

CSE 2500: Problem Set Two

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1 Exercise 1

Determine whether $f : \mathbb{Z} \times \mathbb{Z} \rightarrow \mathbb{Z}$ is onto, if

- $f(m, n) = 2m - n$.
- $f(m, n) = n^2 - m^2$.
- $f(m, n) = m + n + 1$.
- $f(m, n) = |m| - |n|$.
- $f(m, n) = m^2 - 4$.

Recall that $\mathbb{Z} = \{0, \pm 1, \pm 2, \dots\}$.

2 Exercise 2

Let $f : A \rightarrow B$ and $S, T \subseteq A$. Show that

- $f(S \cup T) = f(S) \cup f(T)$.
- $f(S \cap T) \subseteq f(S) \cap f(T)$.
- Prove or disprove $f(S \cap T) = f(S) \cap f(T)$.