

$$\begin{aligned}
 ||x| + 2| = 7 &\Leftrightarrow (|x| + 2)^2 = 7^2 \Leftrightarrow (|x| + 2 - 7)(|x| + 2 + 7) = 0 \Leftrightarrow \\
 &\Leftrightarrow (|x| - 5) \underbrace{(|x| + 9)}_{>0} = 0 \Leftrightarrow |x| - 5 = 0 \Rightarrow x = \pm 5
 \end{aligned}$$