

Rule \Rightarrow

$$x^a \cdot x^b = x^{a+b}$$

Leave the base the same and add the exponents

Rule \Rightarrow

$$(x^a)^b = x^{(a)(b)}$$

Leave the base the same
Multiply the exponents

Rule \Rightarrow

$$\frac{x^a}{x^b} = x^{a-b}$$

Leave the base the same
Subtract the exponents

Examples

$$6^3 \cdot 6^4 =$$

$$(6 \times 6 \times 6)(6 \times 6 \times 6 \times 6)$$

$$6^{3+4}$$

$$6^7$$

$$(-3)^5 \cdot (-3)^8$$

$$\underbrace{(-3)(-3)(-3)(-3)(-3)(-3)(-3)(-3)(-3)(-3)(-3)(-3)}_{(-3)^{5+8}}$$

$$(-3)^{13}$$

Examples

$$(5^3)^2$$

$$(5 \times 5 \times 5)(5 \times 5 \times 5)$$

$$5^{3 \times 2}$$

$$5^6$$

$$(2^2)^5$$

$$(2 \times 2)(2 \times 2)(2 \times 2)(2 \times 2)(2 \times 2)$$

$$2^{2 \times 5}$$

$$2^{10}$$

Examples

$$\frac{4^7}{4^3}$$

$$\frac{4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4}{4 \times 4 \times 4}$$

$$4^{7-3}$$

$$4^4$$

$$4^4$$

$$7^3$$

$$\frac{7 \times 7 \times 7}{7^5}$$

$$7^5$$

$$7 \times 7 \times 7 \times 7 \times 7$$

$$7^{3-5}$$

$$7^{-2} = \frac{1}{7^2}$$

Properties of Exponents