



Warm Up

Test Sept 26

Warm Up quiz tomorrow

Express each as a radical then evaluate:

$$\begin{aligned} \text{a) } (1728)^{\frac{2}{3}} &= \left(\sqrt[3]{1728} \right)^2 \\ &= (12)^2 \\ &= 144 \end{aligned}$$

Express each as a power:

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

Express each in simplest radical form: (Entire \rightarrow Mixed)

$$\begin{aligned} \text{a) } \sqrt{180} &= \sqrt{36 \times 5} \\ &= \sqrt{36} \times \sqrt{5} \\ &= 6\sqrt{5} \end{aligned} \quad \left. \begin{aligned} \text{b) } \sqrt[3]{1024} \\ &= \sqrt[3]{512} \times \sqrt[3]{2} \\ &= 8\sqrt[3]{2} \end{aligned} \right\}$$

Write the reciprocal for each:

a) 7^{-3}

$$\frac{1}{7^3}$$

Opp
 7^3

b) 242^{-1}

$$\text{Rec } 242^1$$

c) $\frac{1}{6}$

$$\text{Rec } 6^1$$

d) 8^2

$$\text{Rec } 8^{-2}$$

Homework Questions

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

c) $\frac{1}{3^3} = 3^2$ d) $\frac{1}{4^2} = 4^2$

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

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

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

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

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

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

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

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

9e) $(-0.027)^{\frac{2}{3}}$ or use calculator $(\frac{1}{-0.027})^{\frac{2}{3}}$
 $\frac{(-27)^{-2/3}}{1000^{-2/3}} = \frac{(\frac{1}{\sqrt[3]{-0.027}})^2}{(\frac{1}{\sqrt[3]{1000}})^2} = \frac{(\frac{1}{-0.3})^2}{(\frac{1}{10})^2} = \frac{(\frac{1}{0.9})^2}{1} = \frac{1}{0.81}$
 $= \frac{(-10)^2}{(3)^2} = \frac{100}{9} = 11.11$

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

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

Didn't flip fraction when taking opp of exp

12) $(\frac{-64}{125})^{-\frac{2}{3}}$ $= \frac{(-125)^{\frac{2}{3}}}{(-64)^{\frac{2}{3}}} = \frac{(\sqrt[3]{125})^2}{(\sqrt[3]{64})^2} = \frac{(5)^2}{(4)^2} = \frac{3125}{1624}$

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) $30^{-2.5} = \frac{1}{30^{2.5}} = \frac{1}{30^{\frac{5}{2}}} = \frac{1}{(\sqrt{30})^5} = \frac{1}{(\frac{1}{2})^5} = \frac{1}{\frac{1}{32}} = 32$

13b) $(\frac{-6}{25})^{-\frac{5}{2}}$ d) $(\frac{81}{16})^{\frac{3}{4}}$
 $= \frac{(-25)^{\frac{5}{2}}}{(-6)^{\frac{5}{2}}} = \frac{(\sqrt[2]{25})^5}{(\sqrt[2]{6})^5} = \frac{(3)^5}{(\frac{3}{2})^5} = \frac{243}{\frac{243}{32}} = \frac{243 \cdot 32}{243} = 32$
 $= \frac{(\frac{81}{16})^{\frac{3}{4}}}{1} = \frac{(\sqrt[4]{81})^3}{(\sqrt[4]{16})^3} = \frac{(3)^3}{(2)^3} = \frac{27}{8}$

Use laws of exponent notes

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

$$\begin{aligned} \text{a) } & (3xy^{-2})^4 \\ & = 3^4 x^4 y^{-8} \quad \leftarrow \text{moves to bottom} \\ & = \frac{81 x^4}{y^8} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{(12r^6t^3)}{(3r^{10}t^2)} \\ & = \frac{12}{3} \frac{r^6}{r^{10}} \frac{t^3}{t^2} \\ & = 4 r^{-4} t^1 \\ & = \frac{4t}{r^4} \end{aligned}$$

Simplify. Explain the reasoning.

$$\begin{aligned} \text{a) } & (x^3y^2)(x^2y^{-4}) \\ & x^3 \cdot x^2 \cdot y^2 \cdot y^{-4} \\ & \text{product law} \\ & = x^5 y^{-2} \quad \leftarrow \text{negative exponent law} \\ & = \frac{x^5}{y^2} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{10a^5b^3}{2a^2b^{-2}} \\ & \text{quotient law} \\ & 5 a^3 b^{3-(-2)} \\ & \quad \quad \quad 3+2 \\ & = 5 a^3 b^5 \end{aligned}$$

Simplify by rewriting the following using a single power

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

power of power

Step 1: Power of a power law

$$\left(-\frac{3}{2} \right)^{-8} \cdot \left(-\frac{3}{2} \right)^6$$

power of product

Step 2: Product of a power law

$$\left(-\frac{3}{2} \right)^{-2}$$

neg exponent law

flip fraction

$$\left(\frac{-2}{3} \right)^2$$

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

$$= \frac{4}{9}$$

Step 3: Rewrite with positive exponent

$$\left(\frac{-3}{2} \right)^{-2}$$

$$= \frac{-3^{-2}}{2^{-2}}$$

$$= \left(-\frac{2^2}{3^2} \right)$$

$$= -\frac{4}{9}$$

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

you try

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

Homework

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3ac, ~~4a~~, 5ac, 6ac,

8aceg, 9aceg, ~~10aceg~~, ~~11aceg~~, ~~12aceg~~, #14ab # 19a

Quiz Tomorrow

Do Tomorrow
Sheet



Attachments

Laws of Exponents Day 2.pdf