Multiply Radicals with Negative Numbers

Example:

First simplify each radical.

\[ \sqrt{-48} \sqrt{-12} \]

\[ \sqrt{-48} = \sqrt{-16 \times 3} = 4\sqrt{-3} \]

\[ \sqrt{-12} = \sqrt{-4 \times 3} = 2\sqrt{-3} \]

Because

\[ i = \sqrt{-1} \]

replace this anywhere you see a negative under the radical:

The problem is now:

\[ 4\sqrt{-3} \times 2\sqrt{-3} \]

\[ 4i\sqrt{3} \times 2i\sqrt{3} \]

Then multiply the 4 and the 2 and the \( i \)'s:

\[ 8i^2 \times \sqrt{3} \times \sqrt{3} \]

Next, multiply the radicals and simplify:

\[ 8i^2 \sqrt{9} \]

\[ 8i^2 \times 3 \]

\[ 24i^2 \]
Because

\[ i^2 = -1: \]
\[ 24i^2 = 24 \times (-1) = -24 \]

\(-24\) is the answer. (There are many different ways to do this. This is just one way.)