

$$\begin{aligned}
ax_{\pm}^2 + bx_{\pm} + c &= a \left(\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right)^2 + b \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} + c \\
&= \frac{1}{4a} \left(b^2 \mp 2b\sqrt{b^2 - 4ac} + b^2 - 4ac \right) - \frac{b^2 \mp b\sqrt{b^2 - 4ac}}{2a} + c \\
&= \frac{b^2 \mp b\sqrt{b^2 - 4ac}}{2a} - c - \frac{b^2 \mp b\sqrt{b^2 - 4ac}}{2a} + c \\
&= 0,
\end{aligned}$$