
Math 3000 - Assignment 2 : Due Friday Sept 9, in class (15 pts)

1. (4 pts) Prove the following identity for sets:

$$A \times (B \setminus C) = (A \times B) \setminus (A \times C).$$

(You may either use logical equivalences or show that each side is a subset of the other).

2. (4 pts) Prove that for any sets A and B , $\mathcal{P}(A) \cup \mathcal{P}(B) \subseteq \mathcal{P}(A \cup B)$. Is it always true that $\mathcal{P}(A \cup B) \subseteq \mathcal{P}(A) \cup \mathcal{P}(B)$?
3. (4 pts) Prove parts c and d of Theorem 2.2 in the notes on sets.
4. Let $f : \mathbb{Z} \rightarrow \mathbb{Z}$ be defined by $f(n) = 3n + 2$.
- (1 pt) Is the range of f equal to \mathbb{Z} ? Justify your answer.
 - (1 pt) Find the image of $E = \{-2, -1, 0, 1, 2\}$.
 - (1 pt) Find the pre-image of $H = \{2n : -4 \leq n \leq 4\}$.