# MIDTERM EXAM

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Questions marked **(T,F,U)** should be answered "True," "False," or "Uncertain," and your answer should be briefly justified. Note that points will be awarded based only on your reasoning, not on the answer itself, even if correct.

(1) **(T,F,U)** A consumer's Hicksian demand curve for a good generally will shift if the prices of other commodities change.
(2) **(T,F,U)** In response to a new pollution regulation, the price of gasoline goes up and the government must compensate consumers $200 to avoid a loss in their utility. This is the same amount that consumer's would have been willing to pay to avoid the price change in the first place.
(3) **(T,F,U)** Consider an economy with only two goods, wine and beer. For a person with income $Y$ who isn't fond of alcohol (but who nonetheless prefers more to less), both goods may be inferior.
(4) **(T,F,U)** The utility function $U(x) = -1/x$ doesn't yield a valid set of demands; since it's negative, it violates the axiom of nonsatiation.
(5) **(T,F,U)** If income elasticities are equal for all goods, then all Marshallian demand functions must be downward sloping.
(6) **(T,F,U)** Tweedledee and Tweedledum are similar in every way except that Tweedledee has preferences over tea ($T$) and biscuits ($B$) given by

$$U_1(T, B) = \log(T) + \log(B)$$

while Tweedledum has preferences given by

$$U_2(T, B) = 2TB.$$

Though we can't observe the utility they derive, We can tell them apart from their *behavior* because Tweedledum will drink more tea than will Tweedledee.

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(7) The U.S. Pacific Northwest is a region rich in water resources. Dams are built on many rivers to provide inexpensive hydroelectric power to many communities. Unfortunately, dams also become an almost impenetrable barrier to adult salmon, which need to migrate upstream to procreate. In recent years, the salmon population has been declining. Let's assume that in a particular community in the Pacific Northwest there are only two goods being consumed, electricity ($q_1$) and other goods ($q_2$). The current budget is equal to \$72, the current price of electricity is $p_1 = 9$ and the current price of the other goods is $p_2 = 1$. This community is considering the construction of a new dam on one of its principal rivers. It has been estimated that the increased supply of electricity will reduce the price of electricity to $p_1 = 1$. Unfortunately, however, the existing population of salmon will die. Let's assume that the community has the utility function

$$U(q_1, q_2) = 4\sqrt{q_1 q_2}.$$

a) In order to keep the local people from building the dam, the government is considering compensating them in lump sum. How much does the government have to offer?
b) Once the dam is built, how much are local people willing to spend on lobbying in order to prevent the dam being torn down as proposed by an environmental group?
Let us assume that the salmon is sufficiently valuable that the dam won't be built. However, rather than making a lump sum transfer, the government decides to subsidize consumers \$5 for each unit of electricity consumed.
c) How much does the subsidy cost the government? How large a lump sum transfer would be required to move consumers to the same level of utility as obtained by by the subsidy?