

Homework 1 - EconS 501 (Wednesday, September 2nd)

1. Moana and Maui need to find the magical fish hook. Maui lost this weapon after stealing the heart of Te Fiti and his subsequent battle with the lava demon Te Kā. The fish hook was lost in sea, and eventually was found by Maui's arch-rival Tamatoa, who placed the fish hook on his shell as a prize. In order to find the hook they need to combine two techniques of navigation, that is, intense observation of (1) the celestial bodies in the sky (technique x) and (2) the swells of the water (technique y). Maui is an expert in the art of navigation, and he weakly prefers a combination of technique x and y that contains more of observation of the sky, i.e., $(x_1, y_1) \succsim (x_2, y_2)$ if and only if $x_1 \geq x_2 + 1$. For this preference relation: describe the upper contour set, the lower contour set, the indifference set of bundle $(3, 2)$, and interpret them. Then check whether this preference relation is rational (by separately examining whether they are complete and transitive), monotone, and convex.
2. Consider the following preference relation defined in $X = \mathbb{R}_+^2$. A bundle (x_1, x_2) is weakly preferred to another bundle (y_1, y_2) , i.e., $(x_1, x_2) \succsim (y_1, y_2)$, if and only if

$$\min \{3x_1 + 2x_2, 2x_1 + 3x_2\} \geq \min \{3y_1 + 2y_2, 2y_1 + 3y_2\}$$

- (a) For any given bundle (y_1, y_2) , draw the upper contour set, the lower contour set, and the indifference set of this preference relation. Interpret.
 - (b) Check if this preference relation satisfies: (i) completeness, (ii) transitivity, and (iii) weak convexity.
3. Explain transitivity in preference relations. Provide an example (different to the examples discussed in class) where this property is not satisfied and discuss the consequences of intransitive preferences.
 4. For each of the following preference relations in the consumption of two goods (1 and 2): describe the upper contour set, the lower contour set, the indifference set of bundle $(2, 1)$, and interpret them. Then check whether these preference relations are rational (by separately examining whether they are complete and transitive), monotone, and convex.
 - (a) Bundle (x_1, x_2) is weakly preferred to (y_1, y_2) , i.e., $(x_1, x_2) \succsim (y_1, y_2)$ if and only if $x_1 \geq y_1 - 1$.
 - (b) Bundle (x_1, x_2) is weakly preferred to (y_1, y_2) , i.e., $(x_1, x_2) \succsim (y_1, y_2)$, if $x_1 \geq y_1 - 1$ and $x_2 \leq y_2 + 1$.