Recitation #10

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Question #1 (Expectation, Variance) Consider the following random variable

$$x = \begin{cases} 1 & w.p\ \alpha \\ -1 & w.p\ 1-\alpha \end{cases}$$

where $\alpha \in (0,1)$

Find $\mathbb{E}(x)$, $\mathbb{V}ar(x)$, $sd(x)$ (expectation, variance and standard deviation of x)

Question #2 (Labor Market) There are 100 identical individuals in the market. Each individual has preference over consumption and leisure given by

$$U(C,L) = C + 48L - L^2$$

where C is (money for) consumption per day and L is the number of leisure hours per day

a) Calculate the optimal L for each individual, assuming that he can work as many hours as he wishes at wage $\$w$/hour, and has no other income

b) Find the market labor supply function, $l^S(w)$

c) Calculate the equilibrium wage, if labod demand is given by $l^D(w) = 2000 - 50w$

d) Now suppose that the government imposes a minimum wage of \$22/hour, and requires that all employed individuals work 11 hours per dy. Who benefits from this policy and who does not?

Quesion #3 (Long Run Equilibrium) Suppose 100 price-taking firms have the cost function

$$C(Q) = 100 + 4Q^2$$

Find the only possible long-run equilibrium price

Remark on Monopoly The Revenue function and Marginal revenue function are always functions in terms of Q (NOT P). Thus one tips on solving monopoly price/quantity is using the inverse demand function (P in terms of Q):

$$\max_Q \pi = PQ - C(Q) = F(Q)\,Q - C(Q)$$

where $F(Q)$ is the **inverse** demand function. Then using F.O.C, it implies

$$MR = MC$$

Don't forget to check S.O.C!!

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