

BAYLOR UNIVERSITY
HANKAMER SCHOOL OF BUSINESS
DEPARTMENT OF FINANCE, INSURANCE & REAL ESTATE

Risk Management
Dr. Garven
Problem Set 8

Name: _____

Show your work and write as legibly as possible. Good luck!

Problem 1

Suppose you are interested in determining arbitrage-free prices for a European call option and (otherwise identical) European put option. The underlying stock does not pay dividends, and its current price is $S = \$18$. For both options, the exercise price $K = \$20$, $u = e^{\sigma\sqrt{\delta t}}$, $d = e^{-\sigma\sqrt{\delta t}}$, and the length of each timestep is $\delta t = 1/4$. Furthermore, the riskless rate of interest $r = 4\%$ per year, the underlying stock's volatility $\sigma = 25\%$ per year, and both options expire 1 year from today.

A. (30 points) What is the arbitrage-free price for the call option?

B. (20 points) What is the arbitrage-free price for the put option?

Problem 2. For this problem, the following set of definitions applies:

C = current (European) call option price;

P = current (European) put option price;

S = current price of a non-dividend paying stock (underlying asset for both options);

K = exercise price (common to both options);

r = annualized riskless rate of interest;

T = time (in terms of number of years) to expiration; and

σ = annualized standard deviation of underlying asset's rate of return.

For each of the following scenarios (A through D), calculate the missing variable(s):

<i>Scenario</i>	<i>C</i>	<i>P</i>	<i>S</i>	<i>K</i>	<i>r</i>	<i>σ</i>	<i>T</i>
A	?	?	\$18	\$20	4%	25%	1.00
B	\$2.96	\$1.98	?	\$25	4%	25%	1.00
C	\$5.60	\$1.42	\$33	?	4%	25%	1.00
D	\$2.38	\$3.60	\$18	\$20	4%	?	1.00

A. SCENARIO A (20 points)

B. SCENARIO B (10 points)

C. SCENARIO C (10 points)

D. SCENARIO D (10 points)