Topic 55: The Black-Scholes-Merton Model

Test ID: 8451123

Question #1 of 15

Question ID: 439395

Which of the following is **NOT** one of the assumptions of the Black-Scholes-Merton (BSM) option-pricing model?

A) Any dividends are paid at a continuously compounded rate.

B) Options valued are European style.

C) There are no taxes.

D) There are no transaction costs.

Question #2 of 15

Question ID: 439401

Consider a 145-day put option at 30 on a stock selling at 27 with an annualized standard deviation of 0.30 when the continuously compounded risk-free rate is 4 percent. The value of the put option is *closest* to: [round d1 and d2 rather than interpolate for N(.)].

$P_T = [Xe^{-r(T)} \times (1 - N(d_2))] - [S_T \times (1 - N(d_1))]$

where:

$d_1 = [\ln(S_t / X) + [r + \sigma^2/2](T)\ ] / \sigma \sqrt{(T-t)}$

$d_2 = d_1 - \sigma \sqrt{(T)}$

Cumulative Standard Normal Probability:

	0.06	0.07	0.08	0.09
0.3	0.6406	0.6443	0.6480	0.6517
0.4	0.6772	0.6808	0.6844	0.6879
0.5	0.7123	0.7157	0.7190	0.7224

A) $3.97.

B) $4.07.

C) $3.64.

D) $3.32.

Question #3 of 15

Question ID: 439399

Using the Black-Scholes model, compute the value of a European call option using the following imputs:

Underlying stock price: $100

> Exercise price: $90
> Risk-free interest rate: 5%
> Volatility: 20%
> Dividend yield: 0%
> Time to expiration: one year

The Black-Scholes call option price is *closest* to:

A) $13.65.

B) $17.99.

C) $16.71.

D) $15.33.

Question #4 of 15

Question ID: 439404

Which of the following methods is **NOT** used for estimating volatility inputs for the Black-Scholes model?

A) Using exponentially weighted historical data.

B) Models of changing volatility.

C) Using the most current historical data.

D) Using long term historical data.

Question #5 of 15

Question ID: 439396

Which of the following is **NOT** one of the assumptions of the Black-Scholes-Merton option-pricing model?

A) The yield curve for risk-free assets is fixed over the term of the option.

B) There are no taxes and transactions costs are zero for options and arbitrage portfolios.

C) There are no cash flows over the term of the options.

D) The volatility is known and remains constant over the term of the option.

Question #6 of 15

Question ID: 439408

Dividends on a stock can be incorporated into the valuation model of an option on the stock by:

A) subtracting the future value of the dividend from the current stock price.

B) adding the future value of the dividend to the option value.

C) adding the present value of the dividend to the current stock price.

D) subtracting the present value of the dividend from the current stock price.

Question #7 of 15

Question ID: 439406

Which of the following is **TRUE** for an option's price? An option's price is:

A) an increasing function of the underlying asset's volatility.

B) a decreasing function of the underlying asset's volatility.

C) unaffected by changes in the underlying asset's volatility.

D) a decreasing function of the underlying asset's volatility when it has a long time remaining until expiration and an increasing function of its volatility if the option is close to expiration.

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Question ID: 439407

Compared to the value of a call option on a stock with no dividends, a call option on an identical stock expected to pay a dividend during the term of the option will have a:

A) lower value in all cases.

B) higher value in all cases.

C) lower value only if it is an American style option.

D) higher value only if it is an American style option.

Question #9 of 15

Question ID: 439405

The implied volatility of interest rates can be *best* computed using the market price of an:

A) interest rate futures contract.

B) interest rate call option contract.

C) S&P 500 option contract.

D) interest rate forward contract.

Question #10 of 15

Question ID: 439402

Consider a 120-day call option at 28 on a stock selling at 30 with an annualized standard deviation of 0.20 when the continuously compounded risk-free rate is 7 percent. The value of the call is closest to: [round d1 and d2 rather than interpolate for N(.)]

$C_T = [S_T \times N(d_1)] - [Xe^{-rT}N(d_2)]$

where:

$d_1 = \ln(S_T / X) + [r + \sigma^2/2]T / \sigma \sqrt{T}$

$d_2 = d_1 - \sigma \sqrt{T}$

Figure 1: Cumulative Standard Normal Probability

	0.03	*0.04*	*0.05*	*0.06*
0.6	0.7357	0.7389	0.7422	0.7454
0.7	0.7673	0.7704	0.7734	0.7764
0.8	0.7967	0.7995	0.8023	0.8051

A) $3.07.

B) $3.02.

C) $3.33.

D) $3.12.

Question #11 of 15

Question ID: 439403

If we use four of the inputs into the Black-Scholes-Merton option-pricing model and solve for the asset price volatility that will make the model price equal to the market price of the option, we have found the:

A) market volatility.

B) option volatility.

C) implied volatility.

D) historical volatility.

Question #12 of 15

Question ID: 439398

Using the Black-Scholes model compute the value of a European put option using the following inputs:

- Underlying stock price: $90
- Exercise price: $90
- Risk-free interest rate: 5%
- Volatility: 20%
- Dividend yield: 0%
- Time to expiration: one year

The Black-Scholes put option price is *closest* to:

A) $6.12.

B) $4.11.

C) $5.01.

D) $5.89.

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Question ID: 439400

The current price of a stock is $55. A put option with a $50 strike price that expires in 3 months is available. If $N(d_1) = 0.8133$, $N(d_2) = 0.7779$, the underlying stock exhibits an annual standard deviation of 25 percent, and current risk free rates are 3.25 percent, the Black-Scholes value of the put is *closest* to:

A) $5.00.

B) $0.75.

C) $1.50.

D) $1.25.

Question #14 of 15

Question ID: 439397

Which of the following is *least likely* one of the assumptions of the Black-Scholes-Merton option pricing model?

A) Changes in volatility are known and predictable.

B) The risk-free rate of interest is known and does not change over the term of the option.

C) The options are European style.

D) There are no cash flows on the underlying asset.

Question #15 of 15

Question ID: 439409

The value of a put option will be higher if, all else equal, the:

A) underlying asset has less volatility.

B) exercise price is lower.

C) underlying asset has positive cash flows.

D) stock price is higher.