Example of Absolute Value Equations

\[ |x + 9| = 5 \]

Split this into two problems: one negative and one positive.

**Positive:**

\[ x + 9 = 5 \]

Solve this for \( x \), and that is one answer.

\[ x + 9 - 9 = 5 - 9 \]
\[ x = -4 \]

**Negative:**

\[ -(x + 9) = 5 \]

Solve this for \( x \), and that is the other answer.

\[ -x - 9 = 5 \]
\[ -x - 9 + 9 = 5 + 9 \]
\[ -x = 14 \]
\[ x = -14 \]
Check the answer if you like to see how both these solutions work:

\[ |x + 9| = 5 \]

Original problem:

\[ x = -4 \]
Check:

\[ |x + 9| = 5 \]
\[ |-4 + 9| = 5 \]
\[ |5| = 5 \]
\[ 5 = 5 \]
Checks out.

\[ x = -14 \]
Check:

\[ |x + 9| = 5 \]
\[ |-14 + 9| = 5 \]
\[ |-5| = 5 \]
\[ 5 = 5 \]
Checks out.