Simplify.

ex1) $\left(x^6\right)^3 = x^{6 \cdot 3} = \boxed{x^{18}}$

ex2) $x^4 \cdot x^8 = x^{4+8} = \boxed{x^{12}}$

ex3) $\left(-x^2 y^3 z^5\right)^7 = (-1)^7 \left(x^2\right)^7 \left(y^3\right)^7 \left(z^5\right)^7$

$= \boxed{-1x^{14} y^{21} z^{35}}$

Simplify.

ex4) $\dfrac{y^5}{y^2}$ = $\dfrac{y \cdot y \cdot y \cdot y \cdot y}{y \cdot y}$ = $\dfrac{y^3}{1}$ = $\boxed{y^3}$

ex5) $\dfrac{a^4 b^7}{ab^4}$ = $\dfrac{a \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b}{a \cdot b \cdot b \cdot b \cdot b}$

= $\dfrac{a^3 b^3}{1}$ = $\boxed{a^3 b^3}$

DIVIDING POWERS WITH LIKE BASES

Shortcut to dividing powers with like bases: **SUBTRACT EXPONENTS**

Exponent Rule 4: Dividing Powers with Like Bases

$$\frac{x^m}{x^n} = x^{m-n}$$

Simplify.

ex6) $\dfrac{x^4y^2z^6}{x^2yz^3}$ $=$ $\dfrac{x^2 y z^3}{1}$ $=$ $\boxed{x^2 y z^3}$

ex7) $\dfrac{2a^7b^2c}{4a^5b^6}$ $=$ $\boxed{\dfrac{1a^2c}{2b^4}}$

Reduce coefficients first!

$\dfrac{2}{4} = \dfrac{1}{2}$

Simplify.

ex8) $\left(\dfrac{1}{2}\right)^3 = \dfrac{1}{2} \cdot \dfrac{1}{2} \cdot \dfrac{1}{2} = \dfrac{1 \cdot 1 \cdot 1}{2 \cdot 2 \cdot 2} = \dfrac{(1)^3}{(2)^3}$

$$= \boxed{\dfrac{1}{8}}$$

ex9) $\left(\dfrac{3a}{4b^3}\right)^2 = \dfrac{3a}{4b^3} \cdot \dfrac{3a}{4b^3} = \dfrac{(3a)^2}{(4b^3)^2} = \boxed{\dfrac{9a^2}{16b^6}}$

FRACTIONS TO POWERS

Shortcut to raising fractions to powers:

Exponent Rule 5: Fractions to Powers

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

FRACTIONS TO POWERS

Simplify.

ex10) $\left(\dfrac{2d^3}{3e^5}\right)^2 = \dfrac{\left(2d^3\right)^2}{\left(3e^5\right)^2} = \dfrac{(2)^2\left(d^3\right)^2}{(3)^2\left(e^5\right)^2}$

$$= \boxed{\dfrac{4d^6}{9e^{10}}}$$

LAWS OF EXPONENTS

Simplify.

ex11) $\left(\dfrac{-4c^5}{2c^3}\right)^3 = \left(\dfrac{-2c^2}{1}\right)^3 = \left(-2c^2\right)^3$

> Before raising a fraction to a power, first simplify the fraction completely.

$$= (-2)^3\left(c^2\right)^3$$

$$= \boxed{-8c^6}$$

LAWS OF EXPONENTS

Simplify.

ex12) $\left[\dfrac{-3j^4k^6}{(6jk)^2}\right]^2 = \left[\dfrac{-3j^4k^6}{36j^2k^2}\right]^2 = \left[\dfrac{-1j^2k^4}{12}\right]^2$

> **Before raising a fraction to a power, first simplify the fraction completely.**

> **Don't forget about PEMDAS!**

$$= \dfrac{(-1j^2k^4)^2}{(12)^2}$$

$$= \boxed{\dfrac{1j^4k^8}{144}}$$