A farmer wants to buy a plot of land and requires a loan of 600 to complete the purchase. The loan she is considering allows her to purchase the land now and requires one payment p_s if the farm is successful and the payment p_f if it fails. When the farm is successful, the farmer has more assets available to make the payment than when it is a failure. Specifically, she will have 1200 in assets if it is a success and 600 if it is a failure. She can influence the probability of success by exerting more effort (High effort vs. Low effort). The relationship between the key variables in the farmer's problem are described below.

Effort	Probability of Success	Cost of Effort
High	4/5	200
Low	2/5	0

Both the farmer and the bank, who makes the loan, are risk neutral. The farmer is also protected by limited liability and cannot be made to pay more than the value of her assets.

1. Assuming the bank sets $p_F = 600$, how should it pick p_S if the bank wants the farmer to exert high effort? Justify your answer.

2. Determine whether or not the loan you found in the previous question is the best possible loan the bank can offer in this setting. Justify your answer.

A risk neutral principal designs a contract for a risk neutral agent. If the agent accepts the contract, the agent chooses an amount of effort to exert towards the success of the principal's project. If the principal's project succeeds, she (the principal) receives a revenue of 440, aid if it fails, she receives a revenue of 240. The contract specifies how much the principal will pay the agent when the project succeeds, w_S, and how much she will pay the agent if it fails, w_F. The agent has two choices of effort, low and high. The relationship between the agent's choice of effort, the probability of success and the cost of that effort to the agent is described in the table below:

Effort Choice	Probability of Success	Cost of Effort
Low	2/5	50
High	4/5	90

1. Give the conditions (inequalities) under which the agent accepts the contract and chooses high effort.

2. Consider the following contract: The principal pays the agent nothing when the project fails and 120 when the project succeeds. First determine what effort choices the agent makes under this contract. Then determine if this is the best way for the principal to get the agent to pick this effort level, If not give a better contract for the principal to offer.

Question 7

5 pts

A certain firm consists of two partners. The revenue received by the firm is random and determined by the effort of each of the partners. The effort choices of the partners are given by e_1 and e_2, corresponding to partners 1 and 2. The average amount of effort exerted is

$\bar{e} = \frac{e_1+e_2}{2}$.

The firm receives a revenue of 1400 with probability $\frac{\bar{e}}{2}$ and a revenue of 600 otherwise. Each partner's cost of effort is given by the function $c(e) = 50e^2$. The partner's payoffs are determined by the amount of revenue they personally receive minus their cost of effort.

Compare two distributions of shares for the partners. In the first, both partners share the firm's revenues equally. In the second, partner 1 receives 3/4 of the revenue while partner 2 receives 1/4. Under which distribution of shares will the firm have a higher expected revenue? Justify your answer.

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