

QR 26: Choice and Chance
The Mathematics of Decision Making

Unit I Study Guide: The Logic of Preferences

Synopsis: How do we formulate particular decision problems wisely? How do we use mathematics to formalize the structure of decision problems in general?

Vocabulary: Set, relation, preference relation, feasible set, independence of irrelevant alternatives, domain shrinkage, transitivity, irreflexivity, equivalence, partition, function, linear transformation, nominal, ordinal, interval, and ratio scales, Proact.

For Class I.1 on February 3, 2000

Topics: Classification of decision making. Some mathematical notation.

Reading: Syllabus and hand-outs.

Do: Fill out a student data form and an Activity I questionnaire.

For Class I.2 on February 8, 2000

Topics: Sets of Alternatives. Binary relations for representing preferences.

Read: Smart Choices Chapters 1, 2, 4; Kreps Chapters 2 and 3.

Note that Totrep is the name Kreps uses for a fictional character (Trade-off Talking Rational Economic Person), but Houthakker and Sen are names of real economists.

Due: Fill out a student data form and an Activity I questionnaire if you have not yet.

For Section I.1 on February 9, 2000

Topics: Help with exercises, lecture material, and setting up Excel.

Due: Find a copy of Microsoft Excel you can use for this course.

For Class I.3 on February 10, 2000

Topics: Choice functions

Due: Exercises as attached.

For Class I.4 on February 15, 2000

Topics: Value functions

Read:

Due: For discussion, a page or so analysis of choosing a course, plus a page or so beginning analysis of the personal decision problems you wish to pursue (cf. Growney #11 and #13).

Serving on national fellowship selection committee, you notice that the system for scaling letter grades to compute class averages is different at Harvard from other colleges. If student record X ranks higher than Y at Harvard, can you conclude that the same grade record X would also rank higher than Y at other colleges? Do it make sense to say Record X is 10% better than record Y? Record X is twice as strong as Record Y? Does it make a difference if the two averages are computed on the same or different scales? By what system would you rank students based on their grades?