Economics 701A **Steven A. Matthews**
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Exam

80 points, 75 minutes. Closed books, notes, calculators.
Indicate your reasoning, using clearly written words as well as math.

1. (40 pts) A consumer with a strictly increasing utility function $u : \mathbb{R}^2_+ \to \mathbb{R}$ has the expenditure function

$$e(p, U) = \left(p_1^a + p_2^b + 2p_1^c p_2^c\right) U^2, \text{ where } a, b, c > 0.$$

   (a) (10 pts) What can you say about the exponents a, b, and c? Prove your answers.

   (b) (10 pts) Find the Hicksian demand functions, $h_1(p, U)$ and $h_2(p, U)$.

   (c) (10 pts) Find the indirect utility function, $v(p, m)$.

   (d) (10 pts) Find the utility function u.

2. (40 pts) Urn R contains 49 green balls and 51 blue balls. Urn U contains 100 balls, each of which is green or blue. One ball will be randomly drawn from one urn. The decision maker, DM, will be allowed to choose the urn.

   In scenario G, DM will be paid \$1000 if the ball that is drawn is green, and nothing if it is blue. In this scenario DM chooses urn R. That is, referring to the gambles as G_R when she chooses urn R and G_U when she chooses urn U, her preference is $G_R \succ G_U$.

   In scenario B, DM will be paid \$1000 if the ball she chooses is blue, and nothing if it is green. In this scenario DM also chooses urn R. That is, referring to these gambles as B_R when she chooses urn R and B_U when she chooses urn U, her preference is $B_R \succ B_U$.

   (a) (20 pts) Are DM's choices consistent with maximizing expected utility, with subjective probabilities for urn U and objective ones for urn R? Prove your answer.

   (b) (10 pts) Describe a set of states such that each of the four gambles is a Savage "act," i.e., a function from the set of states to a set of consequences. Depict them in a table as we did in lecture.

   (c) (10 pts) Are DM's choices consistent with the Sure-Thing Principle? Prove your answer directly from the definition of the principle.