MATH-300 Andrew Jones

Worksheet 3

Let A, B, and C be sets. Prove or disprove the following statements.

- 1. If $A \cap B = \emptyset$ and $B \cap C = \emptyset$, then $A \cap C = \emptyset$
- 2. If $A \not\subset B$ and $B \not\subset C$, then $A \not\subset C$
- 3. If $A \subset \emptyset$, then $a = \emptyset$
- 4. If $A \subset C$ and $B \subset C$, then $A \cap B \subset C$
- 5. If $f:A\to B$ is injective and $g:B\to C$ is injective, then $g\circ f:A\to C$ is injective.
- 6. If $f:A\to B$ is surjective and $g:B\to C$ is surjective, then $g\circ f:A\to C$ is surjective
- 7. Give an example of a function $f: A \to A$ that is injective but not surjective.
- 8. Give an example of a function $g:A\to A$ that is surjective but not injective.
- 9. Let $f: A \to B$ and $g: B \to A$. If $g \circ f = id_a$