SUID:

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Exam 1
Fall 2021

DO NOT OPEN THIS EXAM UNTIL YOU ARE TOLD TO DO SO.

Instructions

1. Write your SUID in the upper right corner of this exam. **DO NOT** write your name.

2. **SHOW ALL YOUR WORK**. Answers without supporting work will receive little or no credit.

3. There are 75 points possible on this exam and you will have 80 minutes to complete it. Be sure to budget your time accordingly.

4. You may write on the backs of pages, on the extra page at the end, or on extra sheets of paper but **BE SURE TO NOTE THAT NEAR THE QUESTION**.

5. If you use extra sheets of paper, please number them so you can do step 4 above.

Area of a triangle: $\frac{1}{2}bh$ Area of a trapezoid: $\left(\frac{b_1+b_2}{2}\right)h$

Question 1 (30 points)

A good is purchased by households of types A and B and produced by sellers of type C. Key information about each group is shown below:

Type	**Number**	**Curve**	**Income**
Individual type A buyer	60	$WTP_{Ai} = 80 - 0.2 * Q_{Ai}^{D}$	120,000
Individual type B buyer	50	$WTP_{Bi} = 48 - 0.1 * Q_{Bi}^{D}$	35,000
Individual type C seller	80	$WTA_{Ci} = 0.1 * Q_{Ci}^{S}$	NA

(a) *15 points.* Please compute: ☐ the market equilibrium price and quantity; ☐ the quantity purchased by an individual type-A household; ☐ the quantity sold by an individual type-C seller; and ☐ illustrate the market equilibrium with an appropriate graph. (There is additional space on the next page.)

Additional space for Question 1.

Question 1, continued

Now suppose the government is considering a $10 tax on the good and would like to know how it would impact the market, and whether it would be progressive or regressive.

(b) *15 points.* Please compute the following when the tax is in place: ☐ the new buyer and seller prices; ☐ the share of the tax burden borne by buyers; ☐ the new market quantity; ☐ the new quantity purchased by an individual household of each buyer type (A and B); ☐ the amount of tax revenue paid by an individual household of each buyer type (A and B); and, finally, ☐ indicate whether the tax is progressive or regressive, including any necessary calculations.

Question 2 (15 points)

A good is produced by two suppliers: a domestic firm (H, for home production) and a foreign firm (F). The market price is currently $200 and 6000 total units are being consumed. The home producer H is supplying 5000 units and has a supply elasticity of 1.2. The foreign producer F has a perfectly elastic supply curve with a $WTA_f = \$140$, but there is currently a quota in place that limits imports to 1000 units. Demand for the good is known to have an elasticity of -0.5.

Please determine what would happen if the quota were removed. Calculate: ☐ the new market price; ☐ the new total quantity consumed; ☐ the new quantities supplied by both H and F; ☐ the changes in CS and PS; and ☐ the overall change in SS.

Question 3 (15 points)

The government would like to intervene in a market for vaccinations. Each vaccination produces a positive externality but the size of the externality falls as Q rises since there are fewer and fewer unprotected people receiving the external benefit. The market WTP and WTA curves for vaccinations are given below, as is the MB curve for the externality. Initially there is no tax or subsidy.

$$WTP = 500 - 2 * Q_M^D$$
$$WTA = 3 * Q_M^S$$
$$MB_e = 280 - Q_M^D$$

Please determine: ☐ the initial market equilibrium price and quantity in the absence of a policy; ☐ the efficient quantity; ☐ the efficient buyer and seller prices; ☐ the subsidy rate that would move the market to the efficient equilibrium; and ☐ the change in the external benefits created by the externality.

Question 4 (15 points)

Taxes on goods that create negative externalities are sometimes said to have a "double dividend" because they provide government revenue as well as reducing the externality. This problem explores the issue.

Suppose that production of a good creates $50 of external costs (such as environmental damage) for each unit produced. The market WTP and WTA curves for the good are given below, as is the MC curve for the externality. Initially there is no tax or subsidy.

$$WTP = 200 - 0.5 * Q_M^D$$
$$WTA = 2 * Q_M^S$$
$$MC_e = 50$$

The government is considering imposing a $50 tax to address the problem.

(a) Please determine: ☐ the initial market equilibrium price and quantity in the absence of the policy; ☐ the new quantity under the tax; ☐ the new buyer and seller prices; ☐ the tax revenue generated by the policy; ☐ the changes in CS, PS and the external damages; ☐ the change in SS; and ☐ *either* the overall cost per dollar of revenue *or* the deadweight loss per dollar of revenue. Finally, ☐ comment briefly on how your last result differs from a typical tax policy.

Additional page for calculations
If you use this, please remember to indicate near the question that part of the answer is here.