

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 4. Do exercise # 28 on page 18.

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.)