1. ASSIGNMENT 6

1.1. **Problem 1.** Suppose $f : X \to Y$ is a function and $A, B \subseteq Y$. Show that

$$f^{-1}[A \cup B] = f^{-1}[A] \cup f^{-1}[B]$$

1.2. **Problem 2.** Let $f(x) = x^2$. Find a subset $E \subseteq \mathbb{R}$ such that

$$f^{-1}[f[E]] \neq E$$

1.3. **Problem 3.** Prove that

$$f(x) = 3x - |x| + |x - 2|$$

is 1-1 on $\mathbb{R}$.

1.4. **Problem 4.** If

$$f(x) = \cos x$$

and $E = [0, \infty)$, find $f[E]$ and $f^{-1}[E]$.