MATH 140A Review: proof by contradiction and the contrapositive

Facts to Know:

To prove a statement by contradiction, do the following:

1. Assume
2. Find
3. Use the negation of the statement to find a

Example: Show that $\sqrt{2} + \sqrt{3}$ is irrational.
Facts to Know:

\[\text{If } P, \text{ then } Q.\]

\[
\text{conditional statement}
\]

Examples:

1. Find the contrapositive of: “If you are not happy, then it’s time to change something.”

2. Assume that \(x\) is an integer. If \(x^{2020} - 3x^{123} + 45\) is even, then \(x\) is odd.