Name:

UTeid:

M339D=M389D Introduction to Actuarial Financial Mathematics
University of Texas at Austin
Mock Exam One
Instructor: Milica Čudina

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Signature:

The maximum number of points on this exam is 60.

Problem 1.1. (10 points) Write the definition of an **arbitrage portfolio**.

Problem 1.2. (5 points) From a manufacturer's perspective, why would they decide to use derivative securities on their product to hedge? Respond in five lines or less.

Problem 1.3. (5 pts) Consider a portfolio consisting of the following four European options with the same expiration date T on the underlying asset S:
long one call with strike 40,
long two calls with strike 50,
short one call with strike 65.

Let $S(T) = 52$. What is the payoff from the above position at time T?

Problem 1.4. (5 points) The initial price of the market index is \$900. After 3 months the market index is priced at \$960. The **effective** monthly rate of interest is 1.0%.

The premium on the long put, with a strike price of \$975, is \$10.00. What is the profit at expiration for this long put?

Problem 1.5. (15 points) The continuously compounded risk-free interest rate equals 0.08.

Jonathan sells short one share of a non-dividend-paying stock and simultaneously buys a six-month, \$85-strike call option on the same stock. The current stock price is \$88, while the call price equals \$8. What is the break-even price of Jonathan's position?

Problem 1.6. (20 points) The future value in one year of the total costs of manufacturing a widget is \$200. You will sell a widget in one year at its market price of $S(1)$.

Assume that the annual effective interest rate equals 5%, and that the current price of the widget equals \$230.

You now purchase a one-year, \$220-strike put on one widget for a premium of \$7. You sell some of the potential gain by writing a one-year, \$250-strike call on one widget for a \$2 premium.

What is the **range** of the profit of your hedged porfolio?