

Exponent Laws 1

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Exponent Laws

1.

$$a^m a^n = a^{m+n}$$

2.

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

3.

$$(a^m)^n = a^{mn}$$

4.

$$(ab)^m = a^m b^m$$

5.

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$$

6.

$$x^0 = 1$$

7.

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

8.

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

9.

$$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n, a, b \neq 0$$

10.

$$a^{p/q} = (\sqrt[q]{a})^p \text{ or } \sqrt[q]{a^p}$$

11.

$$a^{p/q} = (a^p)^{1/q} = (a^{1/q})^p$$

Exercises

Use the exponent laws to simplify.

a)

$$\frac{x^5y^2}{x^3y^4}$$

b)

$$\frac{(3a^2b)^2}{(ab^2)^3}$$

c) $(xy^2)^3$

d)

$$\frac{5x^3y^{-4}}{2x^{-2}y^2}$$

e)

$$\frac{\pi x^2y}{4xy^3}$$

f)

$$(ab)^4 \left(\frac{a^{-2}}{b^{-2}} \right)^2$$

g) $(a^2bc^{-1})^3$