# Group 1

**Problem 1.8.**  
*Prove by cases that*

*for all real numbers r, s*

The proof is by case analysis. Suppose and are real numbers. There are three cases:

**Case 1:** Suppose , this implies that and . Then,.Thus, the proposition holds in this case.

**Case 2:** Suppose , this implies that and . Then,. So the proposition holds in this case.

**Case 3:** If , this implies that . Then,. So the proposition holds in this case.

This implies that the proposition holds all cases.

**Problem 1.14.**

Prove that if , then either or must be , where , and are nonnegative real numbers.

We used proof by contradiction. Suppose the claim is false, and if , then both and must be .

Due to the limitation that , and are nonnegative real numbers, we get , which contradicts the supposition that . Thus, if , then either or must be .