DEPARTMENT OF ECONOMICS | DEC 3, 2021
SAN JOSE STATE UNIVERSITY | 6:00 P.M. TO 9:30 P.M.
MASTER'S COMPREHENSIVE EXAMINATION | PROCTOR: LOMBARDI & RIETZ

INSTRUCTIONS:

1. Answer ONLY the specified number of questions from the options provided in each section. Do not answer more than the required number of questions. Each section takes one hour.
2. Your answers must be on the paper provided. No more than one answer per page. Do not answer two questions on the same sheet of paper.
3. If you use more than one sheet of paper for a question, write "Page 1 of 2" and "Page 2 of 2."
4. Write ONLY on one side of each sheet. Use only pen. Answers in pencil will be disqualified.
5. Write **------ END -----** at the end of each answer.
6. Write your exam identification number in the upper right-hand corner of each sheet of paper.
7. Write the question number in the upper right-hand corner of each sheet of paper.

Section 1: Microeconomic Theory—Answer Any Two Questions.

1A. (Econ 104)
Ben has the utility function $u = x^2y$ and the budget constraint $M = p_x x + p_y y$ where x and y are quantities of two consumption goods whose prices are p_x and p_y respectively.

- **a)** Find the optimal x and y that maximize Ben's utility.
- **b)** Write down Ben's indirect utility function.
- **c)** Show $df^*(M)/dM = \lambda(M)$.
- **d)** Give an interpretation of λ.

(over)

1B. (Econ 201)
Grace's preferences are described by the utility function $U(x_1, x_2) = \alpha\ln(x_1) + \beta\ln(x_2)$ where α and β are positive constants and ln(x) is the natural log of x. Her income is I and prices of both goods are p_1 and p_2, respectively.

a) Find her uncompensated demand functions for x_1^* and x_2^* using the Lagrangian method.
b) For $\alpha + \beta = 1$, calculate the income and substitution effects for x_1.

1C. (Econ 201)
There are ten players in a game show. Each player is put in a separate room. If one or more players volunteer to help the others, then each volunteer will receive $1000 and each of the remaining players (the non-volunteers) will receive $1500. If no player volunteers, then they all get zero. Thus, this is a simultaneous-move game, where each player has two actions: (1) volunteer and (2) not volunteer; suppose one's payoff is the amount of money that he/she receives in the game.

a) Describe the pure-strategy Nash equilibria.
b) Find the symmetric mixed-strategy Nash equilibrium.
c) Calculate the probability that no one volunteers in the mixed-strategy Nash equilibrium.