

Introduction to Options

Part Three – Option Combinations

Disclosure of Risks

Options involve risk and are not suitable for all investors. For more information, read the “Characteristics and Risks of Standardized Options” before investing in options. For a copy call 203- 618-5800 or click [here](#).

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In order to simplify the computations, commissions, fees, margin interest and taxes have not been included in the examples used in these materials. These costs will impact the outcome of all stock and options transactions and must be considered prior to entering into any transactions. Investors should consult their tax advisor about any potential tax consequences.

Any strategies discussed, including examples using actual securities and price data, are strictly for illustrative and educational purposes only and are not to be construed as an endorsement, recommendation or solicitation to buy or sell securities. Past performance is not a guarantee of future results.

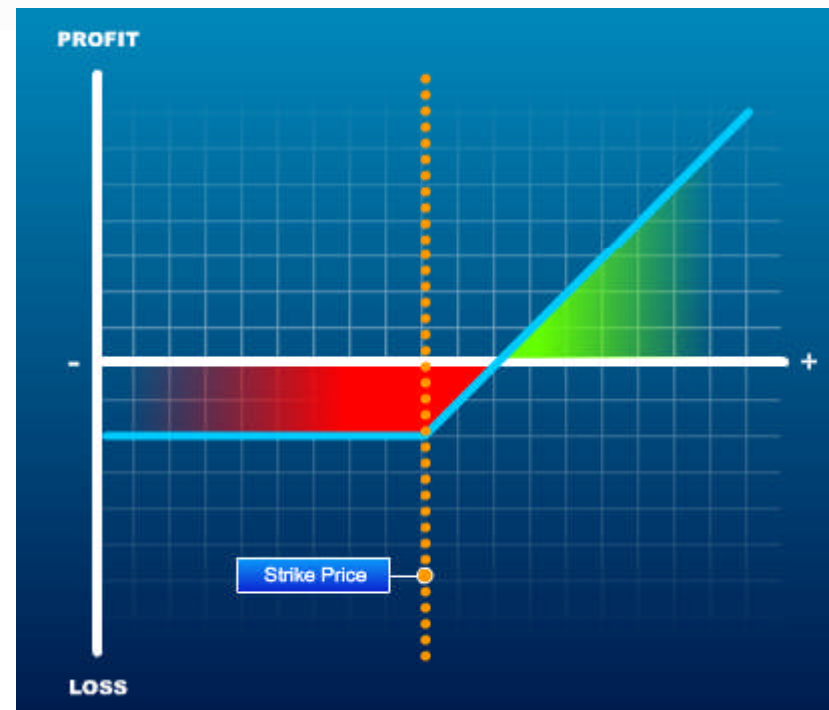
Most strategies involving futures and/or options spreads require a margin account.

Multiple leg strategies involve multiple commissions charges.

Supporting documentation for any claims and statistical information will be provided upon request.

Options Pricing

- ❑ Input Variables
- ❑ Greek Risk Measurements
- ❑ Combining Options
 - IB Options Calculator
 - See Options Combinations Flash Tour at Traders University on the IB website

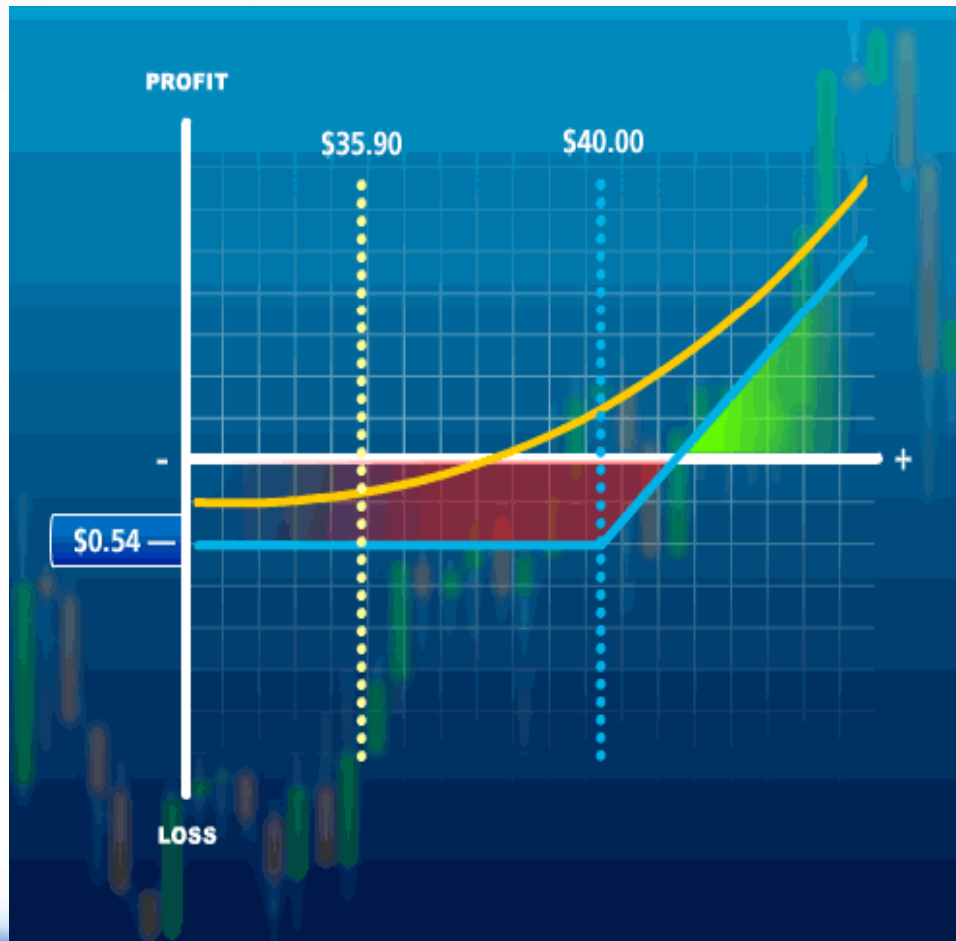
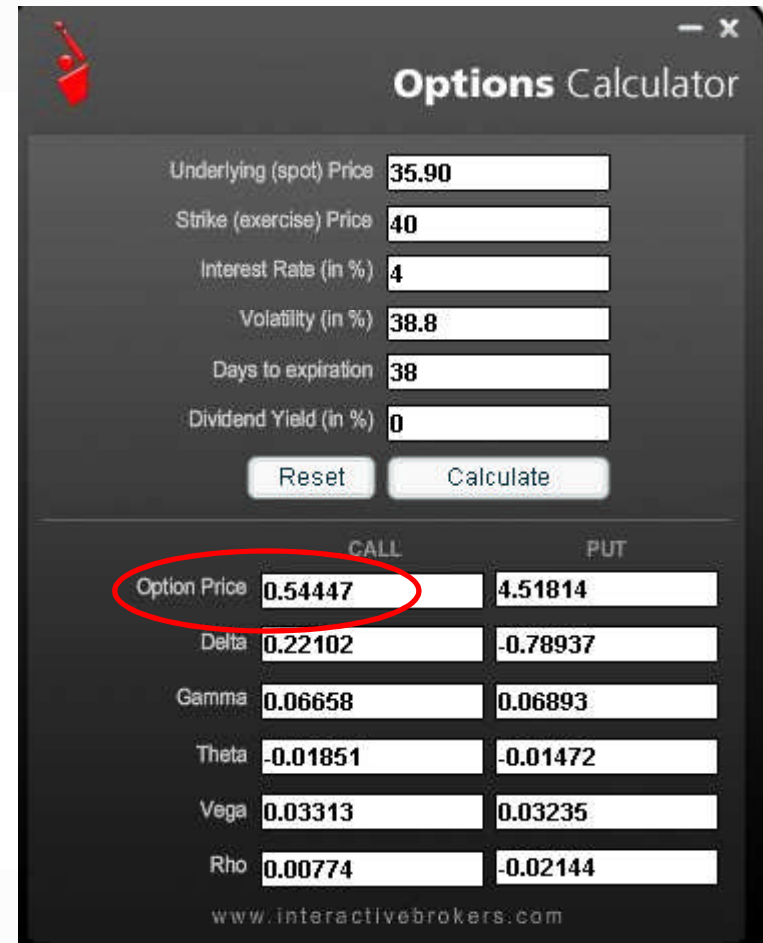




Options Pricing

- ☐ Deciding on a strategy
- ☐ Scenario exploration
- ☐ Impact on variables and risk measurements

Long Call

Options Calculator

Underlying (spot) Price:

Strike (exercise) Price:

Interest Rate (in %):

Volatility (in %):

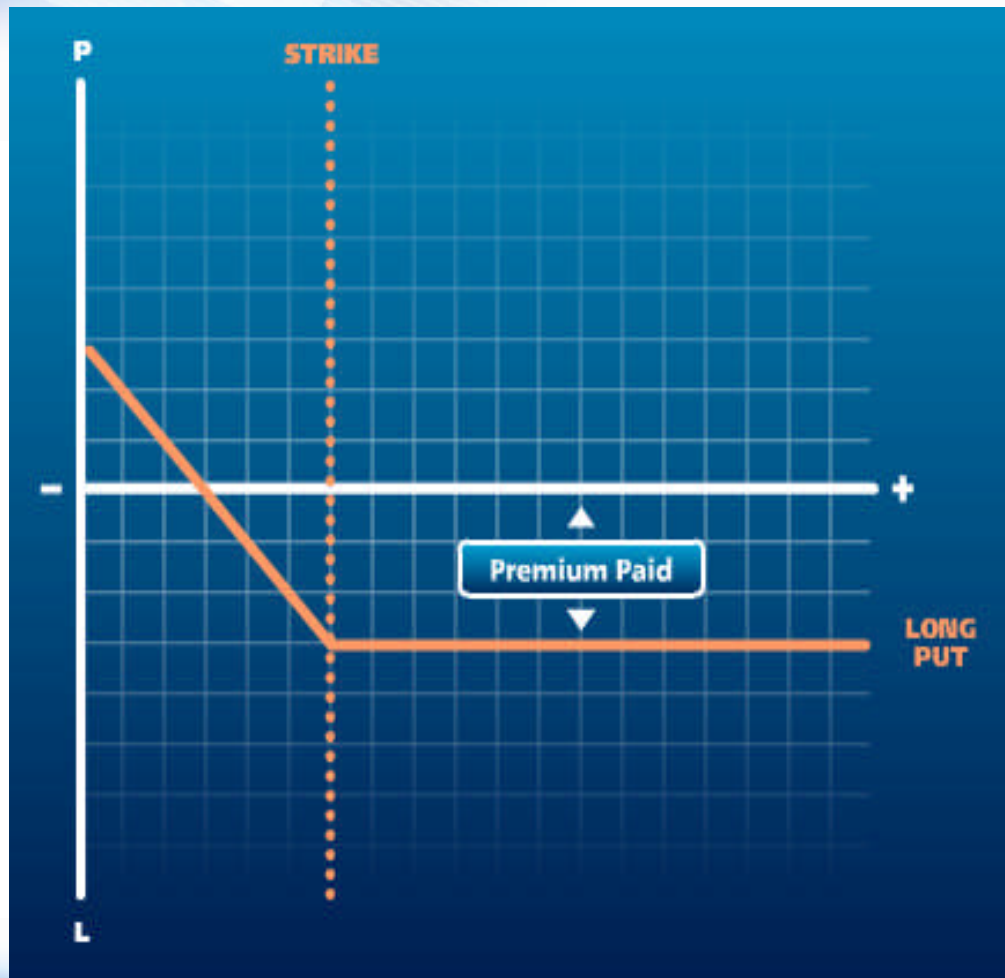
Days to expiration:

Dividend Yield (in %):

	CALL	PUT
Option Price	0.54447	4.51814
Delta	0.22102	-0.78937
Gamma	0.06658	0.06893
Theta	-0.01851	-0.01472
Vega	0.03313	0.03235
Rho	0.00774	-0.02144

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Long Put



Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	3.66174	0.44454
Delta	0.81471	-0.18732
Gamma	0.06648	0.06746
Theta	-0.00811	-0.00575
Vega	0.03929	0.0403
Rho	0.0574	-0.01445

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Long Put – if stock price falls...

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	3.66174	0.44454
Delta	0.81471	-0.18732
Gamma	0.06648	0.06746
Theta	-0.00811	-0.00575
Vega	0.03929	0.0403
Rho	0.0574	-0.01445

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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.5802	1.37939
Delta	0.54802	-0.46007
Gamma	0.1091	0.112
Theta	-0.00963	-0.00738
Vega	0.0585	0.05848
Rho	0.03688	-0.02893

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Long Put – if stock price falls...

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.5802	1.37939
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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

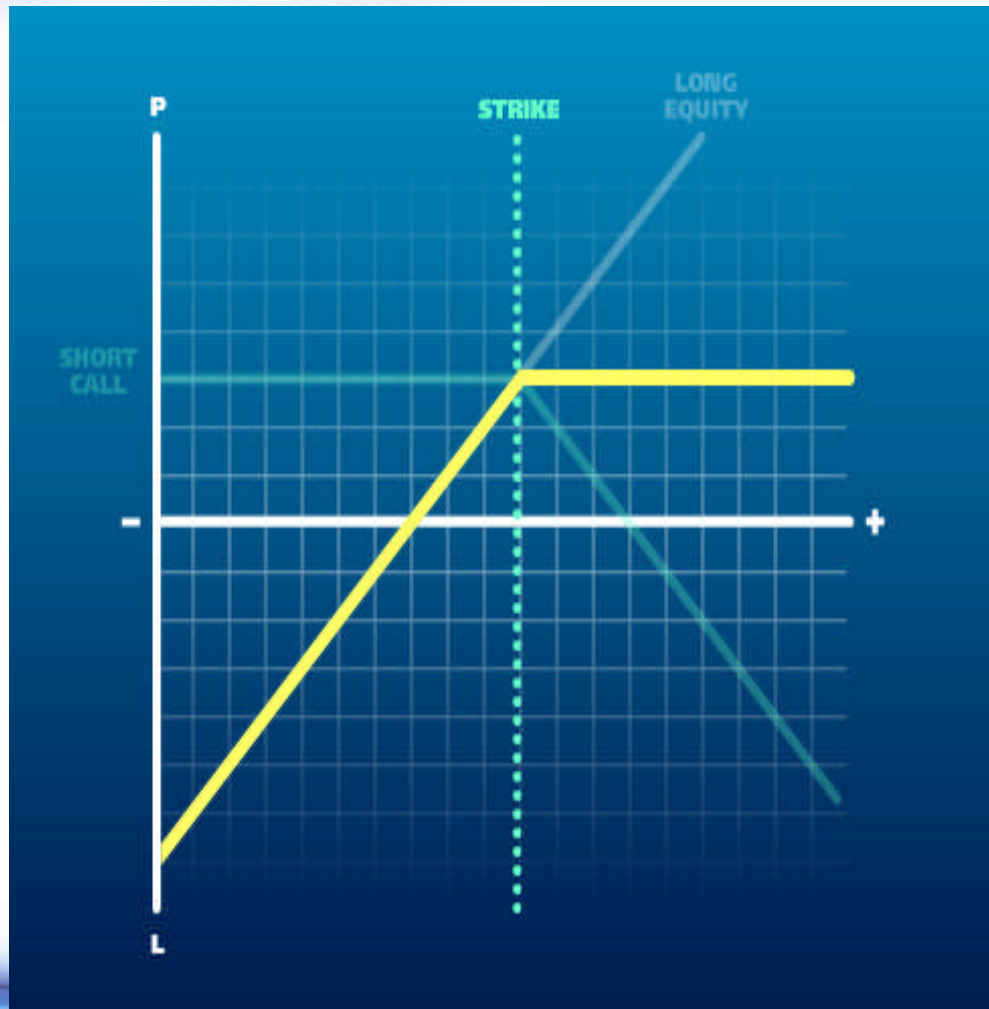
Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.09591	0.9947
Delta	0.53399	-0.47126
Gamma	0.15485	0.15736
Theta	-0.01316	-0.01088
Vega	0.04152	0.04151
Rho	0.01849	-0.01473

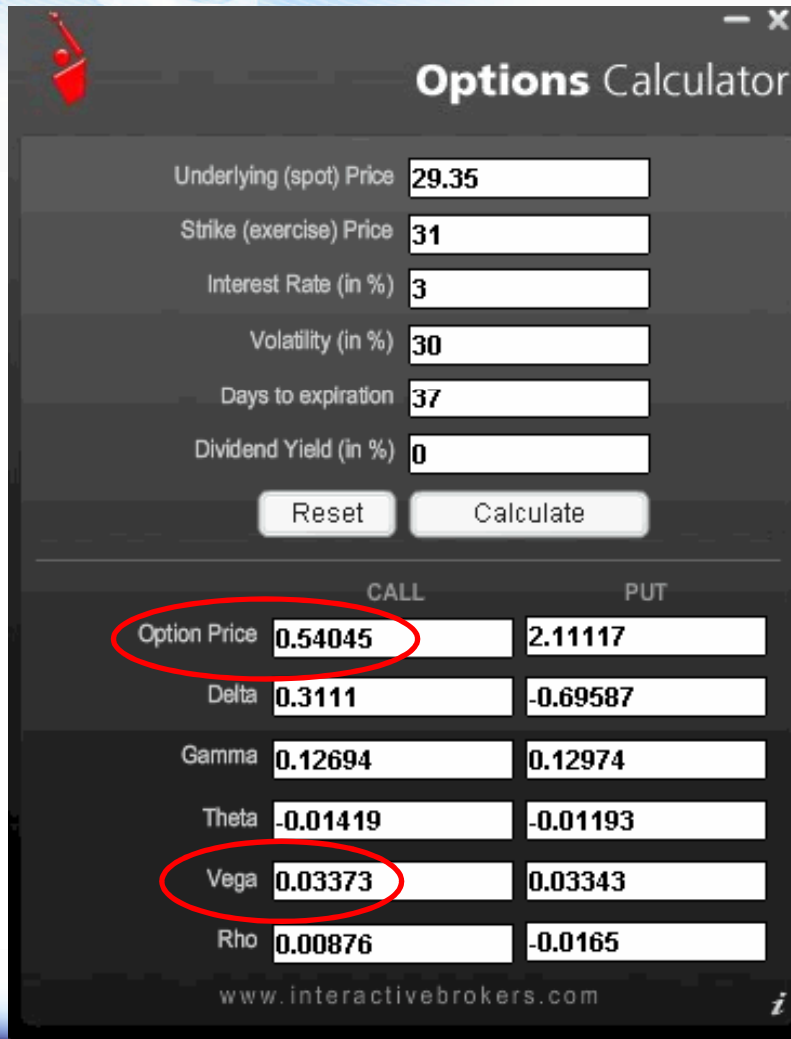
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Covered Call



- ☐ Long Equity
- ☐ Sell or write call option

Covered Call



Options Calculator

Underlying (spot) Price

Strike (exercise) Price


Interest Rate (in %)

Volatility (in %)

Days to expiration

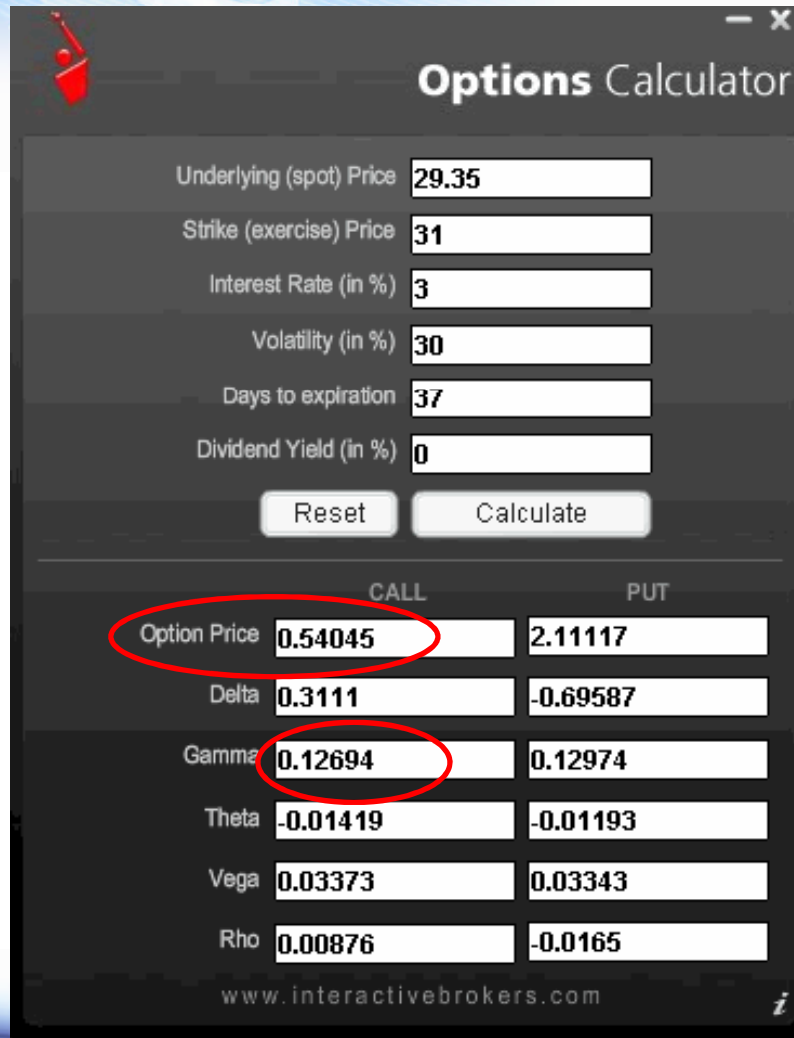
Dividend Yield (in %)

	CALL	PUT
Option Price	<input type="text" value="0.54045"/>	<input type="text" value="2.11117"/>
Delta	<input type="text" value="0.3111"/>	<input type="text" value="-0.69587"/>
Gamma	<input type="text" value="0.12694"/>	<input type="text" value="0.12974"/>
Theta	<input type="text" value="-0.01419"/>	<input type="text" value="-0.01193"/>
Vega	<input type="text" value="0.03373"/>	<input type="text" value="0.03343"/>
Rho	<input type="text" value="0.00876"/>	<input type="text" value="-0.0165"/>

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- ☐ Existing variables provide call option value
- ☐ Vega tells us that a 1% rise in implied volatility might boost option price by 3 cents

Covered Call



Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

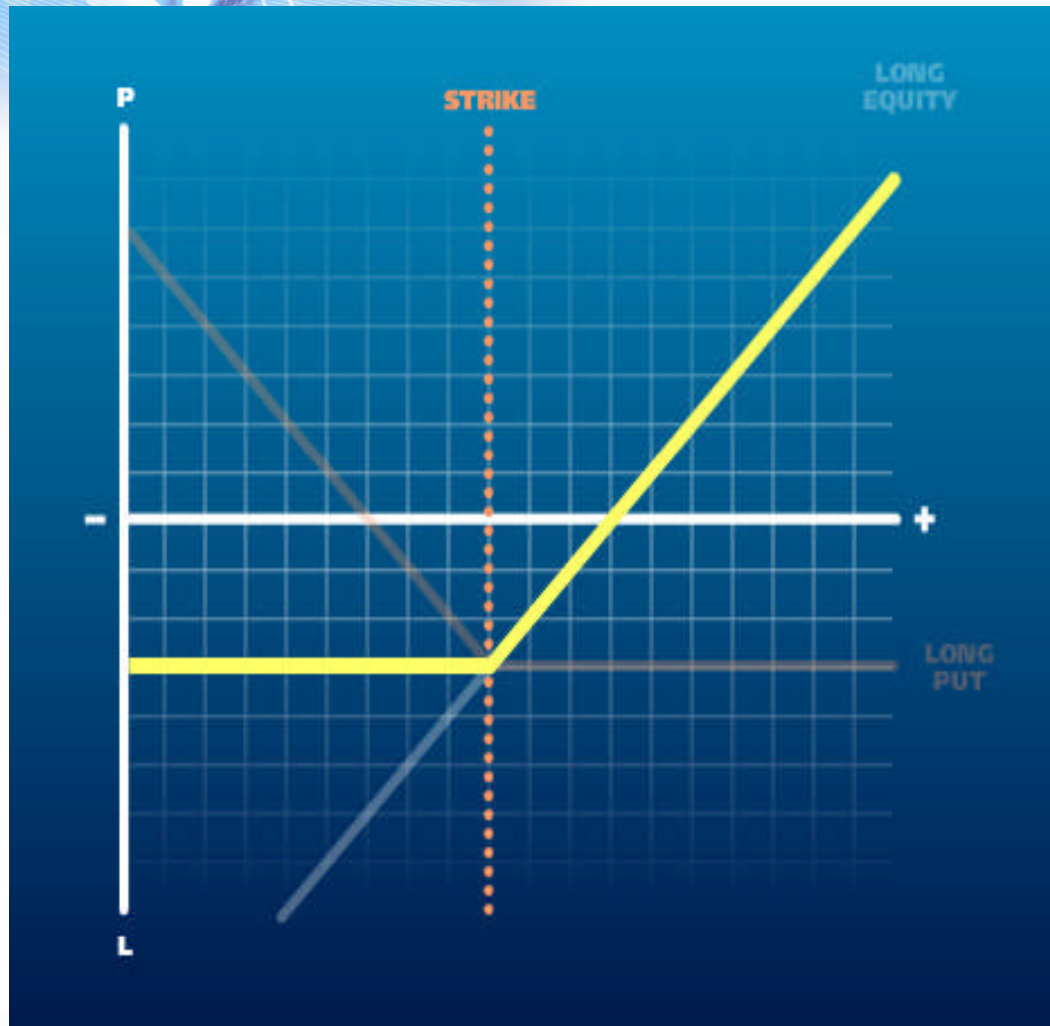
Dividend Yield (in %)

	CALL	PUT
Option Price	<input type="text" value="0.54045"/>	<input type="text" value="2.11117"/>
Delta	<input type="text" value="0.3111"/>	<input type="text" value="-0.69587"/>
Gamma	<input type="text" value="0.12694"/>	<input type="text" value="0.12974"/>
Theta	<input type="text" value="-0.01419"/>	<input type="text" value="-0.01193"/>
Vega	<input type="text" value="0.03373"/>	<input type="text" value="0.03343"/>
Rho	<input type="text" value="0.00876"/>	<input type="text" value="-0.0165"/>

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- ☐ Out-of-the-money option contains ONLY extrinsic value
- ☐ Theta may favor the trade
- ☐ Falling volatility may help

Protective Put



- ☐ Long equity
- ☐ Long put
- ☐ Use of a protective put increases the breakeven on the stock position by the cost of put

Protective Put

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.6538	0.57653
Delta	0.67521	-0.32676
Gamma	0.14052	0.14173
Theta	-0.02133	-0.01829
Vega	0.0353	0.03566
Rho	0.01741	-0.00816

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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.07573	1.00046
Delta	0.52535	-0.47836
Gamma	0.15607	0.15776
Theta	-0.02302	-0.01996
Vega	0.04133	0.04132
Rho	0.01371	-0.01116

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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	0.6538	1.58119
Delta	0.37514	-0.6305
Gamma	0.14828	0.15058
Theta	-0.02149	-0.01843
Vega	0.03789	0.03736
Rho	0.00988	-0.01375

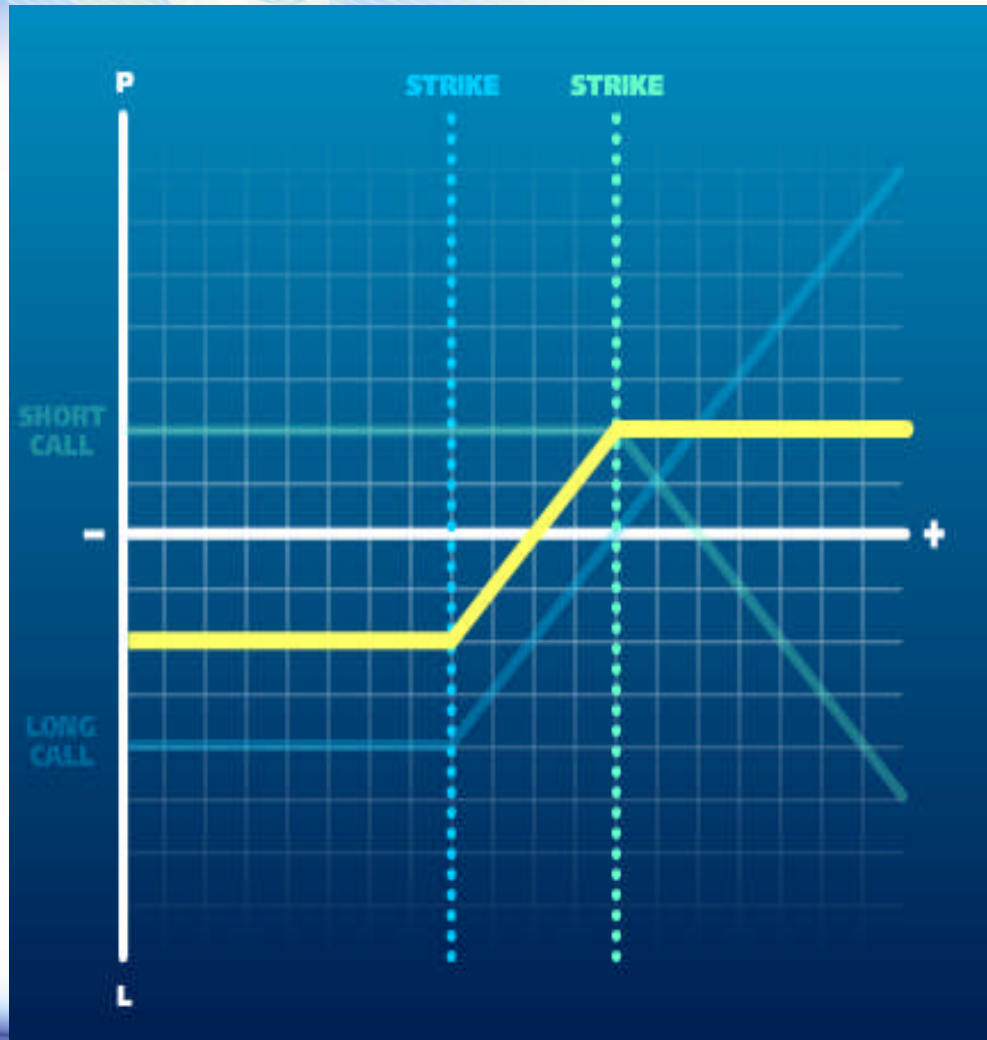
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Strike \$39.00 - \$1.65 = B/e of \$37.35

Strike \$40.00 - \$1.08 = B/e of \$38.92

Strike \$41.00 - \$0.65 = B/e of \$40.35

Bull Call Spread



- ☐ Seeks upside potential from stock
- ☐ Buy call, sell call
- ☐ Profits limited

Bull Call Spread

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	0.54045	2.11117
Delta	0.3111	-0.69587
Gamma	0.12694	0.12974
Theta	-0.01419	-0.01193
Vega	0.03373	0.03343
Rho	0.00876	-0.0165

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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

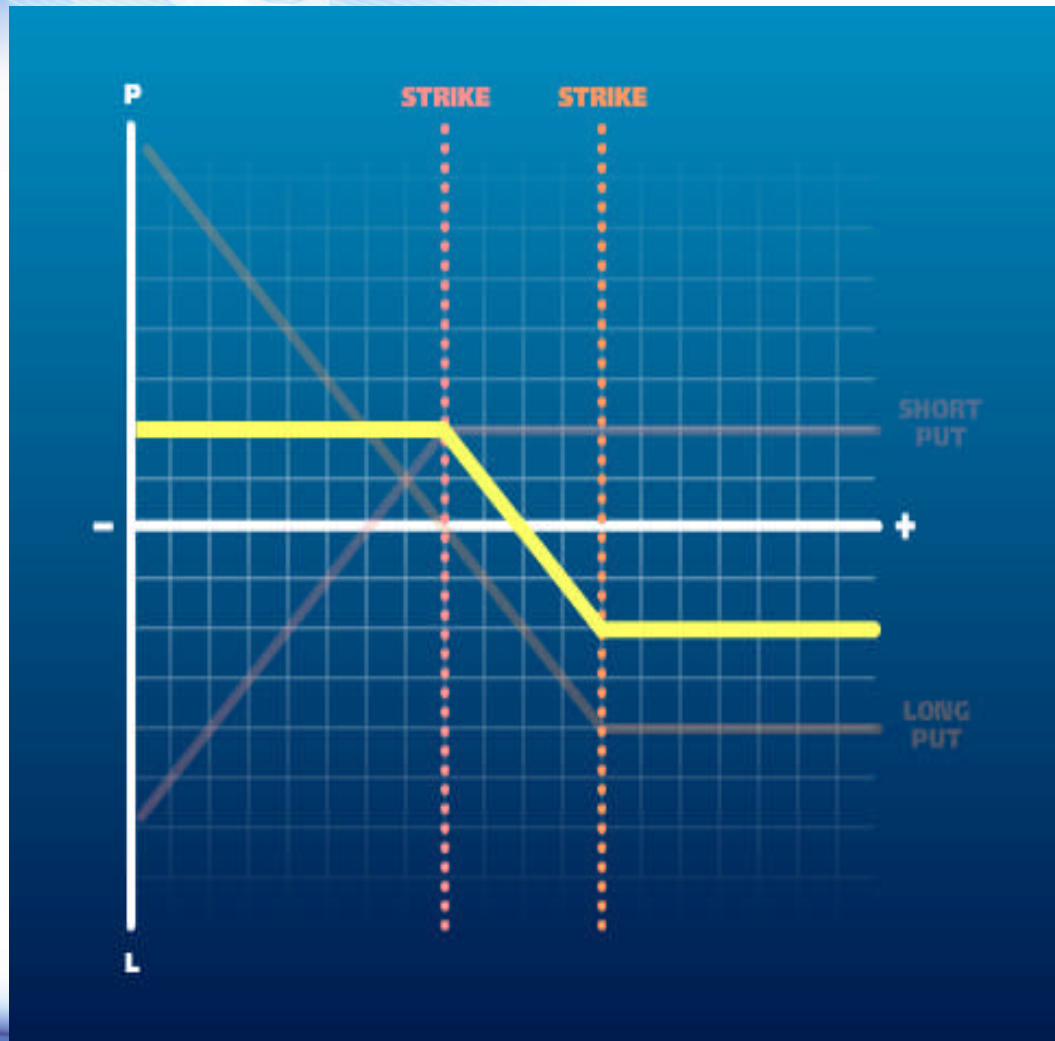
Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	0.31267	2.88904
Delta	0.20456	-0.80533
Gamma	0.10181	0.10531
Theta	-0.01128	-0.00901
Vega	0.02648	0.02583
Rho	0.00581	-0.01675

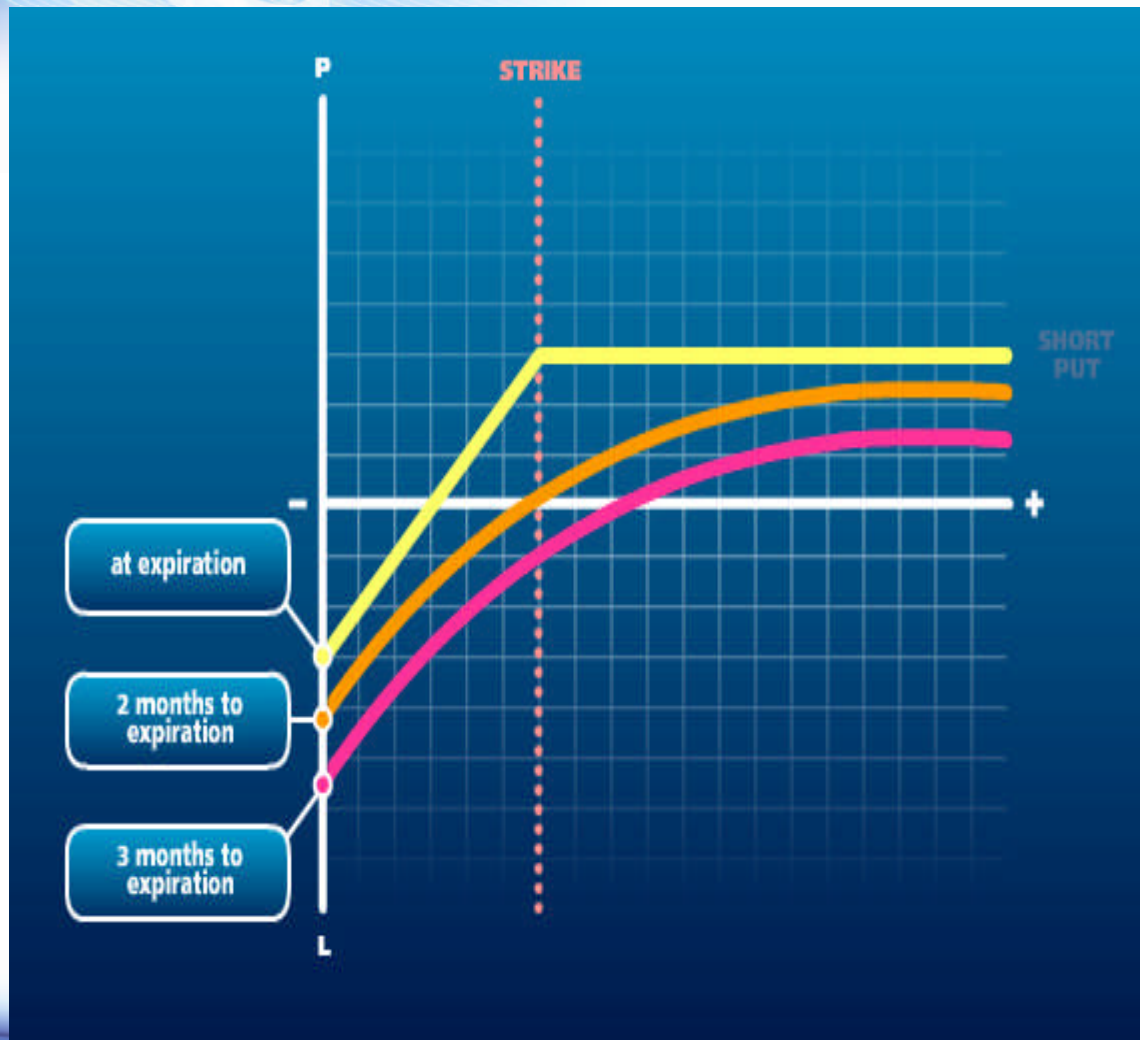
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Bear Put Spread



- ☐ Seeks downside potential from stock
- ☐ Buy put, sell put
- ☐ Profits limited

Naked Put (Bullish)



- ☐ Investor believes that stock price will rise
- ☐ Sell put
- ☐ Stock price needs to remain above strike price to make a profit

Naked Put (Bullish)

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	0.35381	1.84548
Delta	0.27116	-0.72951
Gamma	0.15153	0.15182
Theta	-0.05334	-0.05208
Vega	0.01163	0.01162
Rho	0.00116	-0.00293

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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

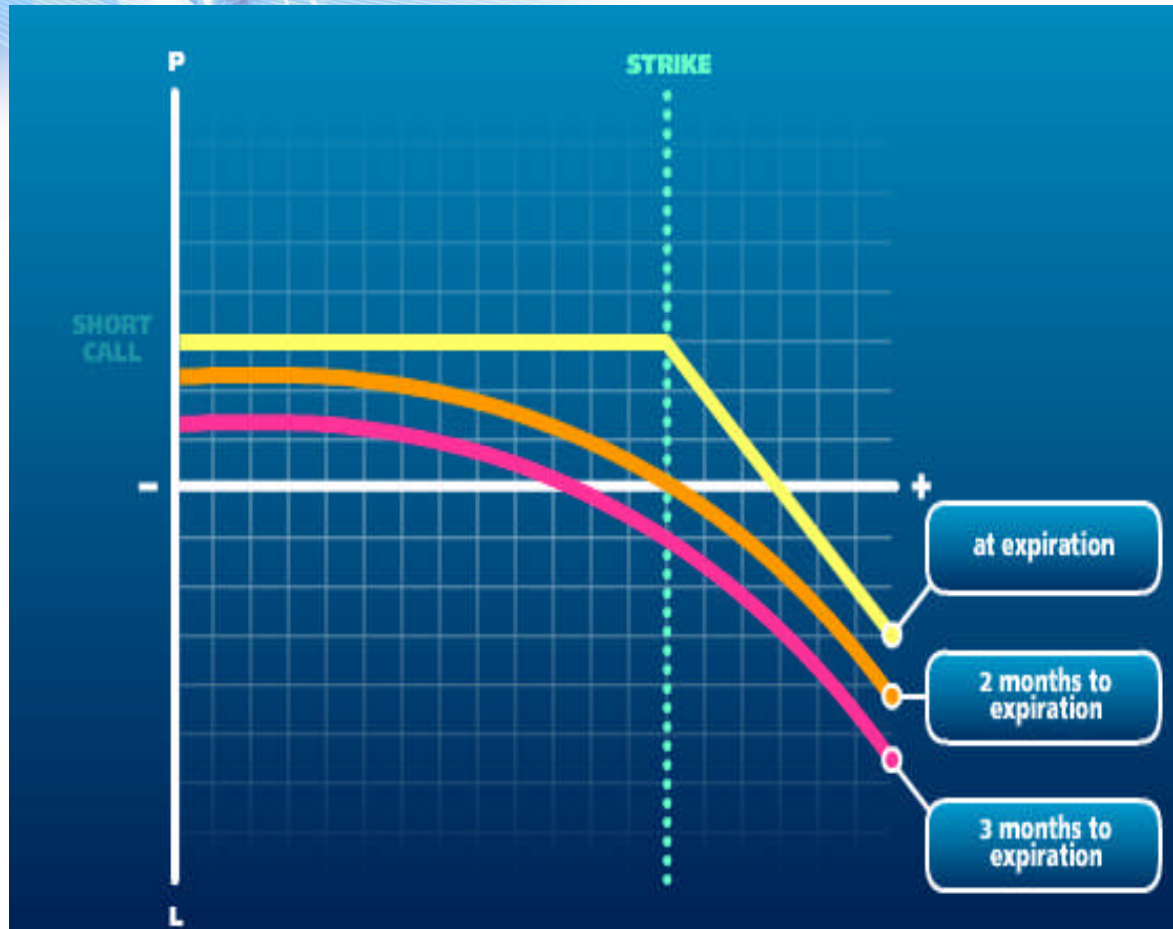
Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.44842	2.90258
Delta	0.43266	-0.56862
Gamma	0.07825	0.07857
Theta	-0.02787	-0.02662
Vega	0.03039	0.03037
Rho	0.00886	-0.01367

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Naked Call (Bearish)



- ☐ Investor believes that stock price will fall
- ☐ Sell call
- ☐ Stock price needs to remain below strike price

Naked Call (Bearish)

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	2.69254	3.97236
Delta	0.46388	-0.53808
Gamma	0.04945	0.04974
Theta	-0.04532	-0.04202
Vega	0.08094	0.08091
Rho	0.02726	-0.0321

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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.98677	3.31194
Delta	0.43884	-0.56268
Gamma	0.06226	0.06254
Theta	-0.05663	-0.05331
Vega	0.06389	0.06387
Rho	0.01638	-0.0206

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Naked Call (Bearish)

Options Calculator

Underlying (spot) Price **62.60**

Strike (exercise) Price **65**

Interest Rate (in %) **2**

Volatility (in %) **40**

Days to expiration **23**

Dividend Yield (in %) **0**

Reset Calculate

	CALL	PUT
Option Price	1.54234	3.87091
Delta	0.37561	-0.62635
Gamma	0.06178	0.06209
Theta	-0.05428	-0.05098
Vega	0.05558	0.05554
Rho	0.01389	-0.02125

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Options Calculator

Underlying (spot) Price **64.60**

Strike (exercise) Price **65**

Interest Rate (in %) **2**

Volatility (in %) **40**

Days to expiration **23**

Dividend Yield (in %) **0**

Reset Calculate

	CALL	PUT
Option Price	2.43949	2.76427
Delta	0.50063	-0.50075
Gamma	0.0625	0.06273
Theta	-0.05881	-0.05547
Vega	0.06427	0.06427
Rho	0.01889	-0.01847

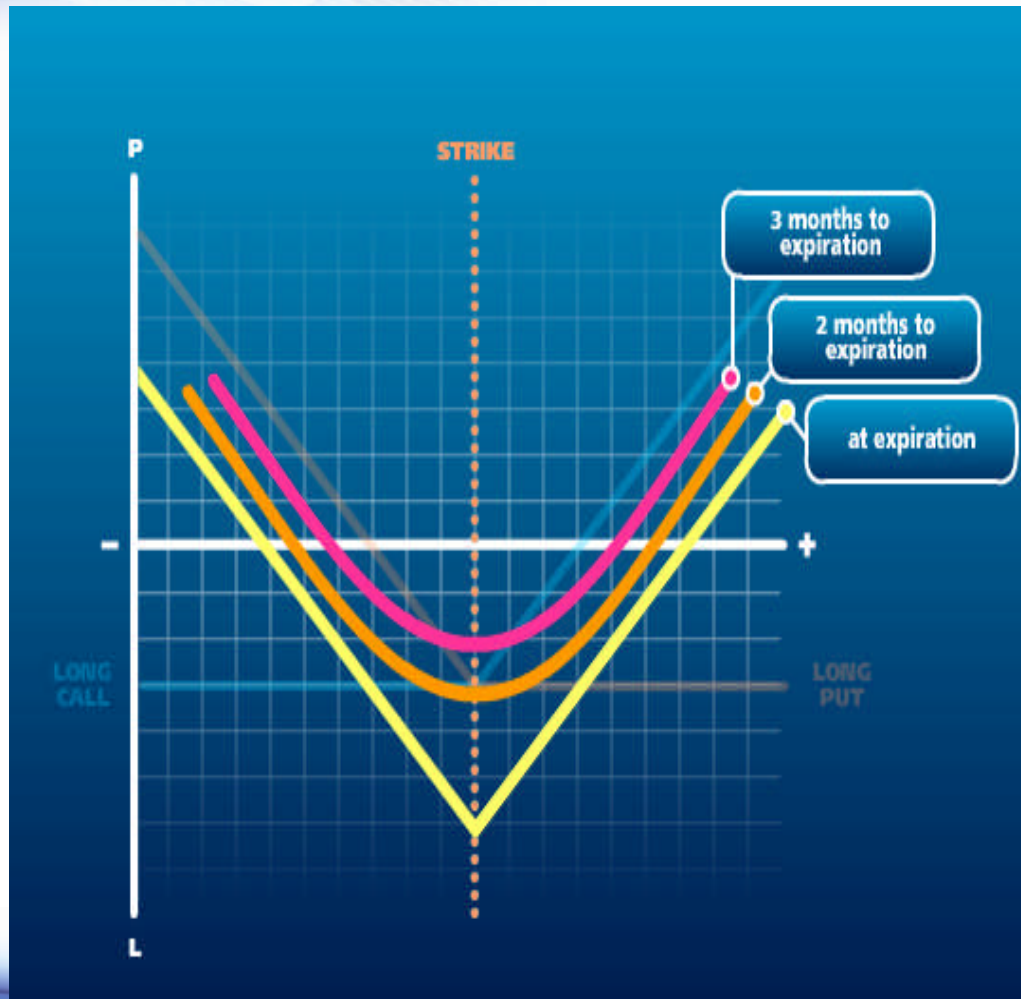
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Option Implied Volatility

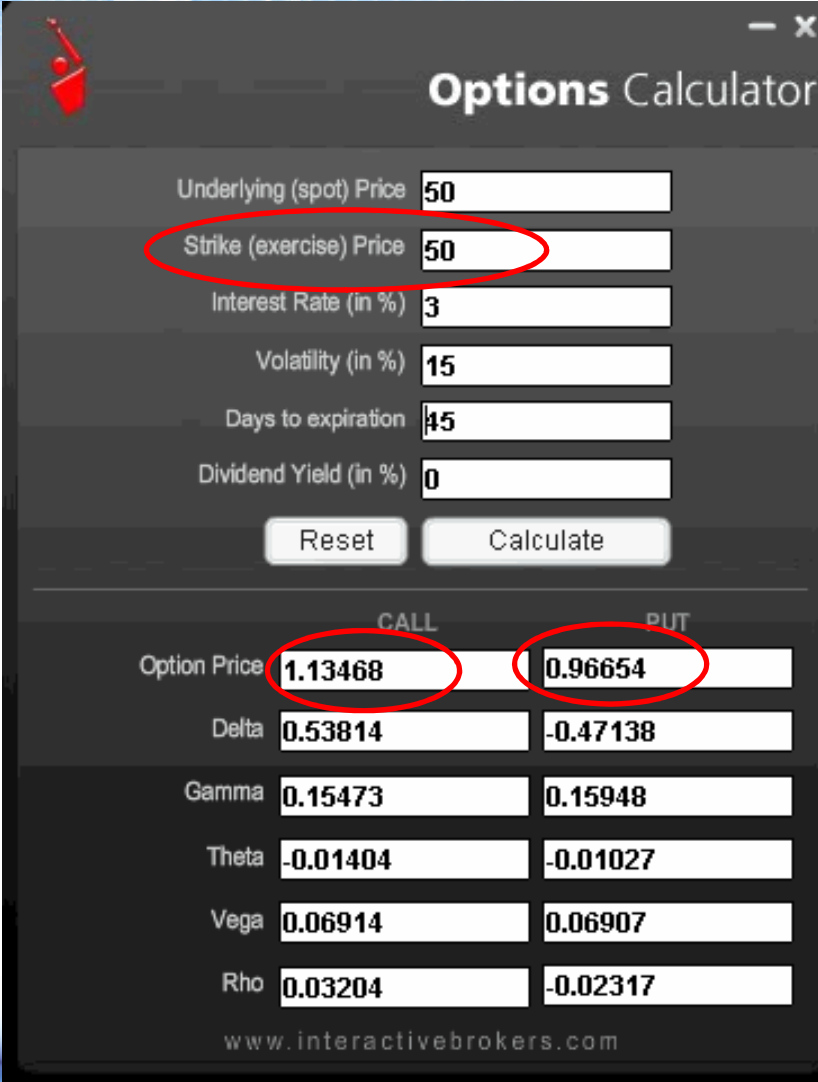
- ☐ Derived from pattern of trading in underlying share price
- ☐ Volatility-specific strategies
- ☐ Option Calculator may help project potential price movements

The Long Straddle



- ☐ Specific volatility play
- ☐ Long call, long put
- ☐ Payoff when underlying shifts up OR down
- ☐ Worse case occurs when prices stand still

The Long Straddle



Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	<input type="text" value="1.13468"/>	<input type="text" value="0.96654"/>
Delta	<input type="text" value="0.53814"/>	<input type="text" value="-0.47138"/>
Gamma	<input type="text" value="0.15473"/>	<input type="text" value="0.15948"/>
Theta	<input type="text" value="-0.01404"/>	<input type="text" value="-0.01027"/>
Vega	<input type="text" value="0.06914"/>	<input type="text" value="0.06907"/>
Rho	<input type="text" value="0.03204"/>	<input type="text" value="-0.02317"/>

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- ☐ ATM straddle at \$50
- ☐ Total premium = $1.13 + 0.97 = 2.10$
- ☐ Implied volatility = 15%

Breakevens:

- ☐ Upside = 52.10
- ☐ Downside = 47.90

The Long Straddle

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	1.13468	0.96654
Delta	0.53814	-0.47138
Gamma	0.15473	0.15948
Theta	-0.01404	-0.01027
Vega	0.06914	0.06907
Rho	0.03204	-0.02317

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Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

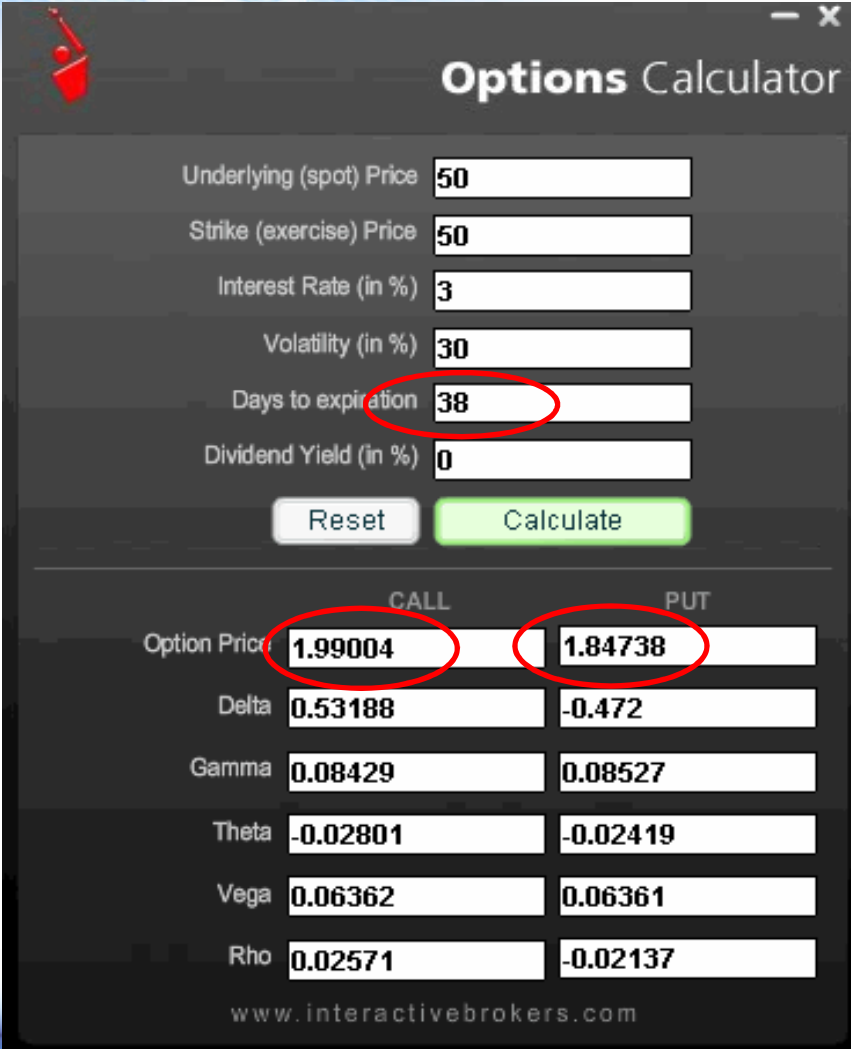
Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	2.1725	2.00379
Delta	0.53469	-0.4696
Gamma	0.07741	0.07842
Theta	-0.02588	-0.02208
Vega	0.06919	0.06919
Rho	0.03041	-0.02515

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The Long Straddle



Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

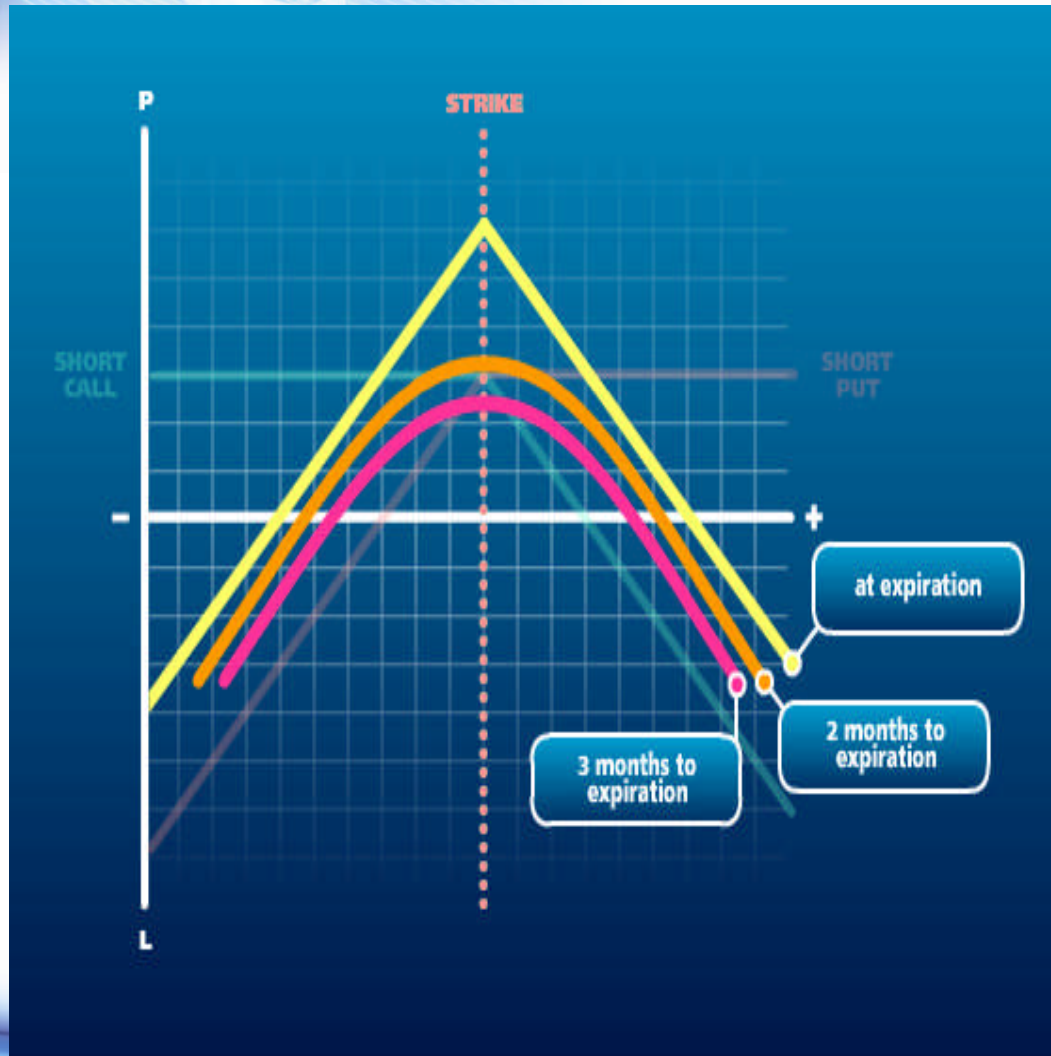
Dividend Yield (in %)

	CALL	PUT
Option Price	<input type="text" value="1.99004"/>	<input type="text" value="1.84738"/>
Delta	<input type="text" value="0.53188"/>	<input type="text" value="-0.472"/>
Gamma	<input type="text" value="0.08429"/>	<input type="text" value="0.08527"/>
Theta	<input type="text" value="-0.02801"/>	<input type="text" value="-0.02419"/>
Vega	<input type="text" value="0.06362"/>	<input type="text" value="0.06361"/>
Rho	<input type="text" value="0.02571"/>	<input type="text" value="-0.02137"/>

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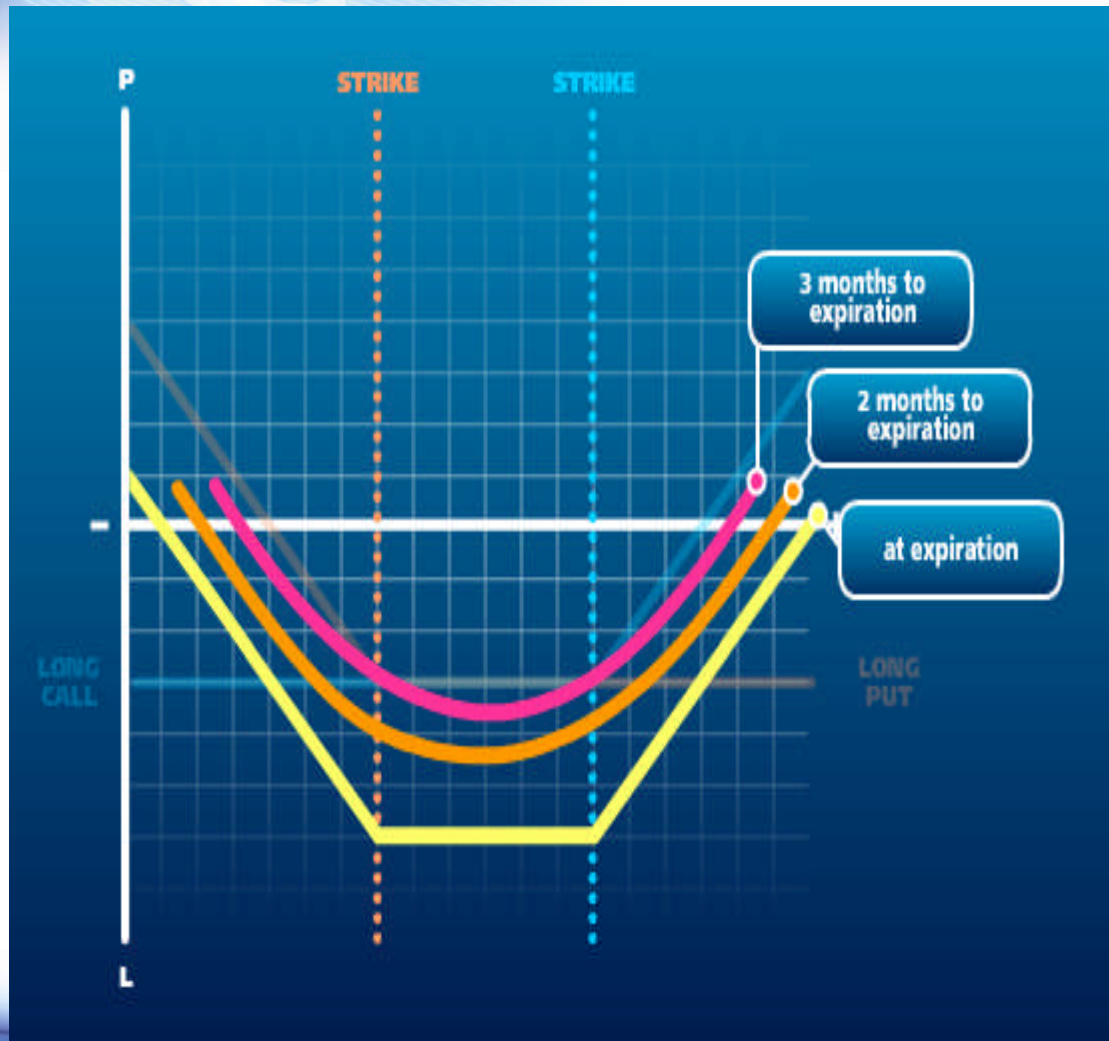
- ☐ Time declines by 1 week
- ☐ Implied volatility = 30%
- ☐ Total premium may decrease 3.84

The Short Straddle



- ☐ Specific volatility play
- ☐ Short call, short put
- ☐ Payoff when underlying price stays still
- ☐ Worse case when prices move up OR down

The Long Strangle



- ☐ Similar to the straddle
- ☐ Uses TWO strike prices rather than ONE
- ☐ Lower cost
- ☐ Lower potential reward

The Long Strangle

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	0.52822	2.92463
Delta	0.26615	-0.74343
Gamma	0.09767	0.10066
Theta	-0.01339	-0.01088
Vega	0.04182	0.04038
Rho	0.01008	-0.02218

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Higher strike call

Lower strike put

Options Calculator

Underlying (spot) Price

Strike (exercise) Price

Interest Rate (in %)

Volatility (in %)

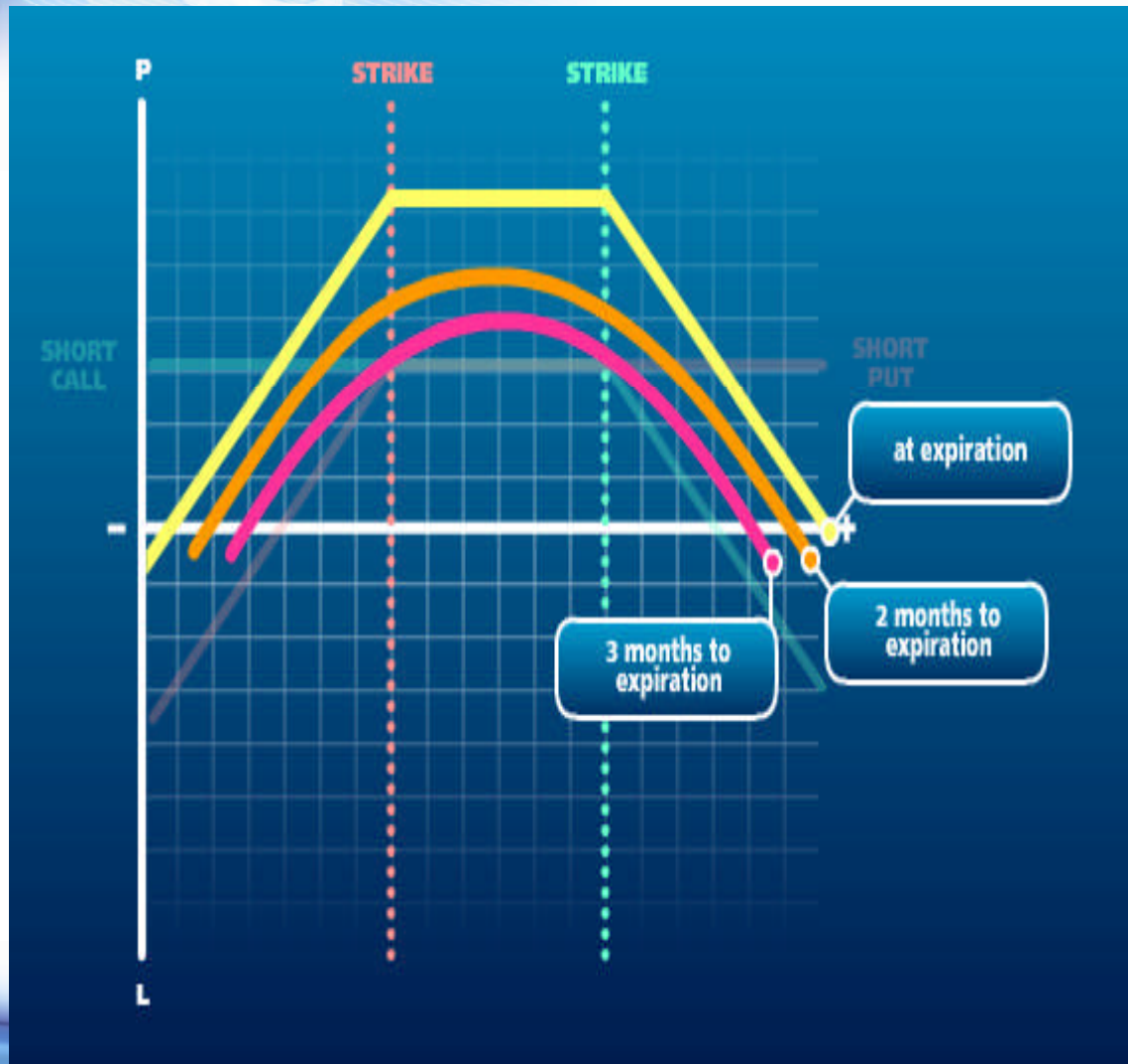
Days to expiration

Dividend Yield (in %)

	CALL	PUT
Option Price	3.00358	0.39468
Delta	0.80368	-0.19746
Gamma	0.08249	0.08313
Theta	-0.01264	-0.01027
Vega	0.02817	0.02869
Rho	0.02855	-0.00757

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The Short Strangle



- ☐ Generates premiums
- ☐ Limited reward
- ☐ Risk of substantial losses outside of trade breakevens

Conclusion

- ☐ Options have many variables to consider
- ☐ IB Option Calculator projects theoretical outcomes
- ☐ Be aware of volatility and time value
- ☐ See more at:

http://individuals.interactivebrokers.com/en/general/education/TradersUniversity.php?ib_entity=llc