

8100 Problem Set 1.

September 1, 2021

Prove the following results. Unless otherwise stated, assume \succeq is complete and transitive and \succ, \sim are as defined in the notes.

- 1.** *If \succeq is complete but intransitive there is some budget $B \subseteq X$ with $\#(B) \geq 3$ such that $C(B) = \emptyset$.*
- 2.** *If \succeq is complete and transitive, then $\forall x, x' \in X$ either $\succeq(x) \subseteq \succeq(x')$ or $\succeq(x') \subseteq \succeq(x)$.*
- 3.** $\succ \cup \sim = \succeq$ & $\succ \cap \sim = \emptyset$.
- 4.** $\sim(x) = \succeq(x) \cap \preceq(x)$.
- 5.** $\succeq(x) = \sim(x) \cup \succ(x)$.
- 6.** \sim is transitive but not necessarily complete.
- 7.** \succ is transitive but not necessarily complete.