Simplifying Radicals 9/24

Fractional Exponents

$36^{\frac{1}{2}}$ exponent / index

Base →

exponential form

$36^{\frac{1}{2}}$ →

Radical form

$\left(\sqrt[2]{36}\right)^1$

$\left(\sqrt{36}\right)^1$

$$27^{-\frac{2}{3}}$$

$$\frac{1}{27^{2/3}} = \frac{1}{(\sqrt[3]{27})^2} = \frac{1}{3^2} = \frac{1}{9}$$

$$16^{\frac{3}{2}}$$

$$(\sqrt{16})^3$$

$$4^3$$

$$64$$

$$(\sqrt{16})^3 = \sqrt{(16)^3}$$

$$(\sqrt[3]{x})^5 = \sqrt[3]{x^5}$$

$-81^{\frac{3}{4}}$

$-\left(\sqrt[4]{81}\right)^3$

$-(3)^3$

-27

$(-81)^{3/4}$

$\left(\sqrt[4]{-81}\right)^3$

Simplify:

$$x^{\frac{3}{4}} * x^{\frac{2}{3}}$$

$x^{\left(\frac{3}{4}\right)+\left(\frac{2}{3}\right)}$

$x^{17/12}$

$$\frac{x^{\frac{1}{2}}}{x^{\frac{1}{4}}}$$

$x^{\frac{1}{2}-\frac{1}{4}} = x^{\frac{1}{4}}$

Simplify:

$$\left(x^{\frac{2}{3}} y^{3}\right)^{5}\left(3xy^{\frac{3}{4}}\right)$$

$$\left(x^{\frac{10}{3}} y^{15}\right)\left(3xy^{\frac{3}{4}}\right)$$

$$3x^{\frac{10}{3}+1}y^{15+\frac{3}{4}}$$

$$3x^{\frac{13}{3}}y^{\frac{63}{4}}$$

Simplifying Radicals

$\sqrt{27}$

$\sqrt{9} \cdot 3$

$3\sqrt{3}$

$\sqrt{x^4} = x^{\frac{4}{2}} = x^2$

$\sqrt{x^6} = x^{\frac{6}{2}} = |x^3|$

$\sqrt[3]{}$

Properties of Radicals

- For any real number a,
- If n is a positive even integer then $\sqrt[n]{a^n} = |a|$ (n even, n even, odd #)

- If n is a positive odd integer then $\sqrt[n]{a^n} = a$

Simplify: $\sqrt{x^2 y^3}$ $= x^{\frac{2}{2}}$

$\sqrt{x^2 y^2 y}$

$|xy|\sqrt{y}$

Simplify:

$$\sqrt{x^5 y^8}$$

$$\sqrt{x^4 \cdot x \cdot y^8} = x^{\frac{4}{2}}$$

$$x^2 y^4 \sqrt{x}$$

Simplify: $\sqrt{36x^7y^3}$

$\sqrt{36x^6 \cdot x \cdot y^2 \cdot y}$ (even, even)

$6|x^3|y\sqrt{xy}$ (odd)

$\sqrt{x^7}$

$\sqrt{x^6 \cdot x^3}$

$x^2\sqrt{x^3}$

$x \cdot x^2\sqrt{x^2 x}$

$x^3\sqrt{x}$

Simplify: $\sqrt[3]{-27x^7y^3z^2}$

$\sqrt[3]{-27x^6 \cdot x \cdot y^3 z^2}$

$-3x^2y\sqrt[3]{xz^2}$

Simplify: $\sqrt[4]{81x^2y^5z^6}$

$\sqrt[4]{81x^2y^4yz^4z^2}$

$3|yz|\sqrt[4]{x^2yz^2}$