}_{n-times} \cdot \underbrace{b \cdot b \cdots b}_{n-times} \\ &= a^n \cdot b^n\end{aligned}$$

Note: We are assuming here that $n$ is a positive integer, but this result can be shown for $n$ being any real number.

Example:

$$(2x)^3 =$$

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

$$\begin{aligned}(ab)^n &= \underbrace{a \cdot a \cdots a}_{n-times} \cdot \underbrace{b \cdot b \cdots b}_{n-times} \\ &= a^n \cdot b^n\end{aligned}$$

Note: We are assuming here that $n$ is a positive integer, but this result can be shown for $n$ being any real number.

Example:

$$(2x)^3 = 2^3 x^3$$

# Distributive Law of Exponents over Multiplication

Combining multiplication and exponentiation:

$$(ab)^n = \underbrace{(ab) \cdot (ab) \cdots (ab)}_{n-times}$$

Since we can multiply in any order, we can rearrange as:

$$\begin{aligned}(ab)^n &= \underbrace{a \cdot a \cdots a}_{n-times} \cdot \underbrace{b \cdot b \cdots b}_{n-times} \\ &= a^n \cdot b^n\end{aligned}$$

Note: We are assuming here that $n$ is a positive integer, but this result can be shown for $n$ being any real number.

Example:

$$\begin{aligned}(2x)^3 &= 2^3 x^3 \\ &= 8x^3\end{aligned}$$