Exponent Laws 3

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2020

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 above the simplify.

a) $\dfrac{3^{-1}+3^{-2}}{3^{-3}}$

b) $\dfrac{ab^2c+a^2bc}{abc}$

c) $\dfrac{x^{3/2}-x^{1/2}-x^{-1}}{t^3}$

d) $\dfrac{4-\sqrt{x}}{x^{3/2}}$

e) $\dfrac{3t-2t^{-1}}{t^3}$

f) $\dfrac{(p^2q+pq^3)^3}{p^3q^4}$

g) $\dfrac{x-1}{\sqrt{x}-x}$

h) $\dfrac{x-9}{x^{1/2}-3}$