University of Texas at Austin

Quiz #11

Exchange options.

Please, provide your **complete solution** to the following problem:

Problem 11.1. (15 points) There are two risky assets available in our market model: **S** and **Q**. Assume that the economy in which the two risky assets exist has three possible different states in three months: *sunny, overcast* and *rainy*. The *sunny* and *rainy* states of the world are equally likely, while the *overcast* has the same probability as the other two states combined. The risky assets' prices in three monts (time$-T$) have the following possible values within our model:

$$S(T) = \begin{cases} 100, & \text{if } \textit{sunny} \\ 80, & \text{if } \textit{overcast} \\ 50, & \text{if } \textit{rainy} \end{cases} \quad \text{and} \quad Q(T) = \begin{cases} 40, & \text{if } \textit{sunny} \\ 70, & \text{if } \textit{overcast} \\ 60, & \text{if } \textit{rainy} \end{cases}$$

What is the expected payoff of a three-month **exchange call** with underlying asset **S** and strike asset **Q** according to the above model?