

Rationalizing square roots

Definition: The conjugate of a term with two items is the same term, but with the sign in the middle changed (+ becomes -, and - becomes +)

Therefore: conjugate of $a + b$ is $a - b$

conjugate of $a - b$ is $a + b$

To rationalize a square root: Multiply (and divide) by its conjugate!

Why does this work? $(a+b)(a-b) = a^2 - b^2$

$$\text{eg } \left(\frac{1}{\sqrt{10} - 7} \right) \left(\frac{\sqrt{10} + 7}{\sqrt{10} + 7} \right) = \frac{\sqrt{10} + 7}{(\sqrt{10})^2 - (7)^2} = \frac{\sqrt{10} + 7}{10 - 49} = \boxed{\frac{\sqrt{10} + 7}{-39}}$$

$$\text{eg } \left(\frac{1}{5 + \sqrt{24}} \right) \left(\frac{5 - \sqrt{24}}{5 - \sqrt{24}} \right) = \frac{5 - \sqrt{24}}{(5)^2 - (\sqrt{24})^2} = \frac{5 - \sqrt{24}}{\underbrace{25 - 24}_1} = \boxed{5 - \sqrt{24}}$$