Warm Up Questions

Simplify by writing as a single power.

1. $\dfrac{(b^{9} \cdot b^{-7} \cdot b^{3})^{2} \times (b^{4} \cdot b^{-3})^{2}}{b^{-14}}$

2. $\dfrac{(a^{3})^{2} \cdot (a^{1/2})^{3}}{(a^{3/2})^{4}}$

3. $\dfrac{(-3/5)^{-3/4} \cdot (-3/5)^{1/2}}{(-3/5)^{5/4}}$

$$\frac{(b^9 \cdot b^{-7} \cdot b^3)^2 \quad x \quad (b^4 \cdot b^{-3})^2}{b^{-14}}$$

$$\frac{(b^5)^2 \times (b^1)^2}{b^{-14}}$$

$$\frac{b^{10} \times b^2}{b^{-14}}$$

$$\frac{b^{12}}{b^{-14}}$$

$$b^{12-(-14)}$$

$$b^{26}$$

$$\frac{(a^3)^2 \cdot (a^{1/2})^3}{(a^{3/2})^4}$$

$\frac{3}{2} \times 4 = \frac{12}{2}$

$\frac{1}{2} \times 3 = \frac{3}{2}$

$$= \frac{a^6 \cdot a^{3/2}}{a^{12/2}}$$

6/1 + 3/2
12/2 + 3/2
= 15/2

$$= \frac{a^{15/2}}{a^{12/2}}$$

15/2 - 12/2
= 3/2

$$= a^{3/2}$$

$$\frac{(-3/5)^{-3/4} \cdot (-3/5)^{1/2}}{(-3/5)^{5/4}}$$

$$\frac{(-3/5)^{-\frac{3}{4}+\frac{1}{2}}}{(-3/5)^{5/4}}$$

$$\frac{(-3/5)^{-\frac{3}{4}+\frac{2}{4}}}{(-3/5)^{\frac{5}{4}}}$$

$$\left\{\frac{(-3/5)^{-1/4}}{(-3/5)^{5/4}}\right.$$

$$(-3/5)^{\frac{1}{4}-\frac{5}{4}}$$

$$(-3/5)^{-\frac{6}{4}}$$

$$(-3/5)^{-3/2}$$ ← negative exponent

$$(-5/3)^{3/2}$$

What happens when there's more than one base?

1. $a^4 \times a^{-4} \times b^3 \times a^2 \times b^{-4}$

$a^{4+(-4)+2} \cdot b^{3+(-4)}$

$a^2 b^{-1}$

$\frac{a^2}{b^1}$

$a^2 b^{-1}$

$a^2 \left(\frac{1}{b}\right)^1$

$a^2 \left(\frac{1}{b}\right)$

$\frac{a^2}{b}$

Examples

① $x^{2}y^{-3} = \frac{x^{2}}{y^{3}}$

② $\frac{x^{5}y^{6}}{z^{-4}} = x^{5}y^{6}z^{4}$

2. $(a^3b^2)^3$

$a^{3\cdot3}\ b^{2\cdot3}$

$a^9\ b^6$

3. $\dfrac{(a^5b^3)^2}{a^3b^{-2}}$

$\dfrac{a^{10}b^6}{a^3b^{-2}}$

$a^{10-3}b^{6-(-2)}$

a^7b^8

4. $\dfrac{10c^{8}d^{-2}}{2c^{4}d^{5}}$

$5c^{8-4}d^{-2-5}$

$5c^{4}d^{-7}$

$\dfrac{5c^{4}}{d^{7}}$

5. $\dfrac{(4d^3c^{-3})(3d^6c^7)}{(2d^3c)^2}$

$\dfrac{12d^{3+6}c^{-3+7}}{(2d^3c)^2} \longrightarrow (2d^3c)(2d^3c)$

$\dfrac{12d^9c^4}{4d^6c^2}$

$3d^{9-6}c^{4-2}$

$3d^3c^2$

6. $\left(\dfrac{(-10a^2b)^2}{10a^5b^{11}}\right)^{-1}$

$\left(\dfrac{100a^4b^2}{10a^5b^{11}}\right)^{-1}$

$\left(10a^{4-5}b^{2-11}\right)^{-1}$

$\left(10^1a^{-1}b^{-9}\right)^{-1}$

$10^{-1}a^1b^9$

$\dfrac{ab^9}{10}$

Homework