

# Options – The Basics

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PROFESSOR DROUSSIOTIS





# Intro to Options

- Three Variables:

- $S$  = Stock (underlying assets)
- $X$  = Future Price (Exercise Price)
- $Pr$  = Premium (“the bet”)

**OTHER TERMS:**

- Expiration Date (3<sup>rd</sup> Friday of the month)
- American / European Options
- Action: Buy/Sell Options
- Speculation/Hedging
- 100 shares per option contract

- BUYING CALL OPTIONS  The right to buy the Stock ( $S$ ) at  $X$  price
- BUYING PUT OPTIONS  The right to sell the Stock ( $S$ ) at  $X$  price
- SELLING CALL OPTIONS  The obligation to sell the Stock ( $S$ ) at  $X$  price
- SELLING PUT OPTIONS  The obligation to buy the Stock ( $S$ ) at  $X$  price

# CALL PRICE CONCEPTS

FB
Exercise Price (X)
150
155
160
165
170
175
180

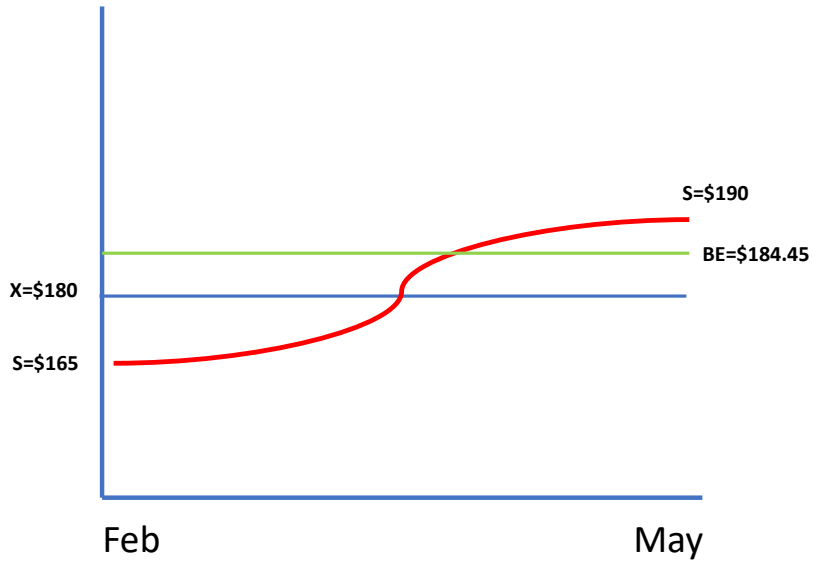
CALLS		
MARCH	APRIL	MAY
20.00	21.50	23.00
15.50	16.25	17.75
12.50	12.85	13.50
8.10	9.00	10.65
5.20	6.30	8.50
3.25	4.25	5.75
2.50	3.40	4.45

PUTS		
MARCH	APRIL	MAY
3.00	3.50	4.45
4.10	4.90	5.90
5.30	6.00	6.80
7.00	8.00	9.20
9.40	10.75	12.45
13.00	14.30	14.20
15.00	16.10	17.75

- VIEW ON THE STOCK: STOCK WILL GO UP BY EXPIRATION TIME
- RIGHT TO BUY THE STOCK AT A SET PRICE **X** NO MATTER WHAT THE STOCK DOES
- TO GET THAT RIGHT, YOU PAY A PREMIUM
- $\text{PAYOFF} = \text{Max}(0, S - X)$
- $\text{PROFIT} = \text{PAYOFF} - \text{PREMIUM}$
- $\text{BE} = \text{EXERCISE PRICE} + \text{PREMIUM}$

# CALL PRICE

## Example



Current Stock Price = \$165

FB
Exercise Price (X)
150
155
160
165
170
175
180

CALLS		
MARCH	APRIL	MAY
20.00	21.50	23.00
15.50	16.25	17.75
12.50	12.85	13.50
8.10	9.00	10.65
5.20	6.30	8.50
3.25	4.25	5.75
2.50	3.40	4.45

PUTS		
MARCH	APRIL	MAY
3.00	3.50	4.45
4.10	4.90	5.90
5.30	6.00	6.80
7.00	8.00	9.20
9.40	10.75	12.45
13.00	14.30	14.20
15.00	16.10	17.75

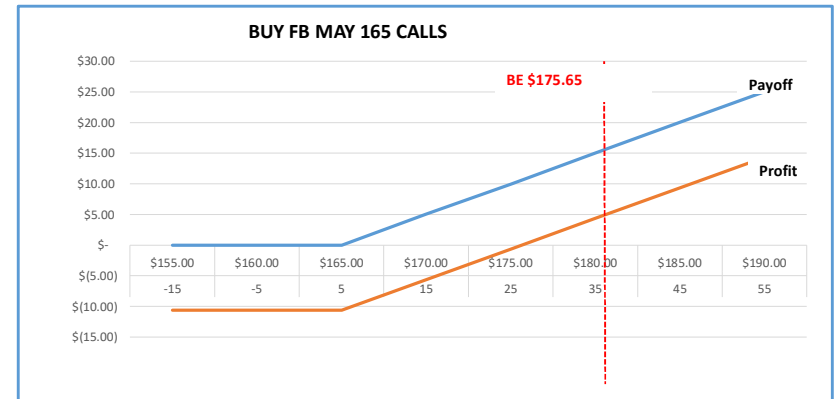
ACTION	X	Prem	S
Buy May	180	4.45	190

PAYOFF	PROFIT	HPR%	BE
190-180=10	10-4.45=5.55	5.55/4.45 = 124.7%	180+4.45=184.45

# CALLS

## 1. UNCOVERED (NAKED) OPTION STRATEGIES - Buying a Call Option

FB	CALLS		
Exercise Price (X)	MARCH	APRIL	MAY
150	20.00	21.50	23.00
155	15.50	16.25	17.75
160	12.50	12.85	13.50
165	8.10	9.00	10.65
170	5.20	6.30	8.50
175	3.25	4.25	5.75
180	2.50	3.40	4.45



### ACTION

Buy Call @ Exercise (X) = \$ 165.00  
 Pay Premium (p) = \$ 10.65

Break Even = \$ 175.65  
 Max Loss = \$ (10.65)  
 Max Gain = Unlimited

Out-of-the-money Option
On-the-money Option
In-of-the-money Option

INPUT		
	X	p
ACTION	Exercise Price (X)	Premium Per Share (p)
Buy May	\$ 165.00	\$ (10.65)
Buy May	\$ 165.00	\$ (10.65)
Buy May	\$ 165.00	\$ (10.65)
Buy May	\$ 165.00	\$ (10.65)
Buy May	\$ 165.00	\$ (10.65)
Buy May	\$ 165.00	\$ (10.65)
Buy May	\$ 165.00	\$ (10.65)
Buy May	\$ 165.00	\$ (10.65)

WHAT IF SCENARIO	
	S
	Stock Price (S)
	\$ 155.00
	\$ 160.00
	\$ 165.00
	\$ 170.00
	\$ 175.00
	\$ 180.00
	\$ 185.00
	\$ 190.00

OUTPUT				
	O = max(0, S-X)	(π) = O - p	HPR % = π / p	X + p
Exercise Y/N?	Payoff (O)	Profit (π)	HPR (%)	Break Even Stock
No	\$ -	\$ (10.65)	-100.0%	\$ 175.65
No	\$ -	\$ (10.65)	-100.0%	\$ 175.65
No	\$ -	\$ (10.65)	-100.0%	\$ 175.65
Yes	\$ 5.00	\$ (5.65)	-53.1%	\$ 175.65
Yes	\$ 10.00	\$ (0.65)	-6.1%	\$ 175.65
Yes	\$ 15.00	\$ 4.35	40.8%	\$ 175.65
Yes	\$ 20.00	\$ 9.35	87.8%	\$ 175.65
Yes	\$ 25.00	\$ 14.35	134.7%	\$ 175.65

# PUT PRICE CONCEPTS

FB
Exercise Price (X)
150
155
160
165
170
175
180

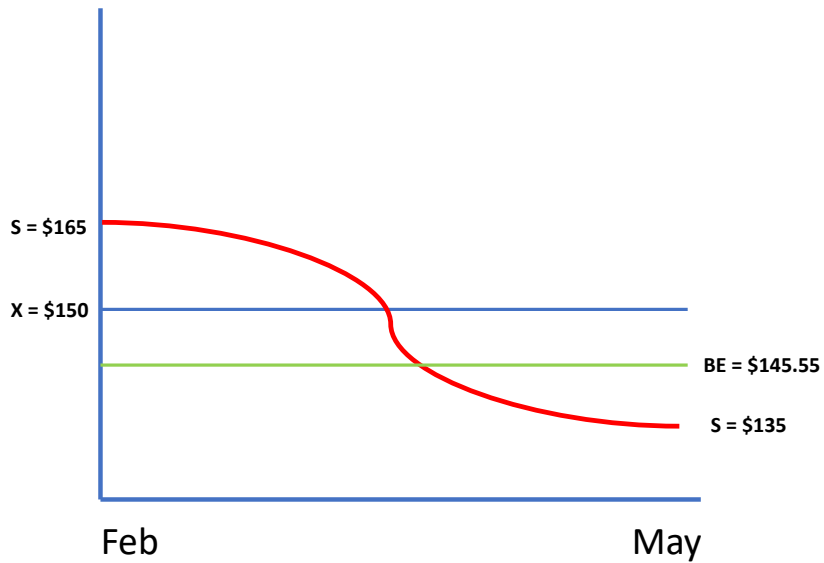
CALLS		
MARCH	APRIL	MAY
20.00	21.50	23.00
15.50	16.25	17.75
12.50	12.85	13.50
8.10	9.00	10.65
5.20	6.30	8.50
3.25	4.25	5.75
2.50	3.40	4.45

PUTS		
MARCH	APRIL	MAY
3.00	3.50	4.45
4.10	4.90	5.90
5.30	6.00	6.80
7.00	8.00	9.20
9.40	10.75	12.45
13.00	14.30	14.20
15.00	16.10	17.75

- VIEW ON THE STOCK: STOCK WILL GO DOWN BY EXPIRATION TIME
- RIGHT TO SELL THE STOCK AT A SET PRICE **X** NO MATTER WHAT THE STOCK DOES
- TO GET THAT RIGHT, YOU PAY A PREMIUM
- PAYOFF =  $\text{Max}(0, X - S)$
- PROFIT = PAYOFF – PREMIUM
- BE = EXERCISE PRICE – PREMIUM

# PUT PRICE

## Example



Current Stock Price = \$165

FB
Exercise Price (X)
150
155
160
165
170
175
180

CALLS		
MARCH	APRIL	MAY
20.00	21.50	23.00
15.50	16.25	17.75
12.50	12.85	13.50
8.10	9.00	10.65
5.20	6.30	8.50
3.25	4.25	5.75
2.50	3.40	4.45

PUTS		
MARCH	APRIL	MAY
3.00	3.50	4.45
4.10	4.90	5.90
5.30	6.00	6.80
7.00	8.00	9.20
9.40	10.75	12.45
13.00	14.30	14.20
15.00	16.10	17.75

ACTION	X	Prem	S
Buy May	150	4.45	135

PAYOFF	PROFIT	HPR%	BE
$150 - 135 = 15$	$15 - 4.45 = 10.55$	$10.55 / 4.45 = 237.1\%$	$150 - 4.45 = 145.55$





# STRADDLES

## CONCEPTS

FB
Exercise Price (X)
150
155
160
165
170
175
180

CALLS		
MARCH	APRIL	MAY
20.00	21.50	23.00
15.50	16.25	17.75
12.50	12.85	13.50
8.10	9.00	10.65
5.20	6.30	8.50
3.25	4.25	5.75
2.50	3.40	4.45

PUTS		
MARCH	APRIL	MAY
3.00	3.50	4.45
4.10	4.90	5.90
5.30	6.00	6.80
7.00	8.00	9.20
9.40	10.75	12.45
13.00	14.30	14.20
15.00	16.10	17.75

- VIEW ON THE STOCK: VOLATILITY
- RIGHT TO BUY OR SELL THE STOCK AT A SET PRICE **X** NO MATTER WHAT THE STOCK DOES
- TO GET THAT RIGHT, YOU PAY A PREMIUM (both Call and Put premiums)
- PAYOFF =  $S - X$  or  $X - S$  which ever is positive
- PROFIT = PAYOFF – PREMIUM
- 2 Break Evens [  $BE_1 = EXERCISE PRICE + BOTH PREMIUM$  ,  $BE_2 = EXERCISE PRICE - BOTH PREMIUM$  ]

# STRADDLES

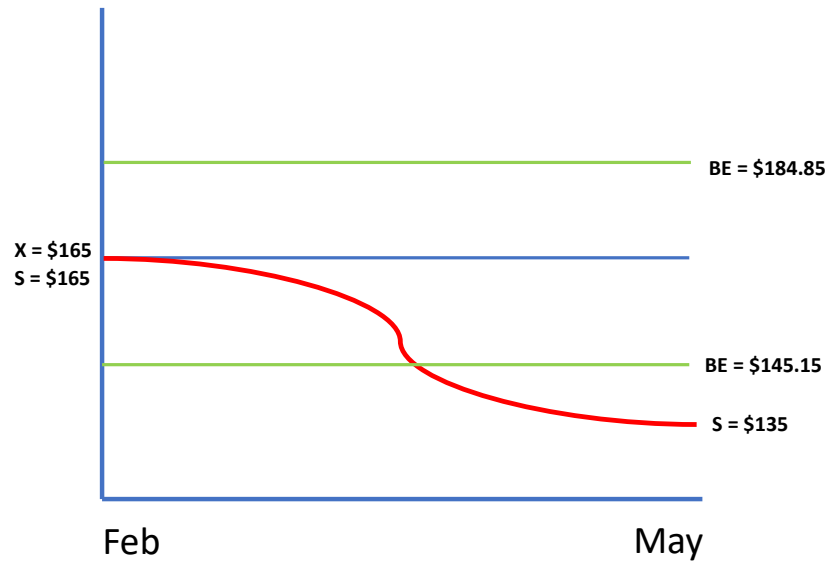
## Example

Current Stock Price = \$165

FB
Exercise Price (X)
150
155
160
165
170
175
180

CALLS		
MARCH	APRIL	MAY
20.00	21.50	23.00
15.50	16.25	17.75
12.50	12.85	13.50
8.10	9.00	10.65
5.20	6.30	8.50
3.25	4.25	5.75
2.50	3.40	4.45

PUTS		
MARCH	APRIL	MAY
3.00	3.50	4.45
4.10	4.90	5.90
5.30	6.00	6.80
7.00	8.00	9.20
9.40	10.75	12.45
13.00	14.30	14.20
15.00	16.10	17.75



ACTION	X	Prem	S
Buy May	165	10.65 + 9.20 = 19.85	135

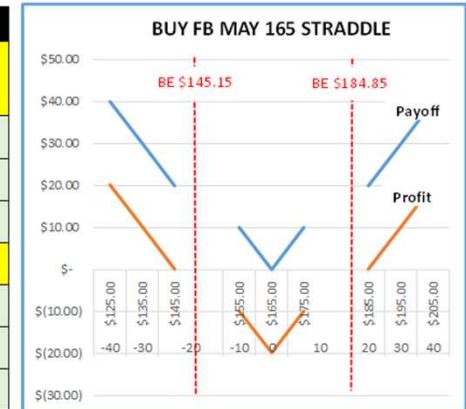
PAYOFF	PROFIT	HPR%	BE
165-135= 30	30-19.85= 10.15	10.15/19.85 = 51.1%	165+19.85= 184.85 165-19.85= 145.15

# STRADDLES

## 3. UNCOVERED (NAKED) OPTION STRATEGIES - Buying Straddles

Current Price Facebook (FB) So = \$163.00 (Feb)

FB Exercise Price (X)	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



### ACTION

Strategy: Buying a Call and Put at the same X

Buy Call & Put @ (X) = \$ 165.00

Pay both Total Prem. (p) = \$ 19.85 (10.65+9.20)

Two Break Evens = \$ 184.85 \$ 145.15

Max Loss = \$ (19.85)

Max Gain = Unlimited

On-the-money Option  
In-of-the-money Option

ACTION	INPUT		WHAT IF SCENARIO
	X	p	
	Exercise Price (X)	Premium Per Share (p)	Stock Price (S)
Buy May	\$ 165.00	\$ (19.85)	\$ 125.00
Buy May	\$ 165.00	\$ (19.85)	\$ 135.00
Buy May	\$ 165.00	\$ (19.85)	\$ 145.00
Buy May	\$ 165.00	\$ (19.85)	\$ 145.15
Buy May	\$ 165.00	\$ (19.85)	\$ 155.00
Buy May	\$ 165.00	\$ (19.85)	\$ 165.00
Buy May	\$ 165.00	\$ (19.85)	\$ 175.00
Buy May	\$ 165.00	\$ (19.85)	\$ 184.85
Buy May	\$ 165.00	\$ (19.85)	\$ 185.00
Buy May	\$ 165.00	\$ (19.85)	\$ 195.00
Buy May	\$ 165.00	\$ (19.85)	\$ 205.00

WHAT IF SCENARIO
S
Stock Price (S)
\$ 125.00
\$ 135.00
\$ 145.00
\$ 145.15
\$ 155.00
\$ 165.00
\$ 175.00
\$ 184.85
\$ 185.00
\$ 195.00
\$ 205.00

Exercise Y/N?	OUTPUT					
	O = (S-X) or (X-S)	(π) = O - p	HPR % = π / p	X + p	X - p	
	Payoff (O)	Profit (π)	HPR (%)	Break Even Stock 1	Break Even Stock 2	
Yes	\$ 40.00	\$ 20.15	101.5%	\$ 184.85	\$ 145.15	
Yes	\$ 30.00	\$ 10.15	51.1%	\$ 184.85	\$ 145.15	
Yes	\$ 20.00	\$ 0.15	0.8%	\$ 184.85	\$ 145.15	
Yes	\$ 19.85	\$ -	0.0%	\$ 184.85	\$ 145.15	Breakeven
Yes	\$ 10.00	\$ (9.85)	-49.6%	\$ 184.85	\$ 145.15	
No	\$ -	\$ (19.85)	-100.0%	\$ 184.85	\$ 145.15	
Yes	\$ 10.00	\$ (9.85)	-49.6%	\$ 184.85	\$ 145.15	
Yes	\$ 19.85	\$ -	0.0%	\$ 184.85	\$ 145.15	Breakeven
Yes	\$ 20.00	\$ 0.15	0.8%	\$ 184.85	\$ 145.15	
Yes	\$ 30.00	\$ 10.15	51.1%	\$ 184.85	\$ 145.15	
Yes	\$ 40.00	\$ 20.15	101.5%	\$ 184.85	\$ 145.15	

# BASIC OPTIONS - PRACTICE PROBLEMS

PRACTICE EXAMPLES												
Action	Type	X	Premium	Stock	Payoff	Profit	BE 1	BE 2	HPR %			
BUY	CALL	100	5	120								
BUY	PUT	68	3	62								
BUY	CALL	100	5	99								
BUY	PUT	68	3	70								
BUY	CALL	100	5	101								
BUY	PUT	68	3	67								
SELL	CALL	90	8	105								
SELL	PUT	75	5	68								
SELL	CALL	90	8	96								
SELL	PUT	75	5	73								
SELL	CALL	90	8	89								
SELL	PUT	75	5	76								
BUY	STRADDLE	100	17	120								
SELL	STRADDLE	70	12	65								
BUY	STRADDLE	100	17	100								

# BASIC OPTIONS - PRACTICE PROBLEMS

## PRACTICE EXAMPLES

Action	Type	X	Premium	Stock	Payoff	Profit	BE 1	BE 2	HPR %
BUY	CALL	100	5	120	20	15	105		300%
BUY	PUT	68	3	62	6	3	65		100%
BUY	CALL	100	5	99	0	-5	105		-100%
BUY	PUT	68	3	70	0	-3	65		-100%
BUY	CALL	100	5	101	1	-4	105		-80%
BUY	PUT	68	3	67	1	-2	65		-67%
SELL	CALL	90	8	105	-15	-7	98		NA
SELL	PUT	75	5	68	-7	-2	70		NA
SELL	CALL	90	8	96	-6	2	98		NA
SELL	PUT	75	5	73	-2	3	70		NA
SELL	CALL	90	8	89	0	8	98		NA
SELL	PUT	75	5	76	0	5	70		NA
BUY	STRADDLE	100	17	120	20	3	117	83	18%
SELL	STRADDLE	70	12	65	-5	7	82	58	NA
BUY	STRADDLE	100	17	100	0	-17	117	83	-100%

manual output

# 1. COVERED OPTION STRATEGIES - Protective Puts

Current Price Facebook (FB) So = \$163.00 (Feb)

FB Exercise Price (X)	PUTS		
	MARCH	APRIL	MAY
150	3.00	3.50	4.45
155	4.10	4.90	5.90
160	5.30	6.00	6.80
165	7.00	8.00	9.20
170	9.40	10.75	12.45

Strategy: Buying or holding the Stock and Buying Put Option at X

ACTION	Exercise (X)	Stock (S)/ Premium (p)	Number of Shares	Investment (I)
Buy the Stock =		\$163.00	100	\$ (16,300)
Buy Put at X =	\$ 165.00			
Pay Prem. (p) =		\$ 9.20	100	\$ (920)

Total Initial Investment = \$(17,220)

STRATEGY	INPUT			
	STOCK INVEST	OPTION SECURITY		WHAT IF SCENARIO
	So	X	p	S
	Stock Purchase per share	Exercise Price (X)	Paid Premium Per Share (p)	Market Price Stock Price (S)
Buy Stock & May Puts	\$163.00	\$ 165.00	\$ (9.20)	\$ 125.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 135.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 145.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 155.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 165.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 175.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 185.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 195.00
Buy Stock & May Puts	\$ 163.00	\$ 165.00	\$ (9.20)	\$ 205.00

STOCK INVEST	OPTION SECURITY	OUTPUT				
		BOTH STOCKS AND OPTIONS				
		CG = S - So	O	$\pi - p$	$(\pi - p + CG)$	$(\pi - p + CG) \times Sh$
Stock Capital Gain/ (Loss)	Put Option Payoff (Hedging)	Profit from the Option per share	Net Profit per share	Net Profit (Total \$) (NP)	Initial Investment	HPR%
\$ (38.00)	\$ 40.00	\$ 30.80	\$ (7.20)	\$ (720.00)	\$ 17,220	-4.18%
\$ (28.00)	\$ 30.00	\$ 20.80	\$ (7.20)	\$ (720.00)	\$ 17,220	-4.18%
\$ (18.00)	\$ 20.00	\$ 10.80	\$ (7.20)	\$ (720.00)	\$ 17,220	-4.18%
\$ (8.00)	\$ 10.00	\$ 0.80	\$ (7.20)	\$ (720.00)	\$ 17,220	-4.18%
\$ 2.00	\$ -	\$ (9.20)	\$ (7.20)	\$ (720.00)	\$ 17,220	-4.18%
\$ 12.00	\$ -	\$ (9.20)	\$ 2.80	\$ 280.00	\$ 17,220	1.63%
\$ 22.00	\$ -	\$ (9.20)	\$ 12.80	\$ 1,280.00	\$ 17,220	7.43%
\$ 32.00	\$ -	\$ (9.20)	\$ 22.80	\$ 2,280.00	\$ 17,220	13.24%
\$ 42.00	\$ -	\$ (9.20)	\$ 32.80	\$ 3,280.00	\$ 17,220	19.05%

## 2. COVERED OPTION STRATEGIES - Covered Calls

Current Price Facebook (FB) So = \$163.00 (Feb 20)

FB Exercise Price (X)	CALLS		
	MARCH	APRIL	MAY
150	20.00	21.50	23.00
155	15.50	16.25	17.75
160	12.50	12.85	13.50
165	8.10	9.00	10.65
170	5.20	6.30	8.50
175	3.25	4.25	5.75
180	2.50	3.40	4.45

Strategy: Holding the Stock and Selling Call Option at X

ACTION	Exercise (X)	Stock (S)/ Premium (p)	Number of Shares	Investment (I)
Own the Stock (So) =		\$163.00	100	\$ (16,300)
Sell Call at (X) =	\$ 165.00			
Pay Prem. (p) =		\$ (4.45)	100	\$ 445

Total Initial Investment = \$(15,855)

STRATEGY	INPUT			
	STOCK INVEST	OPTION SECURITY		WHAT IF SCENARIO
	So	X	p	S
	Market Price	Exercise Price (X)	Received Premium Per Share (p)	Market Price Stock Price (S)
Buy Stock & Sell May Calls	\$163.00	\$ 180.00	\$ 4.45	\$ 180.00
Buy Stock & Sell May Calls	\$163.00	\$ 180.00	\$ 4.45	\$ 190.00
Buy Stock & Sell May Calls	\$163.00	\$ 180.00	\$ 4.45	\$ 200.00
Buy Stock & Sell May Calls	\$163.00	\$ 180.00	\$ 4.45	\$ 210.00
Buy Stock & Sell May Calls	\$163.00	\$ 180.00	\$ 4.45	\$ 220.00

STOCK INVEST	OUTPUT					
	OPTION SECURITY	BOTH STOCKS AND OPTIONS				
	O	$\pi - p$	$(\pi - p + CG)$	$(\pi - p + CG) \times Sh$	I	NP / I
	Call Option Payoff (Hedging)	Profit from the Option per share	Net Profit per share	Net Profit (Total \$) (NP)	Initial Investment	HPR%
\$ 17.00	\$ -	\$ 4.45	\$ 21.45	\$ 2,145.00	\$ 15,855	13.53%
\$ 27.00	\$ (10.00)	\$ (5.55)	\$ 21.45	\$ 2,145.00	\$ 15,855	13.53%
\$ 37.00	\$ (20.00)	\$ (15.55)	\$ 21.45	\$ 2,145.00	\$ 15,855	13.53%
\$ 47.00	\$ (30.00)	\$ (25.55)	\$ 21.45	\$ 2,145.00	\$ 15,855	13.53%
\$ 57.00	\$ (40.00)	\$ (35.55)	\$ 21.45	\$ 2,145.00	\$ 15,855	13.53%

### 3. COVERED OPTION STRATEGIES- Collars

Current Price FaceBook (FB) So = \$163.00 (Feb 20)

FB Exercise Price (X)	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75

**Collars Strategy:** Own Stock, Buy Put, Sell Calls (combination of Protective Puts and Covered Calls) - the intention is to minimize or eliminate the premium

**Action:** Own 100 shares of Facebook (current price at \$163)

Buy the May 150 Puts -pay \$4.45 premium

Sell (Write) the May 180 Calls - receive \$4.45 premium

STRATEGY	INPUT			
	STOCK INVEST So	OPTION SECURITY		
	X puts	X calls	p	
Market Price M2M	Exercise Call Price (X1)	Exercise Put Price (X2)	Net Premium Paid Per Share (p)	
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -
Collars 150 Puts/180 Calls May	\$163.00	\$ 150.00	\$ 180.00	\$ -

WHAT IF SCENARIO	STOCK INVEST	OPTION SECURITY			BOTH STOCKS AND OPTIONS			
		O1	O2	$\pi - p$	$(\pi - p + CG)$	$(\pi - p + CG) \times Sh$	I	NP / I
S	CG = S - So	Put Option Payoff	Call Option Payoff	Profit from the Option per share	Net Profit per share	Net Profit (Total \$) (NP) 100 shares	Based on original February 20 Date	HPR%
Market Price (\$)	Stock Capital Gain/ (Loss)							
\$ 120.00	\$ (43.00)	\$ 30.00	\$ -	\$ 30.00	\$ (13.00)	\$ (1,300.00)	\$ 16,300	-7.98%
\$ 130.00	\$ (33.00)	\$ 20.00	\$ -	\$ 20.00	\$ (13.00)	\$ (1,300.00)	\$ 16,300	-7.98%
\$ 140.00	\$ (23.00)	\$ 10.00	\$ -	\$ 10.00	\$ (13.00)	\$ (1,300.00)	\$ 16,300	-7.98%
\$ 150.00	\$ (13.00)	\$ -	\$ -	\$ -	\$ (13.00)	\$ (1,300.00)	\$ 16,300	-7.98%
\$ 160.00	\$ (3.00)	\$ -	\$ -	\$ -	\$ (3.00)	\$ (300.00)	\$ 16,300	-1.84%
\$ 170.00	\$ 7.00	\$ -	\$ -	\$ -	\$ 7.00	\$ 700.00	\$ 16,300	4.29%
\$ 180.00	\$ 17.00	\$ -	\$ -	\$ -	\$ 17.00	\$ 1,700.00	\$ 16,300	10.43%
\$ 190.00	\$ 27.00	\$ -	\$ (10.00)	\$ (10.00)	\$ 17.00	\$ 1,700.00	\$ 16,300	10.43%
\$ 200.00	\$ 37.00	\$ -	\$ (20.00)	\$ (20.00)	\$ 17.00	\$ 1,700.00	\$ 16,300	10.43%
\$ 210.00	\$ 47.00	\$ -	\$ (30.00)	\$ (30.00)	\$ 17.00	\$ 1,700.00	\$ 16,300	10.43%



# SPREADS

- **HORIZONTAL SPREADS** (CALENDAR SPREADS)
  - LONG (BUY) / SHORT (SELL) CALL AND PUTS SAME X DIFFERENT EXP. DAYS
- **VERTICAL SPREADS** (MONEY SPREADS)
  - LONG (BUY) / SHORT (SELL) CALL AND PUTS SAME EXP. DAY DIFFERENT X
  - BULL CALL SPREADS: BUY LOW CALL X / SELL HIGH CALL X
  - BEAR PUT SPREADS: BUY HIGH PUT X / SELL LOW PUT X
  - BULL PUT SPREADS: BUY LOW PUT X / SELL HIGH PUT X
  - BEAR CALL SPREADS: BUY HIGH CALL X / SELL LOW CALL X
- LONG BUTTERFLY SPREADS: BUY HIGH, BUY LOW, SELL THE AVERAGE TWICE
- SHORT BUTTERFLY SPREADS: SELL HIGH, SELL LOW, BUY THE AVERAGE TWICE

## VERTICAL AND HORIZONTAL SPREADS

FB	CALLS			PUTS		
Exercise Price (X)	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75

← HORIZONTAL SPREAD (TIME SPREADS)

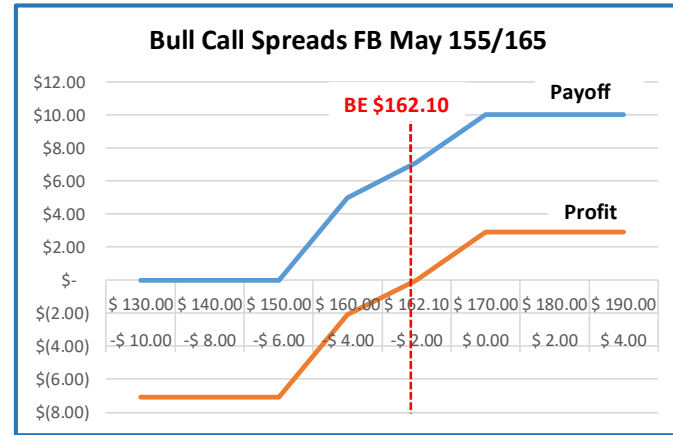
↑  
VERTICAL SPREADS (MONEY SPREADS)

↑  
VERTICAL SPREADS (MONEY SPREADS)

# 1. ADVANCED OPTION STRATEGIES- Bull Call Spreads

Current Price FaceBook (FB) So = \$163.00 (Feb)

FB Exercise Price (X)	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



**Bull Call Strategy:** Buy the Low Exercise Call Price and sell the high Call Exercise Price at the same expiration date (Vertical Spread)

**Action Example:** Buy the May Call 155 -pay \$17.75 premium  
Sell the May 165 Calls - receive \$10.65 premium

STRATEGY	INPUT				
	Low X	p1	High X	p2	p
Buy Low and Sell High Call	Buy Exercise Call (X1)	Premium Paid Per Share (p1)	Sell Exercise Call (X2)	Premium Received Per Share (p2)	Net Premium Paid Per Share
Buy Low and Sell High Call	\$ 155.00	\$ (17.75)	\$ 165.00	\$ 10.65	\$ (7.10)
Buy Low and Sell High Call	\$ 155.00	\$ (17.75)	\$ 165.00	\$ 10.65	\$ (7.10)
Buy Low and Sell High Call	\$ 155.00	\$ (17.75)	\$ 165.00	\$ 10.65	\$ (7.10)
Buy Low and Sell High Call	\$ 155.00	\$ (17.75)	\$ 165.00	\$ 10.65	\$ (7.10)
Buy Low and Sell High Call	\$ 155.00	\$ (17.75)	\$ 165.00	\$ 10.65	\$ (7.10)
Buy Low and Sell High Call	\$ 155.00	\$ (17.75)	\$ 165.00	\$ 10.65	\$ (7.10)
Buy Low and Sell High Call	\$ 155.00	\$ (17.75)	\$ 165.00	\$ 10.65	\$ (7.10)

S Market Price Stock Price (S)	OUTPUT			
	S - X1 + X2	Net Payoff	Net Profit	Maximum Profit
\$ 130.00	\$ -	\$ (7.10)		\$ (7.10)
\$ 140.00	\$ -	\$ (7.10)		\$ (7.10)
\$ 150.00	\$ -	\$ (7.10)		\$ (7.10)
\$ 160.00	\$ 5.00	\$ (2.10)		\$ (7.10)
\$ 162.10	\$ 7.10	\$ -		
\$ 170.00	\$ 10.00	\$ 2.90	\$ 2.90	
\$ 180.00	\$ 10.00	\$ 2.90	\$ 2.90	
\$ 190.00	\$ 10.00	\$ 2.90	\$ 2.90	

Breakeven

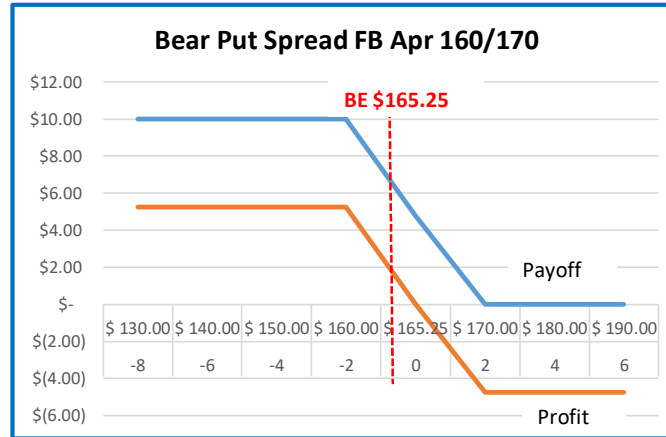
# WHITEBOARD

<b>FB</b>	<b>CALLS</b>			<b>PUTS</b>		
<b>Exercise Price (X)</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75

## 2. ADVANCED OPTION STRATEGIES- Put Bear Spreads

Current Price FaceBook (FB) So = \$163.00 (Feb)

FB Exercise Price (X)	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



**Bear Put Strategy:** Buy the High Exercise Put Price and sell the Low Put Exercise Price at the same expiration date (Vertical Spread)

**Action Example:** Buy the Apr 170 Puts -pay \$10.75 premium  
Sell the Apr 160 Puts - receive \$6.00 premium

STRATEGY	INPUT				
	High X	p1	Low X	p2	p
Buy High and Sell Low Put	Buy Exercise Put (X1)	Premium Paid Per Share (p1)	Sell Exercise Call (X2)	Premium Received Per Share (p2)	Net Premium Paid Per Share (p)
Buy High and Sell Low Put	\$ 170.00	\$ (10.75)	\$ 160.00	\$ 6.00	\$ (4.75)
Buy High and Sell Low Put	\$ 170.00	\$ (10.75)	\$ 160.00	\$ 6.00	\$ (4.75)
Buy High and Sell Low Put	\$ 170.00	\$ (10.75)	\$ 160.00	\$ 6.00	\$ (4.75)
Buy High and Sell Low Put	\$ 170.00	\$ (10.75)	\$ 160.00	\$ 6.00	\$ (4.75)
Buy High and Sell Low Put	\$ 170.00	\$ (10.75)	\$ 160.00	\$ 6.00	\$ (4.75)
Buy High and Sell Low Put	\$ 170.00	\$ (10.75)	\$ 160.00	\$ 6.00	\$ (4.75)
Buy High and Sell Low Put	\$ 170.00	\$ (10.75)	\$ 160.00	\$ 6.00	\$ (4.75)

Market Price Stock Price (S)	OUTPUT				
	X1 - X2 - S	Net Payoff	Net Profit	Maximum Loss	Maximum Profit
\$ 130.00	\$ 10.00	\$ 5.25		\$ 5.25	
\$ 140.00	\$ 10.00	\$ 5.25		\$ 5.25	
\$ 150.00	\$ 10.00	\$ 5.25		\$ 5.25	
\$ 160.00	\$ 10.00	\$ 5.25		\$ 5.25	
\$ 165.25	\$ 4.75	\$ -			
\$ 170.00	\$ -	\$ (4.75)	\$ (4.75)		
\$ 180.00	\$ -	\$ (4.75)	\$ (4.75)		
\$ 190.00	\$ -	\$ (4.75)	\$ (4.75)		

Breakeven

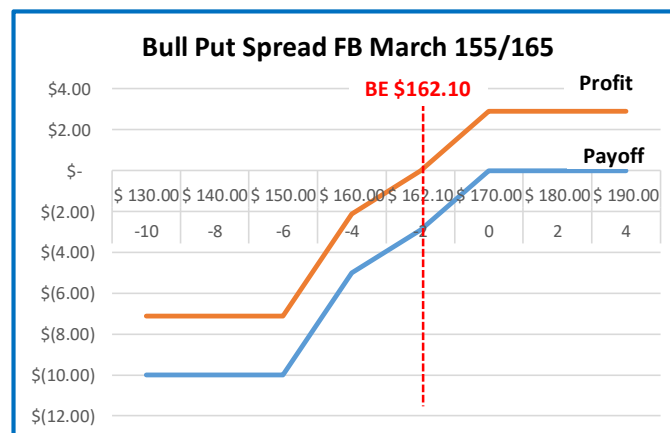
# WHITEBOARD

<b>FB</b>	<b>CALLS</b>			<b>PUTS</b>		
<b>Exercise Price (X)</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75

### 3. ADVANCED OPTION STRATEGIES- Bull Put Spreads

Current Price FaceBook (FB) So = \$163.00 (Feb)

FB Exercise Price (X)	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



**Bull Put Strategy:** Buy the Low Exercise Put Price and sell the high Exercise Put Price at the same expiration date (Vertical Spread)

**Action Example:** Buy the March 155 Puts - pay \$4.10 premium  
Sell the March 165 Puts - receive \$7.00 premium

STRATEGY	INPUT				
	Low X	p1	High X	p2	p
Buy Low and Sell High Put	Buy Exercise Puts (X1)	Premium Paid Per Share (p1)	Sell Exercise Puts (X2)	Premium Received Per Share (p2)	Net Premium Received Per Share
Buy Low and Sell High Put	\$ 155.00	\$ (4.10)	\$ 165.00	\$ 7.00	\$ 2.90
Buy Low and Sell High Put	\$ 155.00	\$ (4.10)	\$ 165.00	\$ 7.00	\$ 2.90
Buy Low and Sell High Put	\$ 155.00	\$ (4.10)	\$ 165.00	\$ 7.00	\$ 2.90
Buy Low and Sell High Put	\$ 155.00	\$ (4.10)	\$ 165.00	\$ 7.00	\$ 2.90
Buy Low and Sell High Put	\$ 155.00	\$ (4.10)	\$ 165.00	\$ 7.00	\$ 2.90
Buy Low and Sell High Put	\$ 155.00	\$ (4.10)	\$ 165.00	\$ 7.00	\$ 2.90

S	OUTPUT			
	S - X1 + X2	Net Payoff	Net Profit	Maximum Profit
Market Price Stock Price (S)				
\$ 130.00	\$ (10.00)	\$ (7.10)		\$ (7.10)
\$ 140.00	\$ (10.00)	\$ (7.10)		\$ (7.10)
\$ 150.00	\$ (10.00)	\$ (7.10)		\$ (7.10)
\$ 160.00	\$ (5.00)	\$ (2.10)		\$ (7.10)
\$ 162.10	\$ (2.90)	\$ (0.00)		
\$ 170.00	\$ -	\$ 2.90	\$ 2.90	
\$ 180.00	\$ -	\$ 2.90	\$ 2.90	
\$ 190.00	\$ -	\$ 2.90	\$ 2.90	

Breakeven

# WHITEBOARD

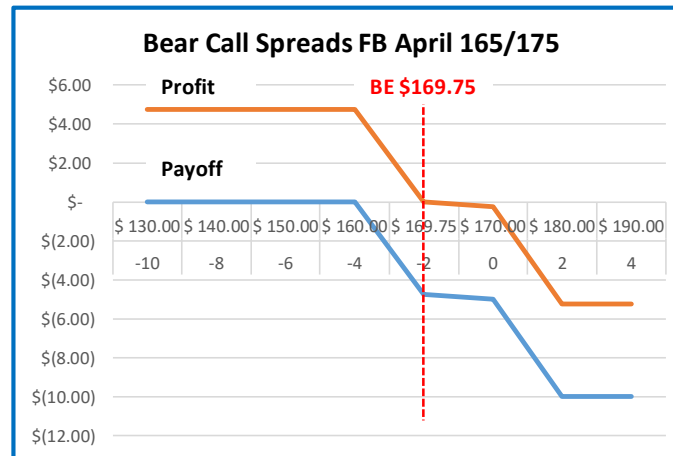
<b>FB</b>	<b>CALLS</b>			<b>PUTS</b>		
<b>Exercise Price (X)</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



#### 4. ADVANCED OPTION STRATEGIES- Bear Call Spreads

Current Price FaceBook (FB) So = \$163.00 (Feb)

FB Exercise Price (X)	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



**Bear Call Strategy:** Buy the high Exercise Call Price and sell the low Exercise Call Price at the same expiration date (Vertical Spread)

**Action Example:** Buy the April 175 Calls -pay \$4.25 premium  
Sell the April 165 Calls - receive \$9.00 premium

STRATEGY	INPUT				
	High X	p1	Low X	p2	p
BuyHigh and Sell Low Call	Buy Exercise Call (X1)	Premium Paid Per Share (p1)	Sell Exercise Call (X2)	Premium Received Per Share (p2)	Net Premium Received Per Share
BuyHigh and Sell Low Call	\$ 175.00	\$ (4.25)	\$ 165.00	\$ 9.00	\$ 4.75
BuyHigh and Sell Low Call	\$ 175.00	\$ (4.25)	\$ 165.00	\$ 9.00	\$ 4.75
BuyHigh and Sell Low Call	\$ 175.00	\$ (4.25)	\$ 165.00	\$ 9.00	\$ 4.75
BuyHigh and Sell Low Call	\$ 175.00	\$ (4.25)	\$ 165.00	\$ 9.00	\$ 4.75
BuyHigh and Sell Low Call	\$ 175.00	\$ (4.25)	\$ 165.00	\$ 9.00	\$ 4.75
BuyHigh and Sell Low Call	\$ 175.00	\$ (4.25)	\$ 165.00	\$ 9.00	\$ 4.75
BuyHigh and Sell Low Call	\$ 175.00	\$ (4.25)	\$ 165.00	\$ 9.00	\$ 4.75

Market Price Stock Price (\$)	OUTPUT				
	S - X1 + X2	Net Payoff	Net Profit	Maximum Loss	Maximum Profit
\$ 130.00	\$ -	\$ 4.75			\$ 4.75
\$ 140.00	\$ -	\$ 4.75			\$ 4.75
\$ 150.00	\$ -	\$ 4.75			\$ 4.75
\$ 160.00	\$ -	\$ 4.75			\$ 4.75
\$ 169.75	\$ (4.75)	\$ -			
\$ 170.00	\$ (5.00)	\$ (0.25)	\$ (5.25)		
\$ 180.00	\$ (10.00)	\$ (5.25)	\$ (5.25)		
\$ 190.00	\$ (10.00)	\$ (5.25)	\$ (5.25)		

Breakeven

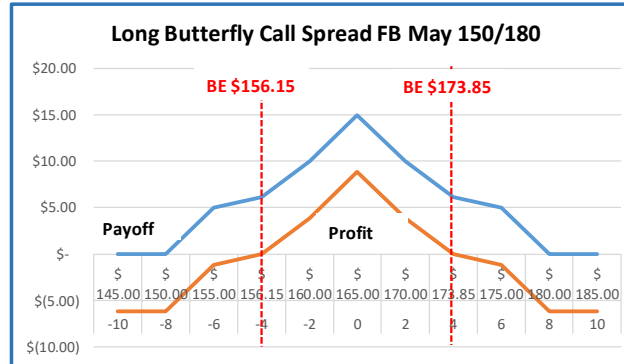
# WHITEBOARD

<b>FB</b>	<b>CALLS</b>			<b>PUTS</b>		
<b>Exercise Price (X)</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75

**5. ADVANCED OPTION STRATEGIES - Long Butterfly Call Spreads**

Current Price FaceBook (FB) So = \$163.00 (Feb)

FB Exercise Price (X)	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



**Long Butterfly Call Strategy:** Buy the Low Exercise Call Price, Buy the High Exercise Price and sell the average Call Exercise Price twice at the same expiration date (Vertical Spread)

**Action Example:** Buy the May Call 150 - pay \$23 premium  
 Buy the May 180 Calls - pay \$4.45 premium  
 Sell the May 165 Calls - receive \$10.65 premium  
 Sell the May 165 Calls - receive \$10.65 premium

STRATEGY	INPUT							S Market Price Stock Price (\$)	OUTPUT			
	Low X1 Buy Exercise Call (X1)	p1 Premium Paid Per Share (p1)	High X2 Buy Exercise Call (X2)	p2 Premium Paid Per Share (p2)	2 x Avg X3 Sell Exercise Call (X2)	2 x p3 Premium Received Per Share (p3)	p Net Premium Paid Per Share		S - X1 + X2 Net Payoff	Net Profit	Maximum Profit	Maximum Loss
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 140.00	\$ -	\$ (6.15)		\$ (6.15)
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 145.00	\$ -	\$ (6.15)		\$ (6.15)
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 150.00	\$ -	\$ (6.15)		\$ (6.15)
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 155.00	\$ 5.00	\$ (1.15)		
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 156.15	BE \$ 6.15	\$ 0.00		
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 160.00	\$ 10.00	\$ 3.85		
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 165.00	\$ 15.00	\$ 8.85	\$ 8.85	
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 170.00	\$ 10.00	\$ 3.85		
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 173.85	BE \$ 6.15	\$ 0.00		
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 175.00	\$ 5.00	\$ (1.15)		
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 180.00	\$ -	\$ (6.15)		\$ (6.15)
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 185.00	\$ -	\$ (6.15)		\$ (6.15)
Buy Low, High and Sell Avg Call	\$ 150.00	\$ (23.00)	\$ 180.00	\$ (4.45)	\$ 165.00	\$ 21.30	\$ (6.15)	\$ 190.00	\$ -	\$ (6.15)		\$ (6.15)

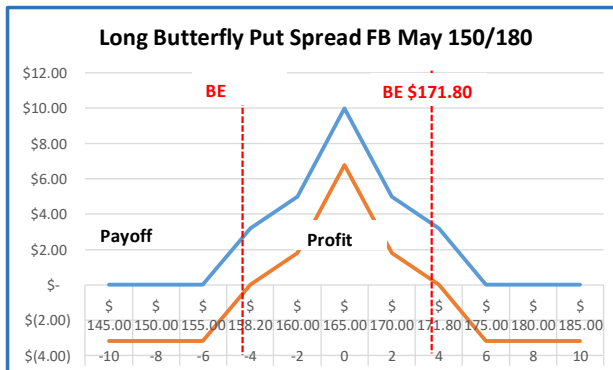
# WHITEBOARD

FB	CALLS			PUTS		
Exercise Price (X)	MARCH	APRIL	MAY	MARCH	APRIL	MAY
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75

**6. ADVANCED OPTION STRATEGIES-Long Butterfly Put Spreads**

Current Price FaceBook (FB) So = \$163.00 (Feb)

FB	CALLS			PUTS		
	MARCH	APRIL	MAY	MARCH	APRIL	MAY
Exercise Price (X)						
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



**Long Butterfly Put Strategy:** Buy the Low Exercise Put Price, Buy the High Exercise Put Price and sell the average Put Exercise Price twice at the same expiration date (Vertical Spread)

- Action Example:**
- Buy the Apr 155 Puts -pay \$4.90 premium
  - Buy the Apr 175 Puts - pay \$14.30 premium
  - Sell the Apr 165 Puts - receive \$8.00 premium
  - Sell the Apr 165 Puts - receive \$8.00 premium

STRATEGY	INPUT							Market Price Stock Price (\$)	OUTPUT			
	Low X1	p1	High X2	p2	2 x Avg X3	2 x p3	p		X1 + X2 - S	Net Payoff	Net Profit	Maximum Profit
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 140.00	\$ -	\$ (3.20)		\$ (3.20)
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 145.00	\$ -	\$ (3.20)		\$ (3.20)
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 150.00	\$ -	\$ (3.20)		\$ (3.20)
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 155.00	\$ -	\$ (3.20)		\$ (3.20)
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 158.20	BE	\$ 3.20	\$ (0.00)	
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 160.00		\$ 5.00	\$ 1.80	
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 165.00		\$ 10.00	\$ 6.80	\$ 6.80
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 170.00		\$ 5.00	\$ 1.80	
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 171.80	BE	\$ 3.20	\$ (0.00)	
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 175.00		\$ -	\$ (3.20)	\$ (3.20)
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 180.00		\$ -	\$ (3.20)	\$ (3.20)
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 185.00		\$ -	\$ (3.20)	\$ (3.20)
Buy Low, High and Sell Avg Put	\$ 155.00	\$ (4.90)	\$ 175.00	\$ (14.30)	\$ 165.00	\$ 16.00	\$ (3.20)	\$ 190.00		\$ -	\$ (3.20)	\$ (3.20)

# WHITEBOARD

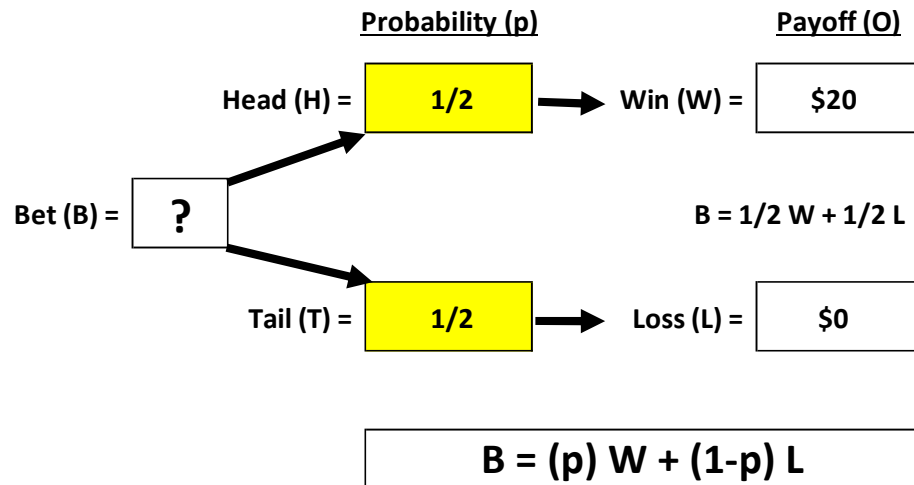
<b>FB</b>	<b>CALLS</b>			<b>PUTS</b>		
<b>Exercise Price (X)</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>	<b>MARCH</b>	<b>APRIL</b>	<b>MAY</b>
150	20.00	21.50	23.00	3.00	3.50	4.45
155	15.50	16.25	17.75	4.10	4.90	5.90
160	12.50	12.85	13.50	5.30	6.00	6.80
165	8.10	9.00	10.65	7.00	8.00	9.20
170	5.20	6.30	8.50	9.40	10.75	12.45
175	3.25	4.25	5.75	13.00	14.30	14.20
180	2.50	3.40	4.45	15.00	16.10	17.75



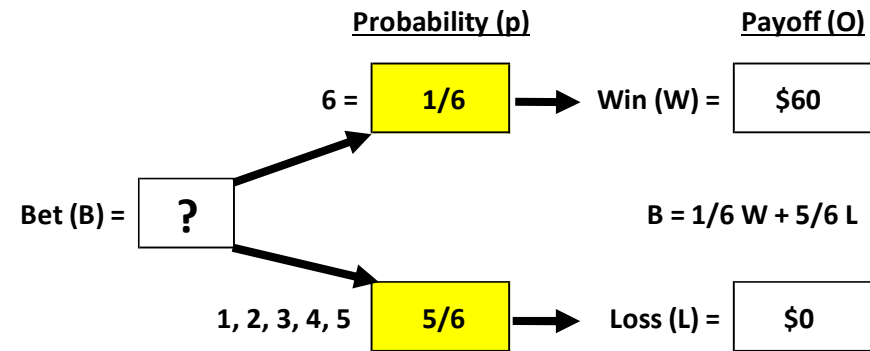
# VALUING OPTIONS

## APPLYING PROBABILITY THEORY

Calculating the Fair Bet based on Probability of Winning on Cointoss:



Calculating the Fair Bet based on Probability of Winning getting a "6" in one toss of a dice:





# BIONOMIAL OPTION PRICING METHOD

## for valuing options (single period)

$$\text{Probability (p)} = \frac{(i - d)}{(u - d)}$$

### INPUT

Current Stock (S)= \$ 100.00  
Up (u) = 1.20x  
Down (d) = 0.90x  
Exercise Price (X) = \$ 110.00  
Risk Free Rate (i) = 5.00%  
Time in Years (t) = 1  
Periods = 1

# BIONOMIAL OPTION PRICING METHOD

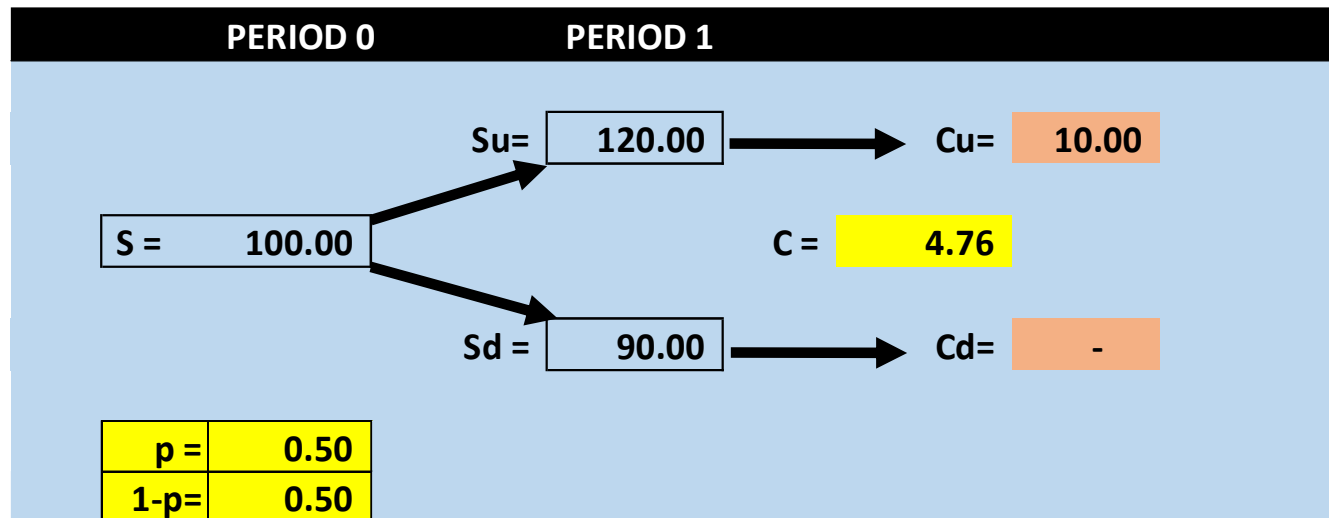
## for valuing options (single period)

$$\text{Probability (p)} = \frac{(i - d)}{(u - d)}$$

### INPUT

Current Stock (S)= \$ 100.00  
 Up (u) = 1.20x  
 Down (d) = 0.90x  
 Exercise Price (X) = \$ 110.00  
 Risk Free Rate (i) = 5.00%  
 Time in Years (t) = 1  
 Periods = 1

### OUTPUT



C = 4.76

# BIONOMIAL OPTION PRICING METHOD

## for valuing options (two-period)

### CALL OPTION

S = \$ 60.00

u = 1.25x

d = 0.80x

X = \$ 55.00

i = 3.50%

Frequency= 1

Periods= 2

$$\text{Probability (p)} = \frac{(i - d)}{(u - d)}$$

# BIONOMIAL OPTION PRICING METHOD for valuing options (two-period)

## CALL OPTION

### CALL OPTION

S = \$ 60.00

u = 1.25x

d = 0.80x

X = \$ 55.00

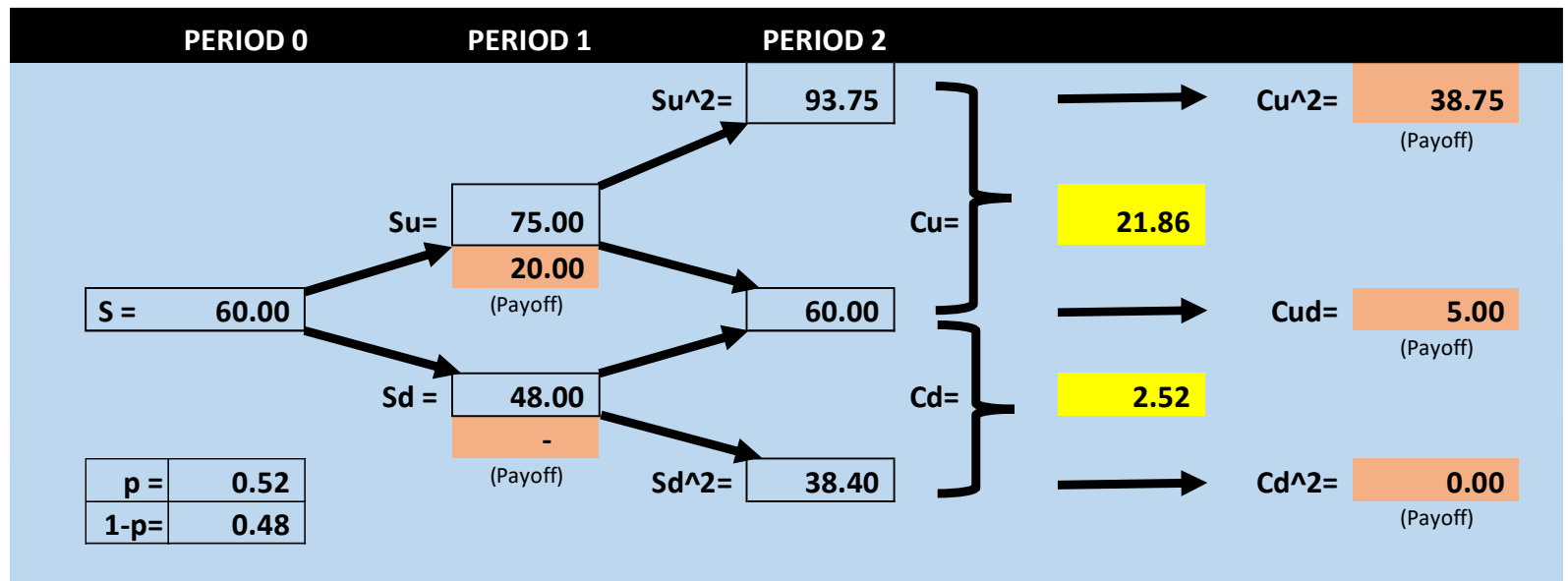
i = 3.50%

Frequency= 1

Periods= 2

### Frequency:

( Annual =1,  
Semiannual = 2,  
Quarterly=4)



**C(E)= 12.19** European Option Premium  
**C(A)= 10.09** American Option Premium

# BIONOMIAL OPTION PRICING METHOD

## for valuing options (two-period)

$$\text{Probability (p)} = \frac{(i - d)}{(u - d)}$$

### PUT OPTION

S = \$ 60.00

u = 1.25x

d = 0.80x

X = \$ 55.00

i = 3.50%

Frequency= 1

Periods= 2

# BIONOMIAL OPTION PRICING METHOD for valuing options (two-period)

## PUT OPTION

### PUT OPTION

S = \$ 60.00

u = 1.25x

d = 0.80x

X = \$ 55.00

i = 3.50%

Frequency= 1

Periods= 2

Frequency:

( Annual =1,

Semiannual = 2,

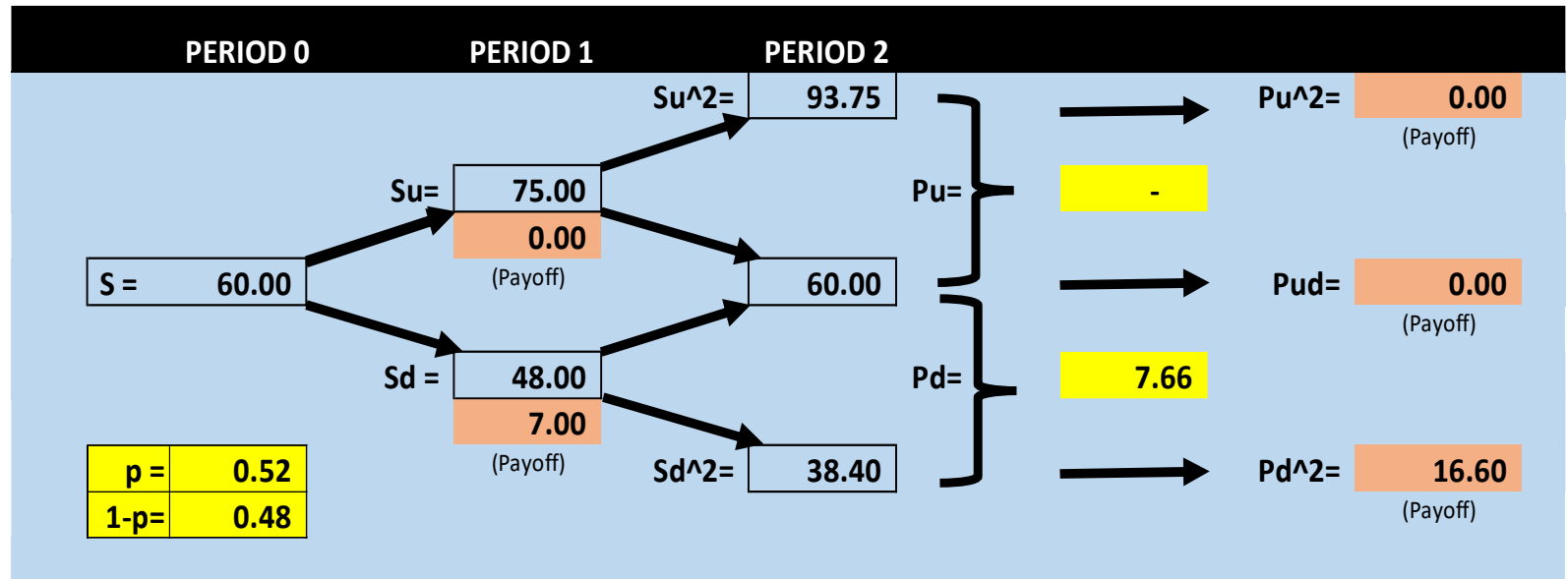
Quarterly=4)

p =	0.52
1-p =	0.48

P(E)=	3.54
P(A)=	3.23

European Option Premium

American Option Premium



# BIONOMIAL OPTION PRICING METHOD

for valuing options (two-period) with Dividends (yield and \$)

$$\text{Probability (p)} = \frac{(i - d)}{(u - d)}$$

## INPUT

### Using Dividend Yield %

S = \$ 100.00  
u = 1.10x  
d = 0.85x  
X = \$ 105.00  
i = 3.50%  
Div ( $\delta$ ) = 4.00% (at 1st Period)

# BIONOMIAL OPTION PRICING METHOD

## for valuing options (two-period) with Dividend Yield

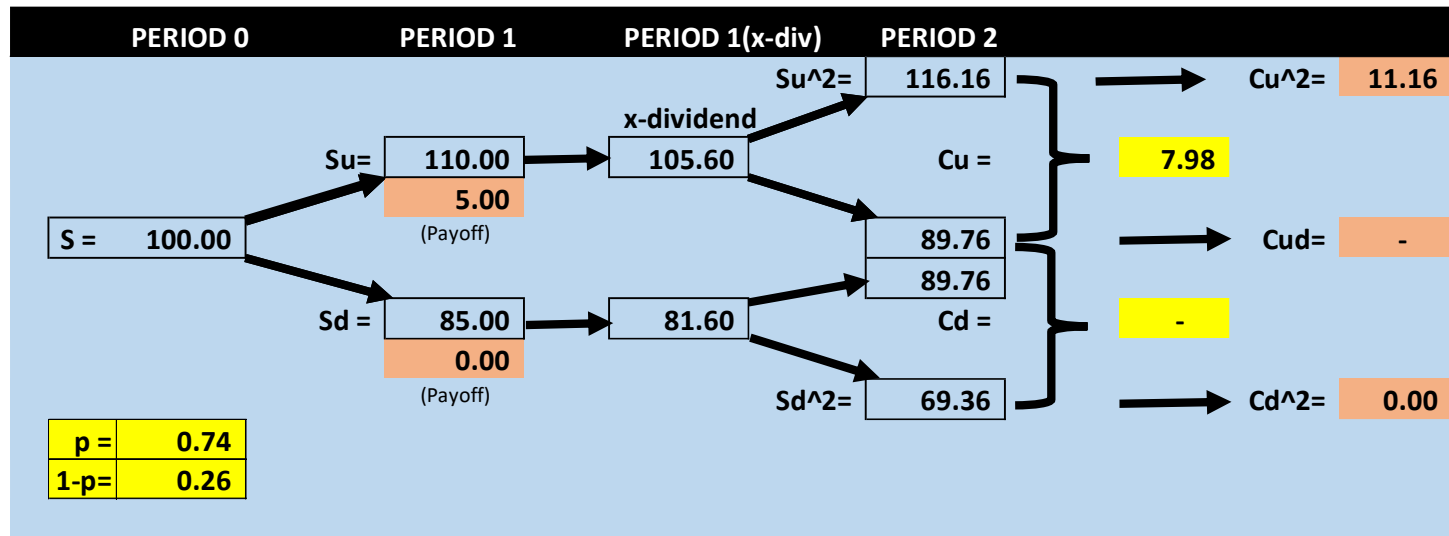
CALL OPTION

### INPUT

Using Dividend Yield %

$S = \$ 100.00$   
 $u = 1.10x$   
 $d = 0.85x$   
 $X = \$ 105.00$   
 $i = 3.50\%$   
 Div ( $\delta$ ) = 4.00% (at 1st Period)  
  
 Annual = 1  
 Periods = 2

### OUTPUT



**C(E) = 5.70** European Option Premium  
**C(A) = 3.57** American Option Premium



# BIONOMIAL OPTION PRICING METHOD

## for valuing options (two-period) with Dividends (\$)

CALL OPTION

Using Dividend Yield \$

$S = \$ 100.00$

$u = 1.10x$

$d = 0.85x$

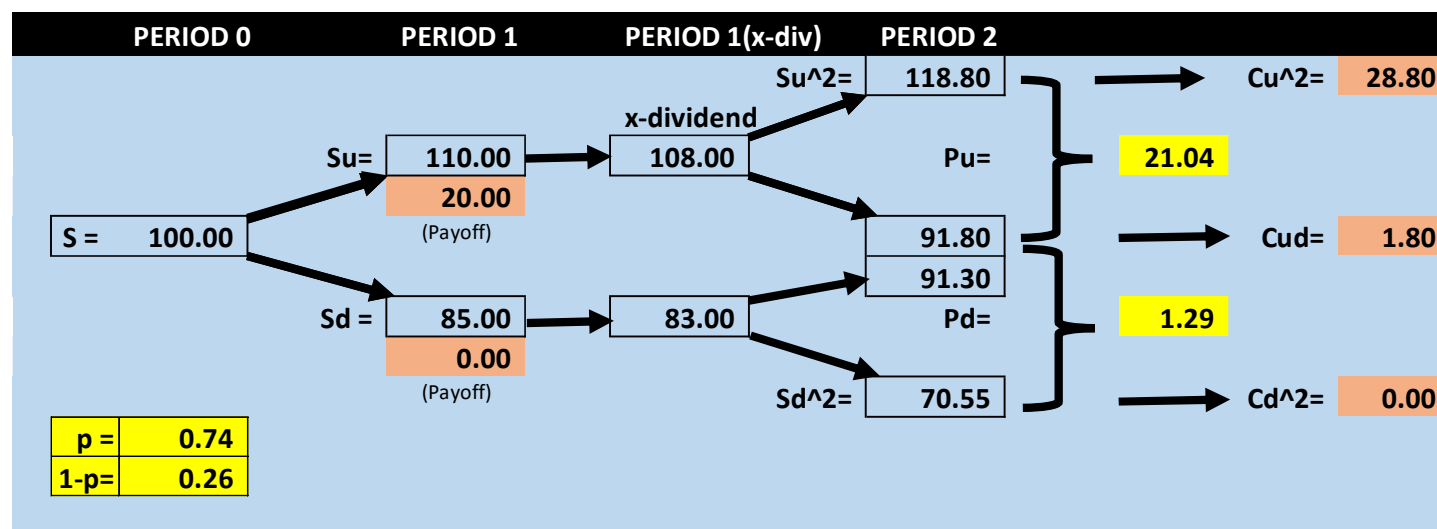
$X = \$ 90.00$

$i = 3.50\%$

Div \$ = \$ 2.00 (at 1st Period)

Annual= 1

Periods= 2



$C(E) = 15.37$  European Option Premium

$C(A) = 14.30$  American Option Premium

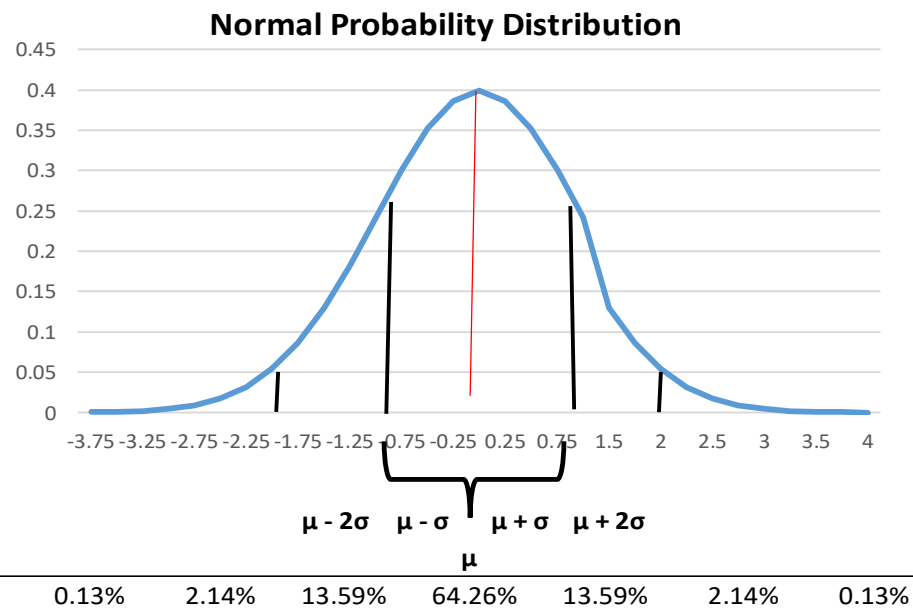
# Math & Statistics 101

## COMPOUND INTEREST USING $e$

Present Value = \$ 1.00  
Interest = 10%  
Years = 10

Description	Compound per year Frequency (f)	Future Value Compunded
Annual	1	2.5937425
Semi	2	2.6532977
Quarterly	4	2.6850638
Monthly	12	2.7070415
Daily	365	2.7179096
Hourly	8,760	2.7182663
By Minute	525,600	2.7182816
By Second	31,536,000	2.7182819
Infinite	$e$	2.7182818

# Math & Statistics 101



NORMAL DISTRIBUTION TABLE									
d	N(d)	d	N(d)	d	N(d)	d	N(d)	d	N(d)
3.200	0.999	1.900	0.971	0.600	0.726	-0.700	0.242	-2.000	0.023
3.100	0.999	1.800	0.964	0.500	0.691	-0.800	0.212	-2.100	0.018
3.000	0.999	1.700	0.955	0.400	0.655	-0.900	0.184	-2.200	0.014
2.900	0.998	1.600	0.945	0.300	0.618	-1.000	0.159	-2.300	0.011
2.800	0.997	1.500	0.933	0.200	0.579	-1.100	0.136	-2.400	0.008
2.700	0.997	1.400	0.919	0.100	0.540	-1.200	0.115	-2.500	0.006
2.600	0.995	1.300	0.903	0.000	0.500	-1.300	0.097	-2.600	0.005
2.500	0.994	1.200	0.885	-0.100	0.460	-1.400	0.081	-2.700	0.003
2.400	0.992	1.100	0.864	-0.200	0.421	-1.500	0.067	-2.800	0.003
2.300	0.989	1.000	0.841	-0.300	0.382	-1.600	0.055	-2.900	0.002
2.200	0.986	0.900	0.816	-0.400	0.345	-1.700	0.045	-3.000	0.001
2.100	0.982	0.800	0.788	-0.500	0.309	-1.800	0.036	-3.100	0.001
2.000	0.977	0.700	0.758	-0.600	0.274	-1.900	0.029	-3.200	0.001

# Black-Scholes Option Pricing Model

# Black-Scholes Option Pricing Model

$$C = SN(d1) - Xe^{-it}N(d2)$$

$$P = Xe^{-it}[1 - N(d2)] - Se^{-\delta t}[1 - N(d1)]$$

$$d1 = \frac{\ln\left(\frac{S}{X}\right) + \left(i + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$$d2 = d1 - \sigma\sqrt{t}$$

# Black-Scholes

$$S = \$100$$

$$X = \$110$$

$$t = 0.50 \text{ (6 months)}$$

$$i = 5.0\%$$

$$\sigma = .40$$

$$\begin{aligned} d1 &= \frac{\ln\left(\frac{100}{110}\right) + \left(0.05 + \frac{.4^2}{2}\right) 0.50}{0.40\sqrt{0.5}} \\ &= \frac{\ln(0.9091) + (0.05 + 0.08) 0.50}{(0.40)(0.7071)} \\ &= \frac{-0.0953 + 0.065}{0.2828} \end{aligned}$$

$$d1 = -0.1071$$

and

$$d2 = -0.1071 - 0.2828 = -0.3899$$

$$N(d1) = N(-0.1071) = 0.4573$$

$$N(d2) = N(-0.3899) = 0.3482$$

## CALL OPTION

The call option for the call option is calculated using the Black-Scholes formula:

$$\begin{aligned} C &= 100 (0.4573) - 110 e^{-(0.05)(0.5)} (0.3482) \\ &= 45.73 - 110(0.9753)(0.3482) \\ &= 45.73 - 37.36 = 8.37 \end{aligned}$$

$$\underline{\underline{C = 8.37}}$$

# Black-Scholes

$$S = \$100$$

$$X = \$110$$

$$t = 0.50 \text{ (6 months)}$$

$$i = 5.0\%$$

$$\sigma = .40$$

## PUT OPTION

$$\begin{aligned} d1 &= \frac{\ln\left(\frac{100}{110}\right) + \left(0.05 + \frac{.4^2}{2}\right) 0.50}{0.40\sqrt{0.5}} \\ &= \frac{\ln(0.9091) + (0.05 + 0.08) 0.50}{(0.40)(0.7071)} \\ &= \frac{-0.0953 + 0.065}{0.2828} \end{aligned}$$

$$d1 = -0.1071$$

and

$$d2 = -0.1071 - 0.2828 = -0.3899$$

$$N(d1) = N(-0.1071) = 0.4573$$

$$N(d2) = N(-0.3899) = 0.3482$$

The put option is calculated as follows:

$$\begin{aligned} P &= 110 e^{-(0.05)(0.5)} [1 - (0.3482)] - 100 [1 - 0.4573] \\ &= 110 (0.9753)(0.6518) - 100 (0.5427) \\ &= 69.93 - 54.27 = 15.66 \end{aligned}$$

$$\underline{\underline{P = 15.66}}$$

## Black-Scholes with Dividends

$$C = Se^{-\delta t}N(d1) - Xe^{-it}N(d2)$$

$$P = Xe^{-it}[1 - N(d2)] - Se^{-\delta t}[1 - N(d1)]$$

$$d1 = \frac{\ln\left(\frac{S}{X}\right) + \left(i - \delta + \frac{\sigma^2}{2}\right)t}{\sigma\sqrt{t}}$$

$$d2 = d1 - \sigma\sqrt{t}$$



# Black-Scholes with Dividends

- **Input**

- $S = \$100$

- $X = \$110$

- $t = 0.50$  (6 months)

- $i = 5.0\%$

- $\sigma = .40$

- $\delta = 3.0\%$

$$\begin{aligned}d_1 &= \frac{\ln\left(\frac{100}{110}\right) + \left(0.05 - 0.03 + \frac{.4^2}{2}\right) 0.50}{0.40\sqrt{0.5}} \\ &= \frac{\ln(0.9091) + (0.02 + 0.08) 0.50}{(0.40)(0.7071)} \\ &= \frac{-0.0953 + 0.050}{0.2828}\end{aligned}$$

$$d_1 = -0.1602$$

and

$$d_2 = -0.1602 - 0.2828 = -0.4430$$

$$N(d_1) = N(-0.1602) = 0.4364$$

$$N(d_2) = N(-0.4430) = 0.3289$$

# Black-Scholes with Dividends

- **Input**

- $S = \$100$
- $X = \$110$
- $t = 0.50$  (6 months)
- $i = 5.0\%$
- $\sigma = .40$
- $\delta = 3.0\%$

The call option for the call option is calculated using the Black-Scholes formula:

$$\begin{aligned} C &= 100 e^{-(0.03)(0.5)}(0.4364) - 110 e^{-(0.05)(0.5)}(0.3289) \\ &= 100 (0.9851)(0.4364) - 110 (0.9753)(0.3289) \\ &= 42.99 - 35.28 = 7.71 \end{aligned}$$

$$\underline{\mathbf{C = 7.71}}$$

The put option is calculated as follows:

$$\begin{aligned} P &= 110 e^{-(0.05)(0.5)}[1 - (0.3482)] \\ &\quad - 100 e^{-(0.03)(0.5)} [1 - 0.4573] \\ &= 110 (0.9753)(0.6518) - 100 (0.9851)(0.5427) \\ &= 69.93 - 53.46 = 16.47 \end{aligned}$$

$$\underline{\mathbf{P = 16.47}}$$

# Black-Scholes using Excel

BLACK-SCHOLES VALUATION								
CALL OPTION								
A	B	C	D	E	F	G	H	I
4								
5	INPUT			OUTPUT		FORMULAS		
6								
7	Standard Deviation ( $\sigma$ ) =	0.4		d1 =	-0.107	=(LN(D11/D12)+(D10-D13+(D8^2)/2)*D9)/(D8*SQRT(D9))		
8	Expiration (in years) (T) =	0.5		d2 =	-0.390	=+G8-D8*SQRT(D9)		
9	Risk-Free Rate (Annual) (i) =	0.05		N(d1) =	0.457	=NORMSDIST(G8)		
10	Stock Price (S) =	100		N(d2) =	0.348	=NORMSDIST(G9)		
11	Exercise Price (X) =	110						
12	Dividend Yield (annual) ( $\delta$ ) =	0		C =	8.3696	=+D11*EXP(-D13*D9)*G10-D12*EXP(-D10*D9)*G11		
13								

Figure 13.21

BLACK-SCHOLES VALUATION								
PUT OPTION								
A	B	C	D	E	F	G	H	I
4								
5	INPUT			OUTPUT		FORMULAS		
6								
7	Standard Deviation ( $\sigma$ ) =	0.4		d1 =	-0.107	=(LN(D11/D12)+(D10-D13+(D8^2)/2)*D9)/(D8*SQRT(D9))		
8	Expiration (in years) (T) =	0.5		d2 =	-0.390	=+G8-D8*SQRT(D9)		
9	Risk-Free Rate (Annual) (i) =	0.05		N(d1) =	0.457	=NORMSDIST(G8)		
10	Stock Price (S) =	100		N(d2) =	0.348	=NORMSDIST(G9)		
11	Exercise Price (X) =	110						
12	Dividend Yield (annual) ( $\delta$ ) =	0		P =	15.6537	=D11*EXP(-D9*D8)*(1-G10)-D10*EXP(-D12*D8)*(1-G9)		
13								

Figure 13.22

## Put Call Parity

$$C - P = S - PV(X) \text{ or}$$

$$C - P = S - Xe^{-it}$$

$$C = S - Xe^{-it} + P \text{ and}$$

$$P = Xe^{-it} - S + C$$

# BINOMIAL OPTION PRICING MODEL – LEVERAGE METHOD

$$S = \$100$$

$$X = \$110$$

$$S_u = 1.20$$

$$S_d = .90$$

$$i = 5.0\%$$

$$t = 1$$

# BINOMIAL OPTION PRICING MODEL

## LEVERAGE METHOD

### BINOMIAL OPTION PRICING MODEL

#### LEVERAGE (BORROWING) METHOD - Call option

Parameters	Current Stock Price	Increase / Decrease Factors (u and d)	Stock x (Su) and (Sd)	Call Option Payoff (Cu) and (Cd)	h
Current Price (So)=	\$ 100.00				
Up factor (u) =		1.2x	\$ 120.00	\$ 10.00	
Down factor (d) =		0.9x	\$ 90.00	\$ -	
Ranges (Su - Sd) and (Cu-Cd) =			\$ 30.00	\$ 10.00	1/3

Exercise Option = \$ 110.00  
 Exercise time = 1 year  
 Interest Rate = 5% annual compounding

**Step 1:** (Su - Sd) = \$ 30.00 Range between Upper and Lower Stock  
**Step 2:** (Cu - Cd) = \$ 10.00 Range between Upper and Lower Payoff  
**Step 3:**  $h = (Cu - Cd) / (Su - Sd) = 1/3$  Hedge Ratio (Buy 1 Stock / Sell 3 Calls)

**Step 4:** (PV of Sd) = \$ 85.71 Present Value of the Stock - Borrowing)  
**Step 5:** (So - PV(Sd)) = \$ 14.29 Intrinsic Value (\$ - Expected X)  
**Step 6:** ((So - PV(Sd)) x h) = \$ 4.76 Intrinsic Value times the hedge ratio

**Premium = \$ 4.76**

**Break Even = \$ 114.76** Stock Price + Premium  
 Distance to BE (\$) = \$ 14.76 Break Even \$116.06 - Current Stock \$100  
 Distance to BE (%) = 14.76% Break Even / Stock Price - 1

#### CALL-PUT PARITY ERROR CHECK

\$ 9.52

#### LEVERAGE (BORROWING) METHOD - Put Option

Parameters	Current Stock Price	Increase / Decrease Factors (u and d)	Stock x (Su) and (Sd)	Put Option Payoff (Pu) and (Pd)	h
Current Price (So)=	\$ 100.00				
Up factor (u) =		1.2x	\$ 120.00	\$ -	
Down factor (d) =		0.9x	\$ 90.00	\$ 20.00	
Ranges (Su - Sd) and (Cd-Cu) =			\$ 30.00	\$ 20.00	2/3

Exercise Option = \$ 110.00  
 Exercise time = 1 year  
 Interest Rate = 5% annual compounding

**Step 1:** (Su - Sd) = \$ 30.00 Range between Upper and Lower Stock  
**Step 2:** (Pu - Pd) = \$ 20.00 Range between Upper and Lower Payoff  
**Step 3:**  $h = (Pu - Pd) / (Su - Sd) = 2/3$  Hedge Ratio (Buy 2 Stocks / Buy 3 Puts)

**Step 4:** (PV of Su) = \$ 114.29 Present Value of the Stock - Borrowing)  
**Step 5:** (So - PV(Su)) = \$ 14.29 Intrinsic Value (Expected X-S)  
**Step 6:** ((PV(Su) - S0] x h) = \$ 9.52 Intrinsic Value times the hedge ratio

**Premium = \$ 9.52**

**Break Even = \$ 100.48** Stock Price - Premium  
 Distance to BE (\$) = \$ 0.48 Break Even \$96.36 - Current Stock \$100  
 Distance to BE (%) = 0.48% Break Even / Stock Price - 1

Figure 13.23