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:

$$\underbrace{\text{If } P\text{, then } Q.}_{\text{conditional statement}}$$

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.