



Warm Up

Warm Up quiz tomorrow

Express each as a radical then evaluate:

a) $(1728)^{\frac{2}{3}} = \sqrt[3]{1728}^2 = 12^2 = 144$

Express each as a power:

a) $(\sqrt[6]{128})^7 = 128^{\frac{7}{6}}$

Express each in simplest radical form:

Entire to Mixed

a) $\sqrt{180} = \sqrt{36 \times 5} = \sqrt{36} \times \sqrt{5} = 6\sqrt{5}$

b) $\sqrt[3]{1024} = \sqrt[3]{512 \times 2} = \sqrt[3]{512} \times \sqrt[3]{2} = 8\sqrt[3]{2}$

Write each with a positive exponent:

a) $7^{-3} = \frac{1}{7^3}$

b) $242^{-2} = \frac{1}{242^2}$

c) $\frac{1}{6^{-1}} = 6^1 = 6$

d) $\left(\frac{8}{9}\right)^{-3} = \frac{8^{-3}}{9^{-3}} = \frac{9^3}{8^3}$

Handwritten notes: "move to both" (pointing to numerator and denominator), "move to top" (pointing to the denominator's negative exponent).

d) $\left(\frac{8}{9}\right)^{-3} = \frac{9^3}{8^3}$

Handwritten note: "Reciprocal of fact" (pointing to the fraction).

$\left(\frac{9}{8}\right)^3 = \frac{9^3}{8^3}$

Homework Questions

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3a) $\frac{1}{3^3} = \frac{1}{27}$ b) $(\frac{2}{3})^3 = \frac{2^3}{3^3} = \frac{8}{27}$
 c) $\frac{1}{3^3} = 3^{-3}$ d) $\frac{2^3}{4^2} = \frac{8}{16} = \frac{1}{2}$

4a) $4^2 = 16$ $4^{-2} = \frac{1}{4^2} = \frac{1}{16}$
 c) $6^1 = 6$ $6^{-1} = \frac{1}{6}$

b) $2^{-3} = \frac{1}{2^3}$ b) $3^{-3} = \frac{1}{3^3}$ d) $(-7)^{-2} = \frac{1}{7^2}$

7) a) $(\frac{1}{2})^{-2} = (\frac{2}{1})^2 = 2^2 = 4$

b) $(\frac{2}{3})^{-3} = (\frac{3}{2})^3 = \frac{27}{8}$

c) $(\frac{4}{5})^{-4} = (\frac{5}{4})^4 = \frac{625}{256}$

9) a) $4^{\frac{1}{2}} = \sqrt[2]{4} = 2$

9c) $27^{\frac{1}{3}} = \sqrt[3]{27} = 3$

9e) $(-0.027)^{\frac{2}{3}}$ or use calculator $(\frac{1}{-0.027})^{\frac{2}{3}}$
 $\frac{(-27)^{\frac{2}{3}}}{(1000)^{\frac{2}{3}}} = \frac{(-1000)^{\frac{2}{3}}}{(\sqrt[3]{1000})^2} = \frac{(\sqrt[3]{1000})^2}{(\sqrt[3]{27})^2} = \frac{(-10)^2}{(3)^2} = \frac{100}{9} = 11.11$
 (Note: The original image shows a negative sign in the final result, which is likely a typo in the original work.)

10a) $\frac{1}{9} = (3^{-1})^2 = 3^{-2}$

d) $4 = 2^2$
 $4^{\frac{1}{2}} = \frac{1}{4^{\frac{1}{2}}} = \frac{1}{2}$

Didn't flip fraction when taking opp of exp

12) $(\frac{-64}{125})^{\frac{2}{3}} = \frac{(-125)^{\frac{2}{3}}}{(64)^{\frac{2}{3}}} = \frac{(\sqrt[3]{125})^2}{(\sqrt[3]{64})^2} = \frac{(5)^2}{(4)^2} = \frac{25}{16}$

13a) $27^{\frac{4}{3}} = \frac{1}{27^{\frac{4}{3}}} = \frac{1}{(\sqrt[3]{27})^4} = \frac{1}{3^4} = \frac{1}{81}$
 b) $16^{-1.5} = \frac{1}{16^{1.5}} = \frac{1}{16^{\frac{3}{2}}} = \frac{1}{(\sqrt{16})^3} = \frac{1}{4^3} = \frac{1}{64}$
 c) $30^{-2.5} = \frac{1}{30^{2.5}} = \frac{1}{30^{\frac{5}{2}}} = \frac{1}{(\sqrt{30})^5} = \frac{1}{(\frac{1}{\sqrt{30}})^5}$

13b) $(\frac{-6}{25})^{\frac{2}{5}} = \frac{(-25)^{\frac{2}{5}}}{(81)^{\frac{2}{5}}} = \frac{(\sqrt[5]{25})^2}{(\sqrt[5]{81})^2} = \frac{(3)^2}{(2)^2} = \frac{9}{4}$
 c) $(\frac{81}{16})^{\frac{3}{4}} = \frac{(16)^{\frac{3}{4}}}{(81)^{\frac{3}{4}}} = \frac{(\sqrt[4]{16})^3}{(\sqrt[4]{81})^3} = \frac{2^3}{3^3} = \frac{8}{27}$

Use laws of exponent notes

Simplify the following (Leave your answer with positive exponents):

a) $(3xy^{-2})^4$

in order to be positive move bottom to bottom reciprocal

$$3^4 x^4 y^{-8}$$
$$= \frac{81 x^4}{y^8}$$

b) $\frac{(12r^6t^3)}{(3r^{10}t^2)}$

$$= 4 r^{-4} t^1$$
$$= \frac{4t}{r^4}$$

Example 2**Simplifying Algebraic Expressions with Integer Exponents**

Simplify. Explain the reasoning.

a) $(x^3y^2)(x^2y^{-4})$

$$= x^{3+2} y^{2+(-4)}$$

$$= x^5 y^{-2}$$

$$= \frac{x^5}{y^2}$$

b) $\frac{10a^5b^3}{2a^2b^{-2}}$

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

$$5 a^3 b^5$$



CHECK YOUR UNDERSTANDING

Simplify by rewriting the following using a single power

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

Step 1: Power of a power law

Step 2: Product of a power law

Step 3: Rewrite with positive exponent

Simplify

What is the value of $\left(\frac{a^6b^9}{a^5b^8}\right)^{-2}$ ~~what is the value~~

$$\begin{aligned} & \left(\frac{a^6 b^9}{a^5 b^8}\right)^{-2} \\ &= (a^1 b^1)^{-2} \\ &= a^{-2} b^{-2} \\ &= \frac{1}{a^2 b^2} \end{aligned}$$

you try

$$\left(\frac{8 \cdot a^5 \cdot 1}{2 \cdot a^9 \cdot b^{-1/3}} \right)^{\frac{1}{2}}$$

bottom some to top

$$= (4 a^{-4} b^{1/3})^{1/2}$$

$$= \frac{4 b^{1/3}}{a^4}^{1/2}$$

$$= \frac{4^{1/2} b^{1/6}}{a^{4/2}}$$

$$= \frac{2 b^{1/6}}{a^2}$$

Recall multiply fractions

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

Rule

$$\frac{\text{Top} \times \text{top}}{\text{Bottom} \times \text{Bottom}}$$

$$\frac{4}{1} \times \frac{1}{2} = \frac{4}{2} = 2$$

Homework

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Leave answers with positive exponents now

3bd, 5bd, 6bd,

8bdfh, 9bdfh, 10 bdfh, 14ab, 21b

Quiz Tomorrow

Do Tomorrow
Sheet



Attachments

Laws of Exponents Day 2.pdf