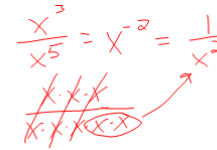


Product Property

$$x^m \cdot x^n = x^{m+n} \quad x^7 \cdot x^{-3} = x^4$$

Quotient Property

$$\frac{x^m}{x^n} = x^{m-n} \quad \frac{x^5}{x^3} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = x^2$$

$$\frac{x^3}{x^5} = x^{-2} = \frac{1}{x^2}$$


Negative exponents

$$x^{-m} = \frac{1}{x^m} \quad 2x^{-3} = \frac{2}{x^3}$$

or

$$\frac{1}{x^{-m}} = x^m \quad \frac{1}{x^{-4}} = x^4$$

Power of a power

$$(x^m)^n = x^{mn} \quad (x^5)^3 = x^{15}$$

Power of a product

$$(xy)^m = x^m y^m \quad (x^2 y^3)^4 = (x^2)^4 (y^3)^4 = x^8 y^{12}$$

Power of a Quotient

$$\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}, y \neq 0 \quad \left(\frac{x^3}{y^5}\right)^2 = \frac{x^6}{y^{10}}$$

$$\left(\frac{x}{y}\right)^{-m} = \left(\frac{y}{x}\right)^m = \frac{y^m}{x^m}$$

$$\rightarrow = \frac{x^{-m}}{y^{-m}} = \frac{y^m}{x^m}$$

Zero Power

$$x^0 = 1$$

$$\boxed{x^0} y^2 = y^2$$

$$5^0 = 1$$

$$12^0 =$$

$$(-18)^0 =$$

$$(-18)^0 = -1$$

Study tip

to simplify

- no powers of powers $(x^2)^3$
- each base appears exactly once
- all fractions in simplest form
- no negative exponents

ex. I $(3x^3y^2)(-4x^2y^4) = -12x^5y^6$

$3 \cdot -4 \quad x^3 \cdot x^2 \quad y^2 \cdot y^4$

ex. A $(-2x^4y^3z^2)^3 = -8x^{12}y^9z^6$

$(-2)^3 \quad (x^4)^3 \quad (y^3)^3 \quad (z^2)^3$

ex. B $\frac{25x^4y}{5x^2y^3} = 5x^2y^{-2} = \frac{5x^2}{y^2}$

$\frac{25}{5} \quad \frac{x^4}{x^2} \quad \frac{y^1}{y^3}$

ex. C $\left(\frac{-18a^4b^2}{-24ac^3}\right)^2 = \left(\frac{3a^3b^2}{4c^3}\right)^2 = \frac{9a^6b^4}{16c^6}$

$\frac{-18}{-24} \quad \frac{a^4}{a}$

ex. D $\left(\frac{x^4y^2}{x^7y}\right)^{-3} = (x^{-3}y)^{-3} = x^9y^{-3} = \frac{x^9}{y^3}$

$\frac{x^4}{x^7} \quad \frac{y^2}{y^1} \quad (x^{-3})^3 \quad (y^1)^{-3}$

(ex. E) $\frac{(2x^2y^3)^2(3x^4y^5)}{6x^4y^2} = \frac{4x^4y^6(3x^4y^5)}{6x^4y^2}$

$x^4 \cdot x^4$

$= \frac{12x^8y^{11}}{6x^4y^2} = 2x^4y^9$

(ex. F) $\left(\frac{45m^4n^2p^{-7}}{9m^{-8}n^4p^5} \right)^0 = 1$

(ex. G) $\frac{45m^4n^2p^{-7}}{9m^{-8}n^4p^5} = 5m^{12}n^{-2}p^{-12}$

$= \frac{5m^{12}}{n^2p^{12}}$

$\frac{8^{98}}{8^{96}} = 8^2 = 64$

p. 316-318

11-13, 16-17, 19-20, 22-
23, 26, 31-32, 36, 40,
43, 47-48