

Problem Set 1

Question 1

- (a) Discuss why in reality the preference relation of a consumer may not be complete.
- (b) Suppose you have to use a scale with a precision of $\pm 5\text{g}$ to measure the weight of three gold coins. The first coin has an exact weight of 24.8 g, the second coin has a weight of 25.1 g and the third coin has a weight of 25.4 g. Can you use the scale to construct a preference relation of the three coins that is both complete and transitive, given that you always prefer a coin that is heavier?
- (c) Discuss how framing effects may influence preference relations in reality.

Question 2 (adapted from Jehle/Reny)

Sketch a map of indifference sets that are all parallel, negatively sloped straight lines, with preference increasing north-easterly. Show that these indifference sets do not satisfy strict convexity.

Question 3

Derive the Marshall demand function, the indirect utility function, the Hicks demand function and the expenditure function for a household with the following (direct) utility functions

- (a) $U(x_1, x_2) = 2\alpha x_1^{0.5} + x_2$ (Quasi-linear)
- (b) $U(x_1, x_2) = [x_1^\rho + x_2^\rho]^{1/\rho}$ (CES)
- (c) $U(x_1, x_2) = [x_1 - \bar{x}_1]^\alpha [x_2 - \bar{x}_2]^{1-\alpha}$ (Stone Geary)

Question 4

Confirm Roy's Identity, Shepard's Lemma, and the duality between Marshall and Hicks demand functions for the above CES utility function.

Question 5

Consider the vNM utility functions $u(w) = \ln w$ and $u(w) = -2e^{-0.5w}$. Determine the Arrow-Pratt measures of absolute and of relative risk aversion.