

Rationalize Roots

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YouTube Video Link to this Post is [Here](#)

Following is covered in the video

▫ **How to Rationalize Roots**

▫ **Example 1 : Rationalize** $\frac{1}{\sqrt{3}-\sqrt{2}}$

▫ **Example 2 : Rationalize** $\frac{1}{\sqrt{4}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{2}}$

How to Rationalize Roots

- To Rationalize the denominator we do computations to move the root term to the numerator.
- This is usually done by multiplying the numerator and denominator with a conjugate of the denominator.
- Thus the denominator becomes a whole number.

Example 1 : Rationalize $\frac{1}{\sqrt{3}-\sqrt{2}}$

To Rationalize $\frac{1}{\sqrt{3}-\sqrt{2}}$ we will multiply the numerator and the denominator with the conjugate of the denominator.

We can find the conjugate of $\sqrt{3}-\sqrt{2}$ by just inverting the sign between $\sqrt{3}$ and $\sqrt{2}$

=> Conjugate of $\sqrt{3}-\sqrt{2}$ will be $\sqrt{3}+\sqrt{2}$

$$\begin{aligned} \Rightarrow \frac{1}{\sqrt{3}-\sqrt{2}} &= \frac{1}{\sqrt{3}-\sqrt{2}} * \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} \\ &= \frac{\sqrt{3}+\sqrt{2}}{(\sqrt{3}-\sqrt{2})(\sqrt{3}+\sqrt{2})} \end{aligned}$$

Now the denominator is of the form $(a-b) * (a+b)$ and will be equal to a^2-b^2

$$\Rightarrow = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}^2-\sqrt{2}^2} = \frac{\sqrt{3}+\sqrt{2}}{3-2} = \sqrt{3} + \sqrt{2}$$

Example 2 : Rationalize $\frac{1}{\sqrt{4+\sqrt{3}}} + \frac{1}{\sqrt{3+\sqrt{2}}}$

Following above logic we can find that $\frac{1}{\sqrt{4+\sqrt{3}}} = \sqrt{4} - \sqrt{3}$ and $\frac{1}{\sqrt{3+\sqrt{2}}} = \sqrt{3} - \sqrt{2}$

$$\Rightarrow \frac{1}{\sqrt{4+\sqrt{3}}} + \frac{1}{\sqrt{3+\sqrt{2}}} = \sqrt{4} - \sqrt{3} + \sqrt{3} - \sqrt{2} = \sqrt{4} - \sqrt{2} = 2 - \sqrt{2}$$

Hope it helps!
Good Luck!

[Watch this video to learn the Properties of Roots](#)