Math 2513
Homework Assignment #7
to turn in on Wednesday, June 15

Problem 1. Let $A$ and $B$ be sets. Use a proof by contradiction to show that if $A$ is a subset of $B$ then $A - B = \emptyset$.

Problem 2. Let $A$, $B$ and $C$ be sets and let $f : A \rightarrow B$ and $g : B \rightarrow C$ be functions.
(a) Show that if $f$ and $g$ are both one–to–one then $g \circ f$ is also one–to–one.
(b) Show that if $f$ is not one–to–one then $g \circ f$ is not one–to–one.
(c) Give an example of functions $f$ and $g$ for which $g \circ f$ is one–to–one but $g$ is not one–to–one.

Problem 3. Let $A$, $B$ and $C$ be sets and let $f : A \rightarrow B$ and $g : B \rightarrow C$ be functions.
(a) Show that if $f$ and $g$ are both onto then $g \circ f$ is onto.
(b) Give an example of functions $f$ and $g$ for which $g \circ f$ is onto but $f$ is not onto.


Problem 5. Do exercise # 30 on page 18.

Problem 6. Do exercise # 16 on page 27.

Problem 7. Do exercise # 28 on page 27.

Problem 8. Consider the implication $\mathcal{P} : If f : A \rightarrow B$ is a surjective function then $f : A \rightarrow B$ has an inverse.
(a) State the converse of $\mathcal{P}$.
(b) State the contrapositive of $\mathcal{P}$.
(c) State the inverse of $\mathcal{P}$.
(d) Which, if any, of (a), (b) or (c) is a true statement? (No explanation required this time.)