MHF 3202, Dr. Block, Quiz 2 with answers Fall 2020

1. (2 points) Determine whether or not the following is a statement. If it is a statement, say if it is true or false.

   If x and y are real numbers and $5x = 5y$, then $x = y$.

   Answer: Statement, True

2. (2 points) Express the statement or open sentence in one of the forms $P \wedge Q$, $P \vee Q$ or $\sim P$. Be sure to also state exactly what statements P and Q stand for.

   $x \in A \cup B$.

   Answer: $P \vee Q$ where $P : x \in A$ and $Q : x \in B$

3. (2 points) Without changing the meaning, convert the following sentence into a sentence having the form "If P, then Q.

   For a function to be continuous, it is sufficient that it is differentiable.

   Answer: If a function is differentiable, then the function is continuous.

4. (2 points) Write a truth table for the logical statement.

   $(Q \vee R) \Leftrightarrow (R \wedge Q)$

5. (2 points) Decide whether or not the following pair of statements are logically equivalent.

   $P \wedge (Q \vee \sim Q)$ and $(\sim P) \Rightarrow (Q \wedge \sim Q)$

   Answer: The statements are logically equivalent.