

# M 431: Assignment 1

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## Page 7 — Problem 14

*Problem.* If  $C$  is a finite set, let  $m(C)$  denote the number of elements in  $C$ . If  $A, B$  are finite sets, prove that

$$m(A \cup B) = m(A) + m(B) - m(A \cap B)$$

*Proof.*

## Page 7 — Problem 20

*Problem.* Show, for finite sets  $A, B$ , that  $m(A \times B) = m(A)m(B)$ .

*Proof.*

## Page 13 — Problem 6

*Problem.* If  $f : S \longrightarrow T$  is onto and  $g : T \longrightarrow U$  and  $h : T \longrightarrow U$  are such that  $g \circ f = h \circ f$ , then  $g = h$ .

*Proof.*

## Page 20 — Problem 11

*Problem.* Can you find a positive integer  $m$  such that  $f^m = i$  for all  $f \in S_4$ ?

*Proof.*

## Page 20 — Problem 13

*Problem.* Show that there is a positive integer  $t$  such that  $f^t = i$  for all  $f \in S_n$ .

*Proof.*