Vocabulary:

A conjugate of binomial is made by changing the sign between the two terms. For example,

The conjugate of $4 + \sqrt{3}$ is $4 - \sqrt{3}$.

The conjugate of $8 - \sqrt{7}$ is $8 + \sqrt{7}$.

Steps to Rationalize a Denominator with Two Terms

1. W.O.P.
2. Multiply numerator and denominator by the conjugate of the denominator. Carefully multiply all terms in both parentheses.
3. Simplify multiplication.

Example: Rationalize $\frac{4+\sqrt{3}}{5-\sqrt{7}}$

$$\begin{aligned}
\frac{4+\sqrt{3}}{5-\sqrt{7}} &= \frac{(4+\sqrt{3})(5+\sqrt{7})}{(5-\sqrt{7})(5+\sqrt{7})} \\
&= \frac{4\cdot 5 + 4\cdot\sqrt{7} + 5\cdot\sqrt{3} + \sqrt{3}\cdot\sqrt{7}}{5\cdot 5 + 5\cdot\sqrt{7} - 5\cdot\sqrt{7} - \sqrt{7}\cdot\sqrt{7}} \\
&= \frac{20 + 4\sqrt{7} + 5\sqrt{3} + \sqrt{3\cdot 7}}{25 + 5\cdot\sqrt{7} - 5\cdot\sqrt{7} - \sqrt{7\cdot 7}} \\
&= \frac{20 + 4\sqrt{7} + 5\sqrt{3} + \sqrt{21}}{25 + 5\sqrt{7} - 5\sqrt{7} - \sqrt{7^2}} \\
&= \frac{20 + 4\sqrt{7} + 5\sqrt{3} + \sqrt{21}}{25 + 5\sqrt{7} - 5\sqrt{7} - 7} \\
&= \frac{20 + 4\sqrt{7} + 5\sqrt{3} + \sqrt{21}}{25 - 7} \\
&= \frac{20 + 4\sqrt{7} + 5\sqrt{3} + \sqrt{21}}{18}
\end{aligned}$$