Blue-book – 25 out of 50 pts. (2 qns., 12 pts. each + 1)

Answer these questions in your blue-book. Show your work and intermediate steps for partial credit. Points are split equally across all sub-parts. Your score will only be based on the marks in your blue-book. You will not receive any credit for anything written on your exam paper. You will receive 1 extra point for correctly writing your name, perm number, version (A, B, C, or D), and TA’s name on your blue-book.

1. Douglas has only one asset, a bike worth $200, that he keeps locked up outside overnight. With probability \( \pi_s = .2 \) thieves steal the wheels and seat, and he is left with only the $50 frame.

(a) Douglas can buy as much bike-theft insurance as he would like from the Isla Vista Insurance for STudents Association (IVISTA), which charges \( p = \frac{2}{3} \) dollars per dollar of coverage. Let \( c_{ns} \) be his consumption if his bike is not stolen and \( c_s \) be his consumption when it is stolen. Write the equation of his state-contingent budget constraint, with \( c_{ns} \) isolated on the left, written as a function of \( c_s \).

Answer: \( c_{ns} = 300 - 2c_s \)

(b) Suppose his expected utility is represented by \( U(c_s, c_{ns}) = c_sc_{ns} \). Write down his Marginal Rate of Substitution (MRS). (You can just write down the absolute value—don’t worry about the sign.)

Answer: \( |MRS| = \frac{c_{ns}}{c_s} \)

(c) How much does Douglas choose to pay as his insurance premium? For partial credit, you may state his optimal consumption (for each state).

Answer: He pays $50 (for $75 of insurance). His optimal consumption is \((c_s, c_{ns}) = (75, 150)\).

(d) Douglas has a roommate, Leon, who faces the exact same situation, but is (much) more averse to risk. In fact he can’t stand the fact that his consumption might be lower or higher depending upon whether the thieves come. His expected utility is \( U(c_s, c_{ns}) = \min\{c_s, c_{ns}\} \). What is Leon’s optimal consumption plan and how much would he pay in insurance premia?

Answer: His consumption plan is \((c_s, c_{ns}) = (100, 100)\) and he pays $100 for $150 of insurance.

(e) The police arrest several of the most prolific thieves, lowering the probability of theft to \( \pi = .01 \). Describe how Leon’s behavior changes.

Answer: Leon’s behavior doesn’t change, even though theft is much less likely. Because he is infinitely risk-averse, he still fully insure, paying $100 for a $150 policy.

2. Econnerds is student-run association that offers tutoring to struggling econ students in the competitive tutoring market. Their supply of tutoring services (per hour) is given by \( S(p) = p - 20 \) and the demand for their services is \( D(p) = 100 - 2p \).

(a) What is the equilibrium price and quantity for an hour of tutoring?

Answer: \((p, q) = (40, 20)\)

(b) What is the resulting consumer surplus, producer surplus, and total welfare?

Answer: \(CS = 100, PS = 200, W = 300\)

(c) The Econ Department wants to encourage quality economics education, so it decides to subsidize Econnerd’s tutoring services by paying the tutors \$s for every hour they work. If its goal is to lower the price that students pay by three dollars, how large must the subsidy, \( s \), be? What is the new equilibrium quantity, \( q^s \)?

Answer: \( s = 9 \) and \( q^s = 26 \)
(d) Suppose the department decided to pay the subsidy to the customers, instead of the tutors. What is the new equilibrium quantity and how does it compare to the answer to the last question?

Answer: The equilibrium quantity would be \( q^* = 26 \), exactly the same as the last question. It doesn't matter whether the buyers or sellers are subsidized.

(e) What is the deadweight loss caused by this subsidy?

Answer: \( DWL = 27 \)

(f) What is the total amount of subsidy payments made by the Econ Department? Suppose that, instead of paying a per unit subsidy, the department decided to just give the Econnerds a lump sum amount that is equal to the total they would have paid in the subsidy. What price will consumers end up paying and what would be the DWL of this policy?

Answer: The department pays $234. Paying this as a lump sum, as opposed to a per unit subsidy, would be completely ineffective as a price-lowering policy. It would not affect the price paid or received per unit, so it would not change the original equilibrium price and quantity. The DWL is zero. It would just be a windfall gain for the Econnerds.