



**QUESTION 2 (21 POINTS)**

**Calculate the Value of the Call and Put Option using the Black Scholes Model**

INPUT	
Standard Deviation ( $\sigma$ ) =	0.3
Expiration (in years) (T) =	1
Risk-Free Rate (Annual) (i) =	1.00%
Stock Price (S) =	95
Exercise Price (X) =	115
Dividend Yield (annual) ( $\delta$ ) =	0

OUTPUT	
d1 =	
d2 =	
N(d1) =	
N(d2) =	

Call Premium =	
Break Even Stock =	
Distance for S to reach BE (%) =	

Put Premium =	
Break Even Stock =	
Distance for S to reach BE (%) =	

## SECTION II FORWARDS, FUTURES & SWAPS (35 POINTS)

### QUESTION 3 (10 POINTS)

Luxury Cotton ("Luxury"), an independent distributor of cotton, is planning to sell 4.0 million lbs of cotton in March 2017 at the spot price on delivery day. In order to hedge against a possible decline in cotton prices, Luxury wants to enter into a Futures contract and lock in the price. The standard deviation of the change in the price per lb is calculated 0.04 (4.0%), the standard deviation of the change in the futures is 0.035 (3.5%) and the coefficient of correlation between the price of cotton and change in the futures price is 0.80.

a. Looking at the Future's Contract table below, how many contracts should Luxury optimize so that **2/3** of its exposure it's hedged for its March 2017 delivery – show calculation?

#### **Cotton (ICE-US) - 50,000 lbs; cents per lb**

<u>Date</u>	<u>Open</u>	<u>High</u>	<u>Low</u>	<u>Settle</u>	<u>Chg</u>	<u>Open Interest</u>
Dec	62.29	63.63	62.10	62.79	.50	94,584
Mar' 17	61.73	62.25	61.53	61.91	.21	68,686

b. After entering into the March 2017 contracts for **100%** of its delivery exposure, suppose that the only three possible prices for cotton in March is to stay at the same level, increase by 5 cents and decrease by 10 cents, show the profit and loss from the futures contracts as well as the total proceeds for Luxury.

		Inc/Decr =			
	Units	Price =			
Revenue from Sales					
Profit/Loss on Futures					
Total Proceeds					

**QUESTION 4 (5 POINTS)**

Today (April 9, 2019) the May 2019 Ethanol future price was settled \$1.97 per gallon. Suppose that when the contract matures in May 2019, the price of Ethanol turns out to be \$2.07 per gallon.

a. What will be the profit or (loss) be for the long position trader who entered the contract at the futures price?

b. If each contract calls for delivery of 29,000 gallons what would the dollar profit / (loss) be to the long position trader

**QUESTION 5 (10 POINTS)**

Goldman Sachs Investment Bank has two companies as customers who are in the process of raising funds and each has different views on the interest rate movements in the future. Company A thinks that interest rates would stay low and Company B feels that rates will rise.

Company A offered either a Fixed Rate of 7.0% or Float LIBOR + 75 bps  
Company B offered either a Fixed Rate of 8.25% or Float LIBOR + 150 bps

Given the different views, the broker recommends that Company A and Company B get into Swap Agreement with a 6.50% Swap price as follows:

Show the a) net interest pay and b) benefits for both parties

**QUESTION 6 (10 POINTS)**

Company XYZ Inc. raised a EUROs 200 million fixed rate annual bond paying 7.0% fixed rate for 4 years per the Indenture but wants to explore possibility to enter into a currency swap with the notional amount equal to the Bond amount (\$150 million) . If the Currency Swap exchange rate is 1.25x \$/Euro with 8.5% rate, run the two different scenarios of 1) Not entering into the currency swap and projecting the exchange rate using the forward rates below and 2) entering into the currency swap. From these two scenarios which is one more beneficial (Tip: use the 7.0% as your Discount Rate for both):

Time	Unhedged Euro Cash Flow (€)	Forward Exchange Rate	Hedges Dollar Cash Flow (\$)	Present Value of the unhedged Cash Flows (\$)
1				
2				
3				
4				

Time	Cash Flow (\$)	Hedges Dollar Cash Flow (\$)	Present Value of the hedged Cash Flows (\$)