Economics 441 Final
Fall 2007

True, false, uncertain, explain (5 points each): Indicate whether each of the following statements is true, false or uncertain and *explain your answer*. The answer 'uncertain' should be used when the statement may or may not be true, depending on the situation, and not when you are uncertain of the answer. If a word or phrase is underlined, you must include a concise definition of the word or phrase in your answer.

1. The complete condition for Pareto efficiency in the allocation of private goods A and B to persons 1 and 2 in the case of *variable production* is

$$MRS_{AB}^{1} = MRS_{AB}^{2}$$

2. In order to determine the economy-wide demand for a public good, demand curves must be summed vertically, holding price fixed.

3. The 45 degree line in the Lorenz curve represents perfect equality.

4. The following is an exact replication of a vote cycling example presented by Group 16.

Preference order	Brad	Jen	Angelina
1st	Oreo	Strawberry	Rocky Road
2nd	Rocky Road	Oreo	Strawbery
3rd	Strawberry	Rocky Road	Oreo

5. In the standard formula describing the relationship between taxes, the dependency ratio and the replacement ratio in a pay-as-you-go Social Security system,

$$t = (N_b / N_w) * (B / w),$$

   if the dependency ratio grows by 50% from one generation to the next, in order to support the old replacement ratio in the new generation the tax rate must increase by 50%.

6. In the U.S. tax code, capital income is indexed to inflation.

7. Taxing cigarette packs heavily is an effective way for the U.S. government to 'punish' tobacco companies.

8. Average Indexed Monthly Earnings (AIME) are used to calculate the Primary Insurance Amount (PIA), which is the basic monthly Social Security benefit received by a worker who retires at age 65.

Essays (20 points each):

1. Suppose you're Wonder Woman and are therefore immortal. You decide to take advantage of your immortality by buying an annuity (a financial asset that pays you a fixed amount annually for as long as you remain alive) from an unsuspecting insurance company.

    (a) You (Wonder Woman) find annuities very appealing, while mere mortals are less likely to purchase them. Of what insurance market problem is this situation symptomatic? How might you expect these factors to influence insurance markets' pricing of annuity contracts in equilibrium?

    (b) You identify two available annuity contracts, each costing $800 up front. The first pays you $100 annually starting next year and continuing until you die (which you won't). The second pays you $100 now and in every subsequent year until you die (which, again, you won't). The annual market rate of return is .10. What is the present value of each stream of annuity payments to you?

    (c) Write (though you need not derive) the formula for the present value of $B paid to you annually starting next year and continuing in every year indefinitely, with an annual market rate of return of r. Write (though you need not derive) the formula for the present value of $B paid to you annually starting right now and continuing in every year indefinitely at the same market return. Why do they differ, and by how much?

2. In Washington, D.C. Temporary Aid for Needy Families benefits are reduced by $1 for every $1 earned in the labor market.

    (a) Suppose parents who earn 0 income receive a TANF transfer of $*G*. Draw the budget constraint (in leisure-consumption space) faced by a TANF recipient in D.C. when making the decision of how much to work.

    (b) On your graph for part (a), draw the indifference curves of a parent who would work in the absence of a TANF program, but in the presence of TANF chooses not to work.

    (c) On a new graph of the consumption-leisure choice with a TANF budget constraint, depict the indifference curves of a parent who would always work positive hours, with or without TANF.

(d) What is the difference between the preferences of the parents in parts (b) and (c)?

(e) What differences between the work options of those who do and do not receive TANF benefits have we abstracted from in constructing this theoretical model of the world? Can we reasonably infer that all TANF recipients have a stronger relative preference for leisure than non-recipients? Why or why not?

3. Adnan consumes barley and corn. His total income in the absence of a tax on either good is expended on barley and corn according to the following equation

$$I = p_b b + p_c c\,.$$

(a) Graph Adnan's budget constraint and preferred consumption bundle, which lands him on indifference curve *i,* in barley-corn space. (It may help to draw a BIG graph).

(b) Now a tax of *t* times the purchase price of barley is imposed on barley. Write Adnan's new budget constraint relating income to expenditure on corn and barley. Add the new budget constraint to your graph in part (a). Graph Adnan's new preferred barley, corn bundle under the tax, which puts him on indifference curve *ii*.

(c) Draw the equivalent variation of the barley tax on your graph. Be careful to label the distance indicating its amount. What does the equivalent variation measure? Does the tax impose any excess burden? Explain your answer using your graph.

(d) Suggest an alternative tax that imposes no excess burden. How would you depict its effect on the budget constraint in your graph?