MATH 250 **Name:**
Homework 2, Spring 2023

I have neither given nor received unauthorized assistance on this assignment.

Homework 2 has questions 1 through 6 with a total of 25 points. For this assignment, use Overleaf to complete the assignment and upload the pdf to Canvas.

[5] 1. Write the *contrapositive* of the statement

If $x = 1$, then $x^2 = 1$.

Solution:

[5] 2. Write a proof of the statement

If $x = 1$, then $x^2 = 1$.

Solution:

[5] 3. Write the *converse* of the statement

If $x = 1$, then $x^2 = 1$.

Solution:

[5] 4. Show that the statement

If $x^2 = 1$, then $x = 1$.

is false. To do this, find a specific number x that makes the statement false.

Solution:

5. Show that $(P \implies Q) \implies (Q \implies P)$ is not a tautology. To do this find one example of truth values for P and Q that make $(P \implies Q) \implies (Q \implies P)$ false.

Solution:

5 6. Show that $(P \equiv Q) \equiv ((P \implies Q) \wedge (Q \implies P))$ is a tautology. Do this by completing the truth table

Solution:

P	Q	$P \equiv Q$	$P \implies Q$	$Q \implies P$	$(P \implies Q) \wedge (Q \implies P)$
T	T				
T	F				
F	T				
F	F				