

Exponent Laws

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## Exponent Laws

1.

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

2.

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

3.

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

4.

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

5.

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

6.

$$x^0 = 1$$

7.

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

8.

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

9.

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

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 evaluate.

(a)  $(7^3)^2 \div 7^4$

(b)  $(\sqrt{3})^4 \times (\sqrt{3})^3$

(c)  $(-8)^{2/3}$

(d)  $4^{-2} - 8^{-1}$

(e)  $(0.3)^3 \div (0.3)^5$

(f)  $(p^2)^3 \div (p^3)^2$

(g)  $(3^{-1})^3 \times 3^2$

(h)  $(-2)^3 \times (2^{-2})^2$

(i)  $(6^3)^4 \div 12^6$