1 Exercises

1.1 Problem 1

Suppose a fast food restaurant would like to purchase veggie burger patties from a food distributor. The restaurant's utility for the patties is given by
\[ S(q) = 500 \ln(1 + q). \]
The fixed costs for the food distributor are 4000, and if the distributor is inefficient (efficient) then its marginal costs are 0.15 (0.10).
Assume that the restaurant believes there is a 30% chance that the food distributor is efficient.

(a) What are the first-best production levels?

(b) What are the contracts to implement the first-best production levels?

(c) How much profit would the efficient distributor make if the restaurant offers a menu of contracts \( \{(q^I, t^I), (q^E, t^E)\} \)?

(d) What are the second-best production levels and the associated menu of contracts?

(e) What is the information rent of the efficient distributor for the menu of contracts for the second-best production levels? Is this higher or lower than the profit gained for the menu of contracts for the first-best production levels?

1.2 Problem 2

Suppose you are consulting for a hospital that would like to hire a contractor to wash hospital clothing (e.g., scrubs). The fixed costs for the contractor are $1200, and the hospital's utility for washed clothing is given by
\[ S(q) = 40\sqrt{q}. \]
If the contractor is inefficient then its marginal costs are $0.30, and if the contractor is efficient then its marginal costs are $0.25. Assume that the hospital believes there is a 30% chance that the contractor is efficient. Your boss wants to choose a menu of contracts such that the inefficient contractor does not participate. The boss suggests the menu of contracts
\[ CB = \{(q^I = 0, t^I = 0), (q^E = 6400, t^E = 2800)\}. \]

(a) Verify that the boss's suggested menu of contracts CB satisfies the participation constraint and the incentive compatibility constraint for the efficient agent.

(b) Verify that the boss's suggested menu of contracts CB does NOT satisfy the participation constraint for the inefficient agent.

(c) What is the menu of contracts for the second-best production levels?

(d) Which menu of contracts (the boss's suggestion OR the menu for second-best levels) is better? Explain your reasoning.