

MAT 511 Fundamental Concepts of Math

Problem Set 9
due Thursday, Nov 13

Please prove all your answers. Short and elegant proofs are encouraged but not required.

Problem 1. The set X has n elements, the set Y has m elements (m and n are natural numbers). How many functions from X to Y are there? Prove your answer by induction (induct on the parameter n).

Problem 2. Let $f : X \rightarrow Y$ be a function, $A, B \subseteq X$. Determine whether the following statements are true or false; give proofs or counterexamples.

- (a) if $f(A) \subseteq f(B)$, then $A \subseteq B$.
- (b) $f(A \cup B) = f(A) \cup f(B)$
- (c) $f(A \cap B) = f(A) \cap f(B)$
- (d) $f(A - B) = f(A) - f(B)$
- (e) $f(\tilde{A}) = \widetilde{f(A)}$

Please also do questions

4bde from section 3.2

3c, 6ce from section 3.3

9 from section 3.4

3be, 5c from section 4.4.