

Welcome Back! Hope you had a great weekend.

All cell phones in holder.

Everything away we will start with quick check.

$$\begin{aligned}
 & x^{-\frac{1}{4}} + \frac{2}{4} \\
 & x^{\frac{2}{4}} \\
 & x^{\frac{1}{2}} y^{\frac{2}{2}}
 \end{aligned}$$

$u^{\frac{2}{3}} \cdot v^0 \cdot u^{\frac{1}{3}} v^{-\frac{2}{3}}$

$u^{\frac{2}{3}} v^{-\frac{2}{3}}$

$u^{\frac{2}{3}} v^{-\frac{2}{3}} \rightarrow \frac{u^{\frac{2}{3}}}{v^{\frac{2}{3}}}$

A) $\frac{v^{\frac{1}{3}}}{v^2}$

$\frac{1}{3} - 2 = -\frac{5}{3}$

$$3) \frac{2 \cdot 1 \cdot 1 \cdot x^{\frac{5}{3}} y^{-2}}{x^{3/2}}$$

$$\frac{2x^{\frac{5}{3} - \frac{2}{2}}}{y^2}$$
$$\frac{2x^{\frac{1}{6}}}{y^2}$$

$$\textcircled{4} \frac{6x^{\frac{3}{4}}y}{3y}$$

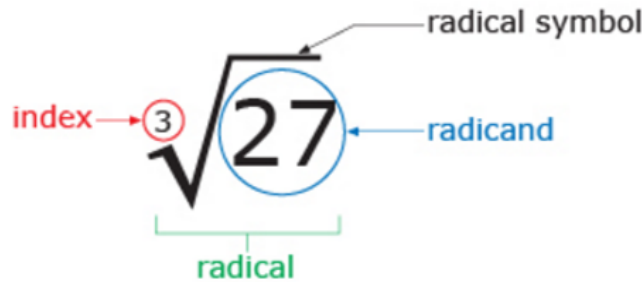
$$2x^{\frac{3}{4}}$$

$$\frac{m^{\frac{5}{8}} n^{\frac{20}{12}}}{m^0 n^{\frac{10}{12}} m^{\frac{10}{12}} n^{\frac{5}{12}}} = \frac{m^{\frac{5}{8}} n^{\frac{20}{12}}}{m^{\frac{10}{12}} n^{\frac{15}{12}}}$$
$$m^{\frac{5}{8} - \frac{10}{12}} n^{\frac{5}{12}}$$
$$m^{\frac{-5}{24}} n^{\frac{5}{12}}$$

Radical Operations

Simplifying

Parts of a Radical



How to simply:

1. Identify the index.
2. Break down the radicand to factors.
3. Group like factors.
4. If group has the same number of members as the index then a representative for the group will be placed in front.
5. Any factors that do not have a group remain inside the radical.

Examples:

$h \cdot j \cdot j \cdot j \cdot k$

Handwritten prime factorization for 48 : $2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

1. $\sqrt{48hj^3k}$
 $4j\sqrt{3hjK}$

2. $\sqrt[3]{128p^5}$
 $4p\sqrt[3]{2p^2}$

3. $\sqrt[3]{-250x^7y^6z}$
 $-5x^2y^2\sqrt[3]{2xz}$

4. $5\sqrt[3]{162a^8bc^3}$
 $15a^2c\sqrt[3]{6a^2b}$

Adding and Subtracting

You can only add or subtract radical with the same INDEX and RADICAND

How to add or subtract:

- 1. Simplify the radicals**
- 2. Identify radicals and radicand**
- 3. Add/subtract the coefficients of like radicals.**

<p>5. $-3\sqrt{7} - 4\sqrt{7}$</p> <div style="border: 1px solid blue; padding: 5px; display: inline-block; margin-top: 10px;"> $-7\sqrt{7}$ </div>	<p>6. $-3\sqrt[3]{81} + 3\sqrt[3]{48} - 3\sqrt[3]{48}$</p> <p>$-9\sqrt[3]{3} + 6\sqrt[3]{6} - 6\sqrt[3]{6}$</p> <div style="border: 1px solid blue; padding: 5px; display: inline-block; margin-top: 10px;"> $-9\sqrt[3]{3}$ </div>
<p>7. $-3\sqrt{45} + 2\sqrt{20} + 3\sqrt{8}$</p> <p>$-9\sqrt{5} + 4\sqrt{5} + 6\sqrt{2}$</p> <div style="border: 1px solid blue; padding: 5px; display: inline-block; margin-top: 10px;"> $-5\sqrt{5} + 6\sqrt{2}$ </div>	<p>8. $-3\sqrt[3]{7} + 4\sqrt[3]{-3} + 3\sqrt[3]{81} + 2\sqrt[3]{7}$</p> <p>$-3\sqrt[3]{7} - 4\sqrt[3]{3} + 9\sqrt[3]{3} + 2\sqrt[3]{7}$</p> <div style="border: 1px solid blue; padding: 5px; display: inline-block; margin-top: 10px;"> $-1\sqrt[3]{7} + 5\sqrt[3]{3}$ </div>



Multiply

In order to multiply radicals you must have the same INDEX

How to multiply:

1. Multiply the outside of the radicals and multiply the inside of the radicals
2. Simplify the radicals

$$3(2 + 5\sqrt{2})$$

$$\sqrt{3}(2 + 5\sqrt{2})$$

9. $-3\sqrt{2n^3} \cdot 3\sqrt{8n^2}$

$$-9\sqrt{16n^5}$$

$$\boxed{-36n^2\sqrt{n}}$$

10. $-3\sqrt{15n}(-\sqrt{5} - 3\sqrt{6n})$

$$3\sqrt{75n} + 9\sqrt{90n^2}$$

$$\boxed{15\sqrt{3n} + 27n\sqrt{10}}$$

Divide

$$\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

How to rationalize the denominator:

Single radical

1. Multiply the numerator and denominator by denominators radical

2. Simplify the numerator and denominator

$$\frac{\sqrt{15}}{\sqrt{3}} = \frac{\sqrt{5}}{\sqrt{1}}$$

$$\frac{4\sqrt{1}}{4} = \frac{4}{4}$$

<p>11. $\frac{2\sqrt{15}}{\sqrt{48}}$</p> <p>$4 \sqrt[4]{12}$ $4 \sqrt[4]{3}$</p> $\frac{2\sqrt{15}}{4\sqrt{3}}$ $\frac{2\sqrt{5}}{4}$	<p>12. $\frac{4 - 4\sqrt[3]{2}}{5\sqrt[3]{2}}$</p> <p>$\frac{\sqrt[3]{2^2}}{\sqrt[3]{2^2}}$</p> $\frac{4\sqrt[3]{4} - 4\sqrt[3]{2^3}}{5\sqrt[3]{2^3}}$
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$$\frac{\sqrt{5}}{2}$$

$$\frac{4\sqrt[3]{4} - 8}{10}$$

$$\frac{2\sqrt[3]{4} - 4}{5}$$

Complex Number

How to rationalize the denominator:

Single radical

1. Multiply the numerator and denominator by conjugate of the denominators

2. Simplify the numerator and denominator

<p>13. $\frac{4}{5+4\sqrt{5}} \cdot \frac{5-4\sqrt{5}}{5-4\sqrt{5}}$</p> <p>$\frac{20-16\sqrt{5}}{25-20\sqrt{5}+20\sqrt{5}-16\sqrt{25}}$</p> <p>$\frac{25-16 \cdot 5}{25-80}$</p> <p>$\frac{20-16\sqrt{5}}{-55}$</p>	<p>14. $\frac{2+3\sqrt{3}}{4-5\sqrt{3}} \cdot \frac{4+5\sqrt{3}}{4+5\sqrt{3}}$</p> <p>$\frac{8+10\sqrt{3}+12\sqrt{3}+15\sqrt{9}}{16+20\sqrt{3}-20\sqrt{3}-75}$</p> <p>$\frac{53+22\sqrt{3}}{-59}$</p>
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$$\frac{-20+16\sqrt{5}}{55}$$

$$\frac{-53-22\sqrt{3}}{59}$$