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EN.555.644.81.FA19 Introduction to Financial Derivatives   Course Modules   Module 13: Greeks

..eview Test Submission: Module 13 Self Check Quiz

Review Test Submission: Module 13 Self Check Quiz

User	IAN MICHAEL MCGROARTY
Course	EN.555.644.81.FA19 Introduction to Financial Derivatives
Test	Module 13 Self Check Quiz
Started	11/25/19 10:57 PM
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Status	Completed
Attempt Score	0 out of 0 points
Time Elapsed	31 minutes
Results Displayed	All Answers, Submitted Answers, Correct Answers, Feedback, Incorrectly Answered Questions

Question 1   0 out of 0 points

A call option on a stock has a delta of 0.3. A trader has sold 1,000 options. What position should the trader take to hedge the position?

Selected Answer: ✅ B. Buy 300 shares

Answers: A. Sell 300 shares

              ✅ B. Buy 300 shares

              C. Sell 700 shares

              D. Buy 700 shares

Response Feedback: When the stock price increases by a small amount, the option price increases by 30% of this amount. The trader therefore has a hedged position if he or she buys 300 shares. For small changes the gain or loss on the stock position is equal and opposite to the loss or gain on the option position.

Question 2   0 out of 0 points

What does theta measure?

Selected Answer: ✅ B. The rate of change of the portfolio value with the passage of time.

Answers:	A. The rate of change of delta with the asset price.
	✅ B. The rate of change of the portfolio value with the passage of time.
	C. The sensitivity of a portfolio value to interest rate changes.
	D. None of the above
Response Feedback:	Theta measures the rate of change in the value of a portfolio with the passage of time.

Question 3

0 out of 0 points

What does gamma measure?

Selected Answer:	✅ A. The rate of change of delta with the asset price.
Answers:	✅ A. The rate of change of delta with the asset price.
	B. The rate of change of the portfolio value with the passage of time.
	C. The sensitivity of a portfolio value to interest rate changes.
	D. None of the above
Response Feedback:	Gamma measure the rate of change of delta with the asset price.

Question 4

0 out of 0 points

What does vega measure?

Selected Answer:	✅ D. None of the above
Answers:	A. The rate of change of delta with the asset price.
	B. The rate of change of the portfolio value with the passage of time.
	C. The sensitivity of a portfolio value to interest rate changes.
	✅ D. None of the above
Response Feedback:	Vega measures the rate of change of the value of the portfolio value with volatility.

Question 5

0 out of 0 points

What does rho measure?

Selected Answer:	✅ C. The sensitivity of a portfolio value to interest rate changes.
Answers:	A. The rate of change of delta with the asset price.

B. The rate of change of the portfolio value with the passage of time.

✅ C. The sensitivity of a portfolio value to interest rate changes.

D. None of the above

Response
Feedback: Rho measures the rate of change of the value of the portfolio with interest rates. (Usually a parallel shift in interest rates is considered.)

Question 6

0 out of 0 points

Which of the following is true?

❌

Selected Answer: ❌ A. The delta of a European put equals minus the delta of a European call.

Answers: A. The delta of a European put equals minus the delta of a European call.

B. The delta of a European put equals the delta of a European call.

C. The gamma of a European put equals minus the gamma of a European call.

✅ D. The gamma of a European put equals the gamma of a European call.

Response   The delta of a put on a non-dividend-paying stock equals the delta of the call minus
Feedback: one. The gamma of a put equals the gamma of call even when there are dividends.

Question 7

0 out of 0 points

A portfolio of derivatives on a stock has a delta of 2400 and a gamma of –10. An option on the stock with a delta of 0.5 and a gamma of 0.04 can be traded. What position in the option is necessary to make the portfolio gamma neutral?

Selected Answer: ❌ B. Short position in 250 options

Answers: ✅ A. Long position in 250 options

B. Short position in 250 options

C. Long position in 20 options

D. Short position in 20 options

Response   The options must have a gamma of +10 to neutralize the gamma of the portfolio. Each
Feedback: option has a gamma of 0.04. Hence a long position of 10/0.04 = 250 options is
           required.

Question 8

0 out of 0 points

A trader uses a stop-loss strategy to hedge a short position in a three-month call option with a strike price of 0.7000 on an exchange rate. The current exchange rate is 0.6950 and value of the option is 0.1. The trader covers the option when the exchange rate reaches 0.7005 and

uncovers (i.e., assumes a naked position) if the exchange rate falls to 0.6995. Which of the following is NOT true?

Selected Answer:	❌ C. The present value of the gain or loss from the exchange rate trading should be about 0.1 on average for each option sold.

Answers: A.
             The exchange rate trading might cost nothing so that the trader gains 0.1 for each option sold.

             B.
             The exchange rate trading might cost considerably more than 0.1 for each option sold so that the trader loses money.

             C.
             The present value of the gain or loss from the exchange rate trading should be about 0.1 on average for each option sold.

             ✅ D. The hedge works reasonably well.

Response Feedback: A good hedging system will ensure that the cost of selling an option is close to its theoretical value. The stop-loss hedging procedure does not have this property. It can lead to the option costing nothing or costing considerably more than its theoretical value. On average the cost of the option is its Black-Scholes value, but there is a wide variation. D is the correct answer.

Question 9
0 out of 0 points

Maintaining a delta-neutral portfolio is an example of which of the following

Selected Answer: ❌ D. Static hedging

Answers: A. Stop-loss strategy

                     ✅ B. Dynamic hedging

                     C. Hedge and forget strategy

                     D. Static hedging

Response Feedback: Delta-neutral hedging is an example of dynamic hedging. The hedge has to be adjusted periodically. (In theory, to maintain a delta-neutral hedge, the hedge must be adjusted continuously.)

Question 10
0 out of 0 points

Which of the following could NOT be a delta-neutral portfolio?

Selected Answer: ❌ A. A long position in call options plus a short position in the underlying stock.

Answers: A. A long position in call options plus a short position in the underlying stock.

✅ **B.**
A short position in call options plus a short position in the underlying stock.

C. A long position in put options and a long position in the underlying stock.

D. A long position in a put option and a long position in a call option.

Response   Calls have a positive delta. Puts have a negative delta. A long stock position has a
Feedback: positive delta. A short stock position has a negative delta. B cannot be delta neutral
(i.e., have a delta of zero) because both parts of the portfolio have a negative delta.

Question 11

0 out of 0 points

Which of the following is NOT true about gamma?

Selected   ❌ D. A long position in either a call or a put has a positive gamma.
Answer:

Answers: A.
A highly positive or highly negative value of gamma indicates that a portfolio needs
frequent rebalancing to stay delta neutral.

B.
The magnitude of gamma is a measure of the curvature of the portfolio value as a
function of the underlying asset price.

✅ C.
A big positive value for gamma indicates that a big movement in the asset price in
either direction will lead to a loss.

D. A long position in either a call or a put has a positive gamma.

Response   C is not true. The change in the value is a gain of 0.5□□S2. There is a gain from a big
Feedback: movement when gamma is positive and a loss from a big movement when gamma is
negative.

Question 12

0 out of 0 points

Gamma tends to be high for which of the following

Selected Answer: ✅ A. At-the money options

Answers: ✅ A. At-the money options

B. Out-of-the money options

C. In-the-money options

D. Options with a long time to maturity

Response Feedback: Gamma tends to be high for at-the-money options. See Figure 19.9.

Question 13

0 out of 0 points

Which of the following is true for a call option on a non-dividend-paying stock when the stock's price equals the strike price?

Selected Answer: ❌ A. It has a delta of 0.5

Answers: A. It has a delta of 0.5

                  B. It has a delta less than 0.5

                  ✅ C. It has a delta greater than 0.5

                  D. Delta can be greater than or less than 0.5

Response Feedback:

The delta is $N(d_1)$ where $d_1 \dfrac{\ln(S_o/K) + (r + \sigma^2/2)T}{\sigma\sqrt{T}}$

From this it can be seen that, when $S_0 = K$, d_1 is $\square \dfrac{(r+\sigma^2/2)\sqrt{T}}{\sigma}$

This is always positive. Hence delta is always greater than 0.5.

Question 14

0 out of 0 points

The risk-free rate is 5% and the dividend yield on an index is 2%. Which of the following is the delta with respect to the index for a one-year futures on the index?

Selected Answer: ✅ C. 1.03

Answers: A. 0.98

                  B. 1.05

                  ✅ C. 1.03

                  D. 1.02

Response Feedback:

The futures price is given by $F_0 = S_0 e^{(r-q)T}$

Hence the delta of the futures with respect to the spot is $e^{(r-q)T}$. In this case, this is $e^{(0.05-0.03)\times 1} = 1.03$

Question 15

0 out of 0 points

The gamma of a delta-neutral portfolio is 500. What is the impact of a jump of $3 in the price of the underlying asset?

Selected Answer: ✅ A. A gain of $2,250

Answers: ✅ A. A gain of $2,250

B. A loss of $2,250

C. A gain of $750

D. A loss of $750

Response Feedback: The change in the value is a gain of $0.5T\Delta\square\square S^2$ = 0.5×500×3²=$2,250.

Question 16   0 out of 0 points

Vega tends to be high for which of the following

Selected Answer: ❌ D. Options with a short time to maturity

Answers: ✅ A. At-the money options

B. Out-of-the money options

C. In-the-money options

D. Options with a short time to maturity

Response Feedback: Vega tends to be high for at-the-money options. See Figure 19.11.

Question 17   0 out of 0 points

The delta of a call option on a non-dividend-paying stock is 0.4. What is the delta of the corresponding put option?

Selected Answer: ✅ C. -0.6

Answers: A. -0.4

B. 0.4

✅ C. -0.6

D. 0.6

Response Feedback: The delta of a call option is $N(d_1)$ and the delta of a put is $N(d_1)-1$. When $N(d_1)$ = 0.4, $N(d_1)-1$ is −0.6.

Question 18   0 out of 0 points

A call option on a non-dividend-paying stock has a strike price of $30 and a time to maturity of six months. The risk-free rate is 4% and the volatility is 25%. The stock price is $28. What is the delta of the option?

Selected Answer: ❌ A. N(-0.1342)

Answers: A. N(-0.1342)

✓ B. N(-0.1888)

C. N(-0.2034)

D. N(-0.2241)

Response Feedback:

The delta is N(d1) where $d_1 = \dfrac{ln(S_0/K)+(r+\sigma^2/2)T}{\sigma\sqrt{T}}$

In this case $d_1 = \dfrac{ln(28/30)+(0.04+0.25^2/2)\times 0.5}{0.25\sqrt{0.5}} = -0.1888$

Question 19

0 out of 0 points

Which of the following is NOT a letter in the Greek alphabet?

Selected Answer: ✓ C. vega

Answers: A. delta

B. rho

✓ C. vega

D. gamma

Response Feedback: Vega, although it is referred to a "Greek letter" by option traders, is not a letter in the Greek alphabet.

Question 20

0 out of 0 points

Which of the following is true for a long position in an option

Selected Answer: ✗ A. Both gamma and vega are negative

Answers: A. Both gamma and vega are negative

B. Gamma is negative and vega is positive

C. Gamma is positive and vega is negative

✓ D. Both gamma and vega are positive

Response Feedback: Gamma and vega are both positive for a long position in an option. It does not matter whether the option is a call or a put.

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← OK