

# Black-Scholes Options Worksheet

STOCK 50.00	VOL% 25.00%	DIV% 0.00%	CALL	
STRIKE 60.00	R.F.% 7.00%	DAYS# 180	PUT	
Delta ( $\delta$ )	Gamma ( $\gamma$ )	Vega ( $\nu$ )	Theta ( $\theta$ )	Rho ( $\rho$ )

This worksheet implements the widely used Black-Scholes European option valuation model to calculate the prices of a **CALL** and **PUT** European stock options.

Black-Scholes Options Menu Actions	
<b>STOCK</b>	Input the current market value of the underlying asset.
<b>STRIKE</b>	Input the strike price on the option.
<b>DIV%</b>	Input the current annualized dividend yield of the asset.
<b>VOL%</b>	Input the stock annualized volatility.
<b>DAYS#</b>	Input the number of days to expiration of the option.
<b>R.F.%</b>	Input the risk free rate that corresponds to the option lifetime.
<b>CALL</b>	Calculates the call option price.
<b>PUT</b>	Calculates the put option price.
<b>Delta</b>	Calculates the Greek 'Delta' for the CALL or PUT options values.
<b>Gamma</b>	Calculates the Greek 'Gamma' for the CALL or PUT options values.
<b>Vega</b>	Calculates the Greek 'Vega' for the CALL or PUT options values.
<b>Theta</b>	Calculates the Greek 'Theta' for the CALL or PUT options values.
<b>Rho</b>	Calculates the Greek 'Rho' for the CALL or PUT options values.

To perform the calculation, the values of “**STOCK**”, “**STRIKE**”, “**DIV%**”, “**VOL%**”, “**R.F.%**” and “**DAYS#**” must be entered typing the value and touching in the corresponding button. Then, touch the “**CALL**” or “**PUT**” to calculate the options values.

To calculate the “Greeks”, select the “Greek” you want and then press the “**CALL**” or “**PUT**” to calculate the value.

### Example:

Consider the European call and put options on a stock that has a current spot price of \$50 and a volatility of 25%. The option has a strike price of \$60 and matures in 180 days. The risk-free interest rate is 7%. What are the values of the PUT and CALL options?, and the “Greeks” of it.

### Solution:

Keystroke	Description
50 [STOCK]	Input the current market value of the underlying asset.
60 [STRIKE]	Input the strike price on the option.
25 [VOL%]	Input the stock annualized volatility.
0 [DIV%]	Input the current annualized dividend yield of the asset.
7 [R.F.%]	Input the risk free rate that corresponds to the option lifetime.
180 [DAYS]	Input the number of days to expiration of the option.
[CALL]	Calculates the <b>call</b> option price. <b>Result = 1.05</b>
[PUT]	Calculates the <b>put</b> option price. <b>Result = 9.02</b>
[ Delta ] [CALL] [ Delta ] [PUT]	Calculates the ‘Delta’ of the CALL option -> $\delta.call = 0.23$ Calculates the ‘Delta’ of the PUT option -> $\delta.put = -0.77$
[ Gamma ] [ CALL ] or [ PUT ]	Calculates the greek ‘Gamma’ -> $\gamma = 0.03$ .
[ Vega ] [ CALL ] or [ PUT ]	Calculates the greek ‘Vega’ -> $v = 10.54$
[ Theta ] [CALL] [ Theta ] [PUT]	Calculates the ‘Theta’ of the CALL option -> $\theta.call = -3.39$ Calculates the ‘Theta’ of the PUT option -> $\theta.put = 0.67$
[ Rho ] [CALL] [ Rho ] [PUT]	Calculates the ‘Rho’ of the CALL option -> $\rho.call = 5.04$ Calculates the ‘Rho’ of the PUT option -> $\rho.put = -23.55$