

# Surds lesson 8 - Rationalise denominators using conjugates

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9:34 PM

$$\begin{aligned} \frac{\sqrt{3}}{\sqrt{2}+\sqrt{5}} &= \frac{\sqrt{3}}{(\sqrt{2}+\sqrt{5})} \times \frac{(\sqrt{2}-\sqrt{5})}{(\sqrt{2}-\sqrt{5})} \\ &= \frac{\sqrt{3}(\sqrt{2}-\sqrt{5})}{(\sqrt{2}+\sqrt{5})(\sqrt{2}-\sqrt{5})} \end{aligned}$$

(conjugates)  
 $(\sqrt{2}+\sqrt{5}) \longleftrightarrow (\sqrt{2}-\sqrt{5})$

$$= \frac{\sqrt{6} - \sqrt{15}}{2 - \sqrt{10} + \sqrt{10} - 5} = \frac{-1(\sqrt{6} - \sqrt{15})}{-1(-3)} = \frac{-\sqrt{6} + \sqrt{15}}{3}$$

Rationalise the denominator:

$$\begin{aligned} \frac{2\sqrt{11} - 3\sqrt{3}}{2\sqrt{11} + 3\sqrt{3}} &= \frac{2\sqrt{11} - 3\sqrt{3}}{2\sqrt{11} + 3\sqrt{3}} \times \frac{2\sqrt{11} - 3\sqrt{3}}{2\sqrt{11} - 3\sqrt{3}} \\ &= \frac{(2\sqrt{11} - 3\sqrt{3})(2\sqrt{11} - 3\sqrt{3})}{(2\sqrt{11} + 3\sqrt{3})(2\sqrt{11} - 3\sqrt{3})} \\ &= \frac{4 \times 11 - 6\sqrt{33} - 6\sqrt{33} + 9 \times 3}{4 \times 11 - 6\sqrt{33} + 6\sqrt{33} - 9 \times 3} \\ &= \frac{44 - 12\sqrt{33} + 27}{44 - 27} \\ &= \frac{-12\sqrt{33} + 71}{17} \end{aligned}$$