4.6 Applying the Exponent Laws

THINK ABOUT IT

Work on your own.

What is the value of $\left(\frac{a^6b^9}{a^5b^8}\right)^{-2}$ when $a = -3$ and $b = 2$?

$\frac{a^5 b^8}{a^6 b^9}^{-2}$

$= \frac{a^{10} b^{16}}{a^{12} b^{18}}$

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

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

$\frac{1}{(-3)^2 \cdot (2)^2} = \frac{1}{9 \cdot 4}$

$= \frac{1}{36}$

Let's put all of our exponent skills to the test...

Don't forget the basic laws:

Make Connections

Recall the exponent laws for integer bases and whole number exponents.

Product of powers:	$a^m \cdot a^n = a^{m+n}$
Quotient of powers:	$a^m \div a^n = a^{m-n}, a \neq 0$
Power of a power:	$(a^m)^n = a^{mn}$
Power of a product:	$(ab)^m = a^m b^m$
Power of a quotient:	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$

We can use the exponent laws to simplify expressions that contain rational number bases. It is a convention to write a simplified power with a positive exponent.

Example 1 Simplifying Numerical Expressions with Rational Number Bases

Simplify by writing as a single power. Explain the reasoning.

a) $0.3^{-3} \cdot 0.3^{5}$

b) $\left[\left(-\frac{3}{2}\right)^{-4}\right]^{2} \cdot \left[\left(-\frac{3}{2}\right)^{2}\right]^{3}$

c) $\frac{(1.4^{3})(1.4^{4})}{1.4^{-2}}$

d) $\left(\frac{7^{\frac{2}{3}}}{7^{\frac{1}{3}} \cdot 7^{\frac{5}{3}}}\right)^{6}$

$\frac{2}{3} \cdot \frac{6}{1} = \frac{12}{3} = 4$

$\frac{1}{3} \cdot \frac{6}{1} = \frac{6}{3} = 2$

$\frac{5}{3} \cdot \frac{6}{1} = \frac{30}{3}$

$\frac{7^{4}}{7^{2} \cdot 7^{10}}$

$7^{-8} = \frac{1}{7}$

Practice Problems...

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Assignment- Due monday

$$-2^4+\left(\frac{1}{3}\right)^{-2}-64^{-\frac{2}{3}}+4w^0+(-3)^2+\frac{2^{-2}}{4}$$

Attachments

Image (19).jpg

4.1 Page 206 Questions.pdf

Worksheet - Simplifying Radicals (Square Roots).pdf

Review - Laws of Exponents.pdf

Review - Laws of Exponents (Grade 9).pdf

Review Solutions - Laws of Exponents (Grade 9).pdf

Warm Up - Laws of Exponents.pdf

Assignment - Radicals and Exponent Laws Feb. 2014.pdf