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 $g \circ f = id_a$