

# Econ306 – Intermediate Microeconomics

## Problem Set 3

Due: Thursday, October 18

### Question 1

Suppose that the demand curve for plums is given by  $Q = 10 - 2p$ , where  $Q$  is the number of pounds demanded per year and  $p$  is the price per pound. Suppose that the price is \$1 per pound. Find the quantity demanded, total expenditure (price times quantity demanded) and consumer surplus. Now suppose that the government initiates a program to limit the supply of plums and, as a consequence, the price per pound goes up to \$2. What is consumer surplus after the price increase? How much would consumers be willing to bribe legislators to repeal the supply limitation program?

### Question 2

Brian won the state lottery grand prize of \$5 million. The lottery offers him two options: five annual payments of \$1 million, starting this year, or one lump sum payment of \$4.5 million right away.

- (i) If the interest rate (discount rate) is  $i = 5\%$ , what is the present value of the prize if Brian choose the five annual payments? Which option should he choose?
- (ii) If the interest rate (discount rate) is  $i = 10\%$ , what is the present value of the prize if Brian choose the five annual payments? Which option should he choose?

### Question 3

Jennifer lives for two periods. In the first period, her income is fixed at \$10,000; in the second, it is \$20,000. She can borrow and lend at the market interest rate of 7%.

- (i) Sketch her intertemporal budget constraint.
- (ii) The interest rate increases to 9%. What effect do you expect this change to have on her savings?
- (iii) (*extra credit*) Suppose that Jennifer is unable to borrow at any rate of interest, although she can still lend at 9%. Sketch her intertemporal budget constraint.

### Question 4

Peter faces two investment projects: one risky, paying \$200 with probability 40% or \$150 with probability 60%, or a riskless project paying \$160. What is the expected value on the risky project? What is the risk premium on the risky project?

### Question 5

Lynne's income is \$2,000 and she is risk averse. The probability of someone slipping on her stairs is  $\frac{1}{8}$ . If this happens, she will be sued for \$1,000 and will have to pay that amount. She can purchase insurance at a price of \$0.30 per dollar of coverage. Show how the equilibrium amount of insurance coverage is determined. Show how it changes if the probability of someone slipping increases to  $\frac{1}{4}$ , but the premium is unchanged.