Derivative Investments: Options, Swaps, and Interest Rate and Credit Derivatives

Test ID: 7441879

Question #1 of 172

Question ID: 464184

In order to compute the implied asset price volatility for a particular option, an investor:

✗ **A)** **must have a series of asset prices.**

✓ **B)** must have the market price of the option.

✗ **C)** does not need to know the risk-free rate.

Explanation

In order to compute the implied volatility we need the risk-free rate, the current asset price, the time to expiration, the exercise price, and the market price of the option.

Question #2 of 172

Question ID: 464214

The fixed-rate payer in an interest-rate swap has a position equivalent to a series of:

✗ **A)** **long interest-puts and short interest-rate calls.**

✓ **B)** short interest-rate puts and long interest-rate calls.

✗ **C)** long interest-rate puts and calls.

Explanation

The fixed-rate payer has profits when short rates rise and losses when short rates fall, equivalent to writing puts and buying calls.

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Question ID: 464097

Referring to put-call parity, which one of the following alternatives would allow you to create a synthetic European call option?

✗ **A)** **Sell the stock; buy a European put option on the same stock with the same exercise price and the same maturity; invest an amount equal to the present value of the exercise price in a pure-discount riskless bond.**

✓ **B)** Buy the stock; buy a European put option on the same stock with the same exercise price and the same maturity; short an amount equal to the present value of the exercise price worth of a pure-discount riskless bond.

✗ **C)** Buy the stock; sell a European put option on the same stock with the same exercise price and the same maturity; short an amount equal to the present value of the exercise price worth of a pure-discount riskless bond.

Explanation

According to put-call parity we can write a European call as: $C_0 = P_0 + S_0 - X/(1+R_f)^T$

We can then read off the right-hand side of the equation to create a synthetic position in the call. We would need to buy the European put, buy the stock, and short or issue a riskless pure-discount bond equal in value to the present value of the exercise price.

Questions #4-9 of 172

Steve Miller is a senior fixed income trader for a large hedge fund based in New York. Miller has recently hired C.D. Johnson to assist Miller in implementing some derivative-based trades. Miller would like to ensure that Johnson understands the basics of interest rate derivatives before allowing him to be involved into some more complicated trading strategies. Miller creates a hypothetical bond scenario for Johnson to analyze in order for him to evaluate Johnson's expertise in the area. Miller instructs Johnson to consider the London Interbank Offered Rate (LIBOR) interest rate environment in Table 1.

Table 1 *90-Day LIBOR Forward Rates and Implied Spot Rates*		
Period (in months)	*LIBOR Forward Rates*	*Implied Spot Rates*
0 × 3	5.500%	5.5000%
3 × 6	5.750%	5.6250%
6 × 9	6.000%	5.7499%
9 × 12	6.250%	5.8749%
12 × 15	7.000%	6.0997%
15 × 18	7.000%	6.2496%
48 × 51	8.100%	7.1228%
51 × 54	8.200%	7.1826%
54 × 57	8.300%	7.2413%
57 × 60	8.400%	7.2992%
60 × 63	8.500%	7.3563%
63 × 66	8.600%	7.4127%
66 × 69	8.700%	7.4686%
69 × 72	8.800%	7.5240%
72 × 75	8.900%	7.5789%
75 × 78	9.000%	7.6335%
78 × 81	9.100%	7.6877%
81 × 84	9.200%	7.7416%
84 × 87	9.300%	7.7953%
87 × 90	9.400%	7.8487%

Miller suggests to Johnson to examine the instruments shown in Table 2 using the information in Table 1. Miller instructs Johnson to use 0.25 years for each quarter and to not concern himself with actual day counts.

Table 2 *Interest Rate Instruments*	
Dollar Amount of Floating Rate Bond	$30,000,000
Floating Rate Bond Spread over LIBOR	0.50%
Time to Maturity (years)	1
Cap Strike Rate	6.00%
Floor Strike Rate	5.00%
Interest Payments	quarterly

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Question ID: 464266

Johnson wants to evaluate the effect of an increase in rates on the inception value of a plain vanilla pay, fixed interest rate swap. Specifically, if interest rates increase across all maturities in Table 1, how would the inception value of the swap be affected? The inception value of the swap would:

✗ **A)** **decrease.**

✓ **B)** stay the same.

✗ **C)** increase.

Explanation

The value stays the same because the inception value of all plain vanilla interest rates swaps is zero by design.

An increase would, however, be correct for an existing pay fixed swap. The counterparty receives the floating rate while paying the fixed rate. Therefore, it would receive a higher interest rate but would still have to pay the same fixed interest rate. Therefore, the value of the swap would increase. (Study Session 17, LOS 54.a, c)

Question #5 of 172

Question ID: 464267

Miller asks Johnson to hedge a hypothetical short position in the floating rate bond in Table 2. Which of the following is the *best* hedge for this position?

✗ **A)** **Sell an interest rate cap.**

✓ **B)** Buy an interest rate cap.

✗ **C)** Buy an interest rate floor.

Explanation

An interest rate cap provides a positive payoff when interest rates are above the cap strike rate. Therefore, the buyer of this instrument is able to hedge himself against rising interest rates.

Incorrect answer explanations:

- Selling an interest rate cap is not a hedge against rising interest rates.
- Buying an interest rate floor hedges the risk of decreasing interest rates.

(Study Session 17, LOS 55.a)

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Question ID: 464268

Miller now asks Johnson to compute the payoff of the cap and floor in Table 2 assuming that LIBOR has risen to 7% at expiration. Specifically, Miller wants Johnson to determine the net payoff of the corresponding short collar (buying the floor and selling the cap) for the total outstanding amount of the floating rate bond. Which of the following is the *closest* to Johnson's answer?

- ✗ **A) $300,000.**
- ✓ **B)** -$300,000.
- ✗ **C)** −$450,000.

Explanation

The floor expires worthless while the cap is exercised and the seller has to pay the difference between the cap strike rate and LIBOR which is 1% in this case. Hence the calculation is as follows:

> Net Payoff = (6.00% − (7.00%)) × $30,000,000 = −$300,000

The answer −$450,000 is incorrect because the payoff is determined by the LIBOR rate, not by the spread over LIBOR for the floating rate bond. (Study Session 17, LOS 55.b)

Question #7 of 172

Question ID: 464269

Next, Miller asks Johnson to determine the net payoff of the corresponding long collar (buying the cap and selling the floor) for the total outstanding amount of the floating rate bond. Assume that LIBOR has risen to 8% at expiration. Which of the following is the *closest* to Johnson's answer?

- ✗ **A) −$600,000.**
- ✗ **B)** $900,000.
- ✓ **C)** $600,000.

Explanation

The floor expires worthless while the cap is exercised and the seller has to pay the difference between the cap strike rate and LIBOR which is 2% in this case. Hence the calculation is as follows:

> Net Payoff = (8.00% − (6.00%)) × $30,000,000 = $600,000

(Study Session 17, LOS 55.b)

Question #8 of 172

Question ID: 464270

Miller asks Johnson which of the following strategies allows an investor to benefit from both increasing and decreasing interest rates?

✓ **A) Buy an at the money cap and an at the money floor.**

✗ **B)** Sell an at the money cap and an at the money floor.

✗ **C)** Buy an at the money cap and sell an at the money floor.

Explanation

This is a straddle on interest rates. The cap provides a positive payoff when interest rates rise and the floor provides a positive payoff when interest rates fall.

Incorrect answer explanations:

- Sell an at the money cap and an at the money floor. In this case the investor would suffer from increasing and decreasing interest rates since the caplets and floorlets would be exercised against him.
- Buy an at the money cap and sell an at the money floor. In this case the investor would suffer from decreasing interest rates since the floorlets would be exercised against him.

(Study Session 17, LOS 55.a)

Question #9 of 172

Question ID: 464271

Johnson now considers the floating rate bond shown in Table 2. Specifically, Johnson considers this note from the perspective of the issuer. If the issuer decided to hedge the interest rate risk associated with this liability which of the following is the *most* appropriate hedge?

✗ **A) Buying an interest rate floor.**

✗ **B)** Selling an interest rate floor.

✓ **C)** Selling Eurodollar futures.

Explanation

If a short position in Eurodollar futures is added to the existing liability in the correct amount, the interest risk is hedged.

Incorrect answer explanations:

- Buying an interest rate floor is a hedge against declining interest rates if one has a long position in a floating rate bond.
- Selling an interest rate floor is not a hedge against changing interest rates.

(Study Session 17, LOS 55.a)

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Question ID: 464254

For an interest rate swap, the swap spread is the difference between the:

✓ **A) swap rate and the corresponding Treasury rate.**

✗ **B)** fixed rate and the floating rate in a given period.

✗ **C)** average fixed rate and the average floating rate over the life of the contract.

Explanation

The swap spread is the swap rate minus the corresponding Treasury rate.

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Question ID: 464208

The floating-rate payer in a simple interest-rate swap has a position that is equivalent to:

- ✗ **A) a series of long forward rate agreements (FRAs).**
- ✓ **B)** a series of short FRAs.
- ✗ **C)** issuing a floating-rate bond and a series of long FRAs.

Explanation

The floating-rate payer has a liability/gain when rates increase/decrease above the fixed contract rate; the short position in an FRA has a liability/gain when rates increase/decrease above the contract rate.

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Question ID: 464119

For a change in which of the following inputs into the Black-Scholes-Merton option pricing model will the direction of the change in a put's value and the direction of the change in a call's value be the same?

- ✓ **A) Volatility.**
- ✗ **B)** Exercise price.
- ✗ **C)** Risk-free rate.

Explanation

A decrease/increase in the volatility of the price of the underlying asset will decrease/increase both put values and call values. A change in the values of the other inputs will have opposite effects on the values of puts and calls.

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Question ID: 464227

Consider a fixed-rate semiannual-pay equity swap where the equity payments are the total return on a $1 million portfolio and the following information:

- 180-day LIBOR is 4.2%
- 360-day LIBOR is 4.5%
- Div. yield on the portfolio = 1.2%

What is the fixed rate on the swap?

- ✗ **A) 4.5143%.**
- ✗ **B)** 4.3232%.
- ✓ **C)** 4.4477%.

Explanation

$$\frac{\left(1-\frac{1}{1.045}\right)}{\left(\frac{1}{1+0.042\left(\frac{180}{360}\right)}+\frac{1}{1+0.045\left(\frac{360}{360}\right)}\right)} = 0.022239 \times 2 = 4.4477\%$$

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Question ID: 464235

An investor who anticipates the need to exit a pay-fixed interest rate swap prior to expiration might:

- ✗ **A) buy a payer swaption.**
- ✓ **B)** buy a receiver swaption.
- ✗ **C)** sell a payer swaption.

Explanation

A receiver swaption will, if exercised, provide a fixed payment to offset the investor's fixed obligation, and allow him to pay floating rates if they decrease.

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Question ID: 464168

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) higher value only if it is an American style option.**
- ✗ **B)** lower value only if it is an American style option.
- ✓ **C)** lower value in all cases.

Explanation

An expected dividend during the term of an option will decrease the value of a call option.

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Question ID: 464212

Writing a series of interest-rate puts and buying a series of interest-rate calls, all at the same exercise rate, is equivalent to:

- ✗ **A) a short position in a series of forward rate agreements.**
- ✓ **B)** being the fixed-rate payer in an interest rate swap.
- ✗ **C)** being the floating-rate payer in an interest rate swap.

Explanation

A short position in interest rate puts will have a negative payoff when rates are below the exercise rate; the calls will have positive payoffs when rates exceed the exercise rate. This mirrors the payoffs of the fixed-rate payer who will receive positive net payments when settlement rates are above the fixed rate.

Question #17 of 172

Question ID: 464182

Which of the following statements regarding an option's price is CORRECT? An option's price is:

✗ **A)** **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.**

✓ **B)** an increasing function of the underlying asset's volatility.

✗ **C)** a decreasing function of the underlying asset's volatility.

Explanation

Since an option has limited risk but significant upside potential, its value always increases when the volatility of the underlying asset increases.

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Question ID: 464218

A U.S. firm (U.S.) and a foreign firm (F) engage in a 3-year, annual pay plain-vanilla currency swap; U.S. is the fixed rate payer in FC. The fixed rate at initiation was 5%. The variable rate at the end of year 1 was 4%, at the end of year 2 was 6%, and at the end of year 3 was 7%. At the beginning of the swap, $2 million was exchanged at an exchange rate of 2 foreign units per $1. At the end of the swap period the exchange rate was 1.75 foreign units per $1.
At the end of year 1, firm:

✗ **A)** **F pays firm U.S. $200,000.**

✗ **B)** U.S. pays firm F $200,000.

✓ **C)** U.S. pays firm F 200,000 foreign units.

Explanation

A plain-vanilla currency swap pays floating on dollars and fixed on foreign. Fixed on foreign 0.05 × $2,000,000 × 2 foreign units per $1 = 200,000 foreign units paid by the U.S. firm.

Questions #19-24 of 172

Mark Washington, CFA, is an analyst with BIC, a Bermuda-based investment company that does business primarily in the U.S. and Canada. BIC has approximately $200 million of assets under management, the bulk of which is invested in U.S. equities. BIC has outperformed its target benchmark for eight of the past ten years, and has consistently been in the top quartile of performance when compared with its peer investment companies. Washington is a part of the Liability Management group that is responsible for hedging the equity portfolios under management. The Liability Management group has been authorized to use calls or puts on the underlying equities in the portfolio when appropriate, in order to minimize their exposure to market volatility. They also may utilize an options strategy in order to generate additional returns.

One year ago, BIC analysts predicted that the U.S. equity market would most likely experience a slight downturn due to inflationary pressures. The analysts forecast a decrease in equity values of between 3 to 5% over the upcoming year and one-half. Based upon that prediction, the Liability Management group was instructed to utilize calls and puts to construct a delta-neutral portfolio. Washington immediately established option positions that he believed would hedge the underlying portfolio against the impending market decline.

As predicted, the U.S. equity markets did indeed experience a downturn of approximately 4% over a twelve-month period. However, portfolio performance for BIC during those twelve months was disappointing. The performance of the BIC portfolio lagged that of its peer group by nearly 10%. Upper management believes that a major factor in the portfolio's underperformance was the option strategy utilized by Washington and the Liability Management group. Management has decided that the Liability Management group did not properly execute a delta-neutral strategy. Washington and his group have been told to review their options strategy to determine why the hedged portfolio did not perform as expected. Washington has decided to undertake a review of the most basic option concepts, and explore such elementary topics as option valuation, an option's delta, and the expected performance of options under varying scenarios. He is going to examine all facets of a delta-neutral portfolio: how to construct one, how to determine the expected results, and when to use one. Management has given Washington and his group one week to immerse themselves in options theory, review the basic concepts, and then to present their findings as to why the portfolio did not perform as expected.

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Question ID: 464149

Which of the following *best* explains a delta-neutral portfolio? A delta-neutral portfolio is perfectly hedged against:

✓ **A) small price changes in the underlying asset.**

✗ **B)** all price changes in the underlying asset.

✗ **C)** small price decreases in the underlying asset.

Explanation

A delta-neutral portfolio is perfectly hedged against small price changes in the underlying asset. This is true both for price increases and decreases. That is, the portfolio value will not change significantly if the asset price changes by a small amount. However, large changes in the underlying will cause the hedge to become imperfect. This means that overall portfolio value can change by a significant amount if the price change in the underlying asset is large. (Study Session 17, LOS 53.e)

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Question ID: 464150

After discussing the concept of a delta-neutral portfolio, Washington determines that he needs to further explain the concept of delta. Washington draws the payoff diagram for an option as a function of the underlying stock price. Using this diagram, how is delta interpreted? Delta is the:

✗ **A) level in the option price diagram.**

✗ **B)** curvature of the option price graph.

✓ **C)** slope in the option price diagram.

Explanation

Delta is the change in the option price for a given instantaneous change in the stock price. The change is equal to the slope of the option price diagram. (Study Session 17, LOS 53.e)

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Question ID: 464151

Washington considers a put option that has a delta of −0.65. If the price of the underlying asset decreases by $6, then which of the following is the *best* estimate of the change in option price?

✗ **A) −$3.90.**

✓ **B)** +$3.90.

✗ **C)** −$6.50.

Explanation

The estimated change in the price of the option is:

Change in asset price × delta = −$6 × (−0.65) = $3.90

(Study Session 17, LOS 53.e)

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Question ID: 464152

Washington is trying to determine the value of a call option. When the slope of the at expiration curve is close to zero, the call option is:

✗ **A)** **in-the-money.**

✓ **B)** out-of-the-money.

✗ **C)** at-the-money.

Explanation

When a call option is deep out-of-the-money, the slope of the at expiration curve is close to zero, which means the delta will be close to zero. (Study Session 17, LOS 53.e)

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Question ID: 464153

BIC owns 51,750 shares of Smith & Oates. The shares are currently priced at $69. A call option on Smith & Oates with a strike price of $70 is selling at $3.50, and has a delta of 0.69 What is the number of call options necessary to create a delta-neutral hedge?

✓ **A)** **75,000.**

✗ **B)** 0.

✗ **C)** 14,785.

Explanation

The number of call options necessary to delta hedge is = 51,750 / 0.69 = 75,000 options or 750 option contracts, each covering 100 shares. Since these are call options, the options should be sold short. (Study Session 17, LOS 53.e)

Question #24 of 172

Question ID: 464154

Which of the following statements regarding the goal of a delta-neutral portfolio is *most* accurate? One example of a delta-neutral portfolio is to combine a:

✗ **A)** **long position in a stock with a short position in a call option so that the value of the portfolio changes with changes in the value of the stock.**

✓ **B)** long position in a stock with a short position in call options so that the value of the portfolio does not change with changes in the value of the stock.

✗ **C)** long position in a stock with a long position in call options so that the value of the portfolio does not change with changes in the value of the stock.

Explanation

A delta-neutral portfolio can be created with any of the following combinations: long stock and short calls, long stock and long puts, short stock and long calls, and short stock and short puts. (Study Session 17, LOS 53.e)

Questions #25-30 of 172

Rachel Barlow is a recent graduate of Columbia University with a Bachelor's degree in finance. She has accepted a position at a large investment bank, but first must complete an intensive training program to gain experience in several of the investment bank's areas of operations. Currently, she is spending three months at her firm's Derivatives Trading desk. One of the traders, Jason Coleman, CFA, is acting as her mentor, and will be giving her various assignments over the three month period.

One of the first projects Coleman asks Barlow to do is to compare different option trading strategies. Coleman would like Barlow to pay particular attention to strategy costs and their potential payoffs. Barlow is not very comfortable with option models, and knows she needs to be able to fully understand the most basic concepts in order to move on. She decides that she must first investigate how to properly price European and American style equity options. Coleman has given Barlow software that provides a variety of analytical information using three valuation approaches: the Black-Scholes model, the Binomial model, and Monte Carlo simulation. Barlow has decided to begin her analysis using a variety of different scenarios to evaluate option behavior. The data she will be using in her scenarios is provided in Exhibits 1 and 2. Note that all of the rates and yields are on a continuous compounding basis.

Exhibit 1

Stock Price (S)	$100.00
Strike Price (X)	$100.00
Interest Rate (r)	7.0%
Dividend Yield (q)	0.0%
Time to Maturity (years)	0.5
Volatility (Std. Dev.)	20.0%
Value of Put	$3.9890

Exhibit 2

Stock Price (S)	$110.00
Strike Price (X)	$100.00
Interest Rate (r)	7.0%
Dividend Yield (q)	0.0%
Time to Maturity (years)	0.5
Volatility (Std. Dev.)	20.0%
Value of Call	$14.8445
$N(d_1)$	0.8394
$N(d_2)$	0.8025

Exhibit 3

Stock Price (S)	$115.00
Strike Price (X)	$100.00
Interest Rate (r)	7.0%

Dividend Yield (q)	0.0%
Time to Maturity (years)	0.5
Volatility (Std. Dev.)	20.0%
Value of Call	$19.2147
Value of Put	$0.7753

Question #25 of 172

Question ID: 464171

Barlow notices that the stock in Exhibit 1 does not pay dividends. If the stock begins to pay a dividend, how will the price of a call option on that stock be affected? The price of the call option:

- ✗ **A)** **will increase.**
- ✗ **B)** may either increase or decrease.
- ✓ **C)** will decrease.

Explanation

The call option value will decrease since the payment of dividends reduces the value of the underlying, and the value of a call is positively related to the value of the underlying. (LOS 53.g)

Question #26 of 172

Question ID: 464172

Barlow calculated the value of an American call option on the stock shown in Exhibit 2. Which of the following is *closest* to the value of this call option?

- ✓ **A)** **$14.84.**
- ✗ **B)** $15.12.
- ✗ **C)** $15.41.

Explanation

The value of the American-style call option is the same as the value of the equivalent European-style call option. Since the underlying stock does not pay a dividend, it is never optimal to exercise the American option early. Hence the early-exercise option iembedded in the American-style call has no value in this case. This makes the American option worth exactly the same as the European option. (LOS 53.g)

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Question ID: 464173

Using the information in Exhibit 2, Barlow computes the value of a European put option. Which of the following is *closest* to the value of this option?

- ✗ **A)** **$1.97.**
- ✗ **B)** $4.84.
- ✓ **C)** $1.41.

Explanation

Using the information in Exhibit 2, this value can be determined from put-call parity as follows:

Put = Call + Xe^{-rt} − S

So we have Put = $14.8445 + 100.00e^{(-7.00\% \times 0.5)}$ − $110.00 = $1.4050

(LOS 53.a)

Question #28 of 172

Question ID: 464174

Barlow notices that the stock in Exhibit 2 does not pay dividends. If the stock starts to pay a dividend, how will the price of a put option on that stock be affected?

- ✗ **A) Decrease.**
- ✓ **B)** Increase.
- ✗ **C)** Increase or decrease.

Explanation

The put option value will increase since the payment of dividends reduces the value of the underlying, and the value of a put is negatively related to the value of the underlying. (LOS 53.g)

Question #29 of 172

Question ID: 464175

If the price of the underlying stock increases from the $110.00 price showing in exhibit 2 to $115.00, the approximate price change as predicted by delta using the data from exhibit 2 is:

- ✗ **A) more than the actual $19.2147 value of the call because of gamma.**
- ✓ **B)** less than the actual $19.2147 value of the call because of gamma.
- ✗ **C)** is precisely the actual $19.2147 value of the call because of gamma.

Explanation

The approximate change in value using delta for $1.00 of change is $N(d_1)$ = 0.8394. For an increase of $5.00 in the stock, the approximate value is: 5 × 0.8394 = $4.1972. Add this to the value of the call of $14.8445 gives = $19.0416. This value is less than the actual value of $19.2147 shown in exhibit 3. The change in delta, (gamma, effects) have increased the value of the call greater than the estimated change. (LOS 53.e)

Question #30 of 172

Question ID: 464176

If the market price of all calls and puts are greater than the predicated option prices, the implied volatility is:

- ✓ **A) greater than the current standard deviation of 20.0%.**
- ✗ **B)** calculated from historical volatility.
- ✗ **C)** less than the current standard deviation of 20.0%.

Explanation

Both calls and puts have higher values when expected volatility is higher. Vega, the change in option price relative to change in volatility, is positive for both calls and puts. As standard deviation increases, call and put prices increase. If the market values both calls and puts higher than our calculated values, the market-implied volatility must be higher than the values we are using in our calculations. Historical standard deviation as estimated may be higher or lower than the implied volatility. (LOS 53.d)

Question #31 of 172

Question ID: 464209

Which of the following is equivalent to a plain vanilla receive fixed currency swap?

✓ **A) A long position in a foreign bond coupled with the issuance of a dollar-denominated floating rate note.**

✗ **B)** A short position in a foreign bond coupled with the issuance of a dollar-denominated floating rate note.

✗ **C)** A short position in a foreign bond coupled with a long position in a dollar-denominated floating rate note.

Explanation

A long position in a fixed rate foreign bond will receive fixed coupons denominated in a foreign currency. The short floating rate note requires U.S. dollar denominated floating-rate payments. Combined, these are the same cash flow as a plain vanilla currency swap.

Question #32 of 172

Question ID: 464100

A stock is priced at 38 and the periodic risk-free rate of interest is 6%. What is the value of a two-period European put option with a strike price of 35 on a share of stock using a binomial model with an up factor of 1.15 and a risk-neutral probability of 68%?

✓ **A) $0.57.**

✗ **B)** $0.64.

✗ **C)** $2.58.

Explanation

Given an up factor of 1.15, the down factor is simply the reciprocal of this number 1/1.15=0.87. Two down moves produce a stock price of $38 \times 0.87^2 = 28.73$ and a put value at the end of two periods of 6.27. An up and a down move, as well as two up moves leave the put option out of the money. You are directly given the probability of up = 0.68. The down probability = 0.32. The value of the put option is $[0.32^2 \times 6.27] / 1.06^2 = \$0.57$.

Question #33 of 172

Question ID: 464138

An instantaneously riskless hedged portfolio has a delta of:

✗ **A) anything; gamma determines the instantaneous risk of a hedge portfolio.**

✓ **B)** 0.

✗ **C)** 1.

Explanation

A riskless portfolio is delta neutral; the delta is zero.

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Question ID: 464162

Which of the following is the *best* approximation of the gamma of an option if its delta is equal to 0.6 when the price of the underlying security is 100 and 0.7 when the price of the underlying security is 110?

- ✗ **A)** **1.00.**
- ✓ **B)** 0.01.
- ✗ **C)** 0.10.

Explanation

The gamma of an option is computed as follows:

Gamma = change in delta/change in the price of the underlying = (0.7 - 0.6)/(110 - 100) = 0.01

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Question ID: 464225

90 days ago the exchange rate for the Canadian dollar (C$) was $0.83 and the term structure was:

	180 days	*360 days*
LIBOR	5.6%	6%
CDN	4.8%	5.4%.

A swap was initiated with payments of 5.3% fixed in C$ and floating rate payments in USD on a notional principal of USD 1 million with semiannual payments.

90 days have passed, the exchange rate for C$ is $0.84 and the yield curve is:

	90 days	*270 days*
LIBOR	5.2%	5.6%
CDN	4.8%	5.4%

What is the value of the swap to the floating-rate payer?

- ✓ **A)** **$10,126.**
- ✗ **B)** $3,472.
- ✗ **C)** −$2,708.

Explanation

The present value of the USD floating-rate payment is:

$$\frac{1+0.056\left(\frac{180}{360}\right)}{1+0.052\left(\frac{90}{360}\right)}$$

(1.028 / 1.013) = 1.014808

1.014808 × 1,000,000 = $1,014,808

The present value of the fixed C$ payments per 1 CDN is:

$$\frac{0.053\left(\frac{180}{360}\right)}{1+0.048\left(\frac{90}{360}\right)}+\frac{1+0.053\left(\frac{180}{360}\right)}{1+0.054\left(\frac{270}{360}\right)}$$

(0.0265 / 1.012) + (1.0265 / 1.0405) = 1.012731 and for the whole swap amount, in USD is 1.012731 × 0.84 × (1,000,000 / 0.83) = $1,024,932

−1,014,808 + 1,024,932 = $10,126

Question #36 of 172

Question ID: 464165

Gamma is the greatest when an option:

✗ **A) is deep out of the money.**

✗ **B)** is deep in the money.

✓ **C)** is at the money.

Explanation

Gamma, the curvature of the option-price/asset-price function, is greatest when the asset is at the money.

Question #37 of 172

Question ID: 464118

Which of the following option sensitivities measures the change in the price of the option with respect to a decrease in the time to expiration?

✓ **A) Theta.**

✗ **B)** Delta.

✗ **C)** Gamma.

Explanation

Theta describes the change in option price in response to the passage of time. Since option holders would prefer that value not decay too quickly, an option with a low theta value is desirable.

Question #38 of 172

Question ID: 464294

5-year, 5% Zillon Corp. bonds currently trade at $980 reflecting credit spread of 3%. A 5-year CDS for Zillon bonds has a coupon rate of 5%. The duration of the CDS = 4.

The upfront payment made/received by the protection buyer on a $4 million notional CDS is *closest to*:

- ✗ **A) $400,000 received by the protection buyer.**
- ✗ **B)** $300,000 paid by the protection buyer.
- ✓ **C)** $320,000 received by the protection buyer.

Explanation

Upfront payment = (CDS spread − CDS coupon) × duration × notional principal
= (0.03 − 0.05) × 4 × 4,000,000 = −$320,000

The protection buyer will receive an upfront premium of $320,000.

Question #39 of 172

Question ID: 464139

The delta of an option is equal to the:

- ✓ **A) dollar change in the option price divided by the dollar change in the stock price.**
- ✗ **B)** dollar change in the stock price divided by the dollar change in the option price.
- ✗ **C)** percentage change in option price divided by the percentage change in the asset price.

Explanation

The delta of an option is the dollar change in option price per $1 change in the price of the underlying asset.

Question #40 of 172

Question ID: 464238

Which of the following is *least likely* to be a use of a swaption?

- ✓ **A) Hedging the risk of a current fixed-rate commitment.**
- ✗ **B)** Exiting an offsetting swap at the exercise date.
- ✗ **C)** Hedging the risk of an anticipated floating-rate obligation.

Explanation

Swaptions will not be a good hedge for a current obligation since the swaption is for a swap in the future.

Questions #41-46 of 172

Frank Potter, CFA, a financial adviser for Star Financial, LLC has been hired by John Williamson, a recently retired executive from Reston Industries. Over the years Williamson has accumulated $10 million worth of Reston stock and another $2 million in a cash savings account. Potter has a number of unconventional investment strategies for Williamson's portfolio; many of the strategies include the use of various equity derivatives.

Potter's first recommendation involves the use of a total return equity swap. Potter outlines the characteristics of the swap in Table 1. In addition to the equity swap, Potter explains to Williamson that there are numerous options available for him to obtain almost any risk return profile he might need. Potter suggest that Williamson consider options on both Reston stock and the S&P 500. Potter collects the information needed to evaluate options for each security. These results are presented in Table 2.

Table 1: Specification of Equity Swap

Term	3 years
Notional principal	$10 million
Settlement frequency	Annual, commencing at end of year 1
Fairfax pays to broker	Total return on Reston Industries stock
Broker pays to Fairfax	Total return on S&P 500 Stock Index

Table 2: Option Characteristics

	Reston	*S&P 500*
Stock price	$50.00	$1,400.00
Strike price	$50.00	$1,400.00
Interest rate	6.00%	6.00%
Dividend yield	0.00%	0.00%
Time to expiration (years)	0.5	0.5
Volatility	40.00%	17.00%
Beta Coefficient	1.23	1
Correlation	0.4	

Table 3: Regular and Exotic Options (Option Values)

	Reston	*S&P 500*
European call	$6.31	$6.31
European put	$4.83	$4.83
American call	$6.28	$6.28
American put	$4.96	$4.96

Table 4: Reston Stock Option Sensitivities

	Delta
European call	0.5977
European put	-0.4023
American call	0.5973
American put	-0.4258

Table 5: S&P 500 Option Sensitivities

	Delta
European call	0.622
European put	-0.378
American call	0.621
American put	-0.441

Potter has also been asked to evaluate the interest rate risk of an intermediate size bank. The bank has a large floating rate liability of $100,000,000 on which it pays the London Inter Bank Offered Rate (LIBOR) on a quarterly basis. Potter is concerned about the significant interest rate risk the bank incurs because of this liability: since most of the bank's assets are invested in fixed rate instruments there is a considerable duration mismatch. Some of the bank's assets are floating rate notes tied to LIBOR, however, the total par value of these securities is significantly less than the liability position.

Potter considers both swaps and interest rate options. The interest rate options are 2-year caps and floors with quarterly exercise dates. Potter wishes to hedge the entire liability.

Potter has obtained the prices for an at-the-money 6 month cap and floor with quarterly exercise. These are shown in Table 6.

Table 6: At-the-Money 0.5 year Cap and Floor Values	
Price of at-the-money Cap	$133,377
Price of at-the-money Floor	$258,510

Question #41 of 172

Question ID: 464257

Williamson would like to consider neutralizing his Reston equity position from changes in Reston's stock price. Using the information in Tables 3 and 4 how many standard Reston European options would have to be bought/sold in order to create a delta neutral portfolio?

✗ **A)** **Sell 497,141 put options.**

✗ **B)** Sell 370,300 call options.

✓ **C)** Buy 497,141 put options.

Explanation

Number of put options = (Reston Portfolio Value / Stock Price$_{Reston}$) / −DeltaPut

Number of put options = ($10,000,000 / $50.00) / −0.4023 = −497,141 meaning buy 497,141 put options.

(LOS 53.e)

Question #42 of 172

Question ID: 464258

Williamson is very interested in the total return swap. He asks Potter how much it would cost to enter into this transaction. Which of the following is the *most likely* cost of the swap at inception?

✗ **A)** **$45,007.**

✗ **B)** $340,885.

✓ **C)** $0.

Explanation

Swaps are priced so that their value at inception is zero.

(LOS 54.e)

Question #43 of 172

Question ID: 464259

Williamson likes the characteristics of the swap arrangement in Table 1 but would like to consider the options in Table 3 before making an investment decision. Given Williamson's current situation which of the following option trades makes the *most* sense in the short-term (all options are on Reston stock)?

✗ **A)** **Buy out-of-the-money call options.**

✗ **B)** Sell at-the-money-call options.

✓ **C)** Buy at-the-money put options.

Explanation

Buying at the money put options greatly reduces Williamson's downside risk. Selling call options yields an option premium to the seller but does not deliver any downside protection and limits the upside potential of the portfolio.

(LOS 53.a)

Question #44 of 172

Question ID: 464260

Potter analyzes alternative hedging strategies to address the risk of the bank's large floating-rate liability. Which of the following is the *most appropriate* transaction to efficiently hedge the interest rate risk for the floating rate liability without sacrificing potential gains from interest rate decreases?

✗ **A) Buy an interest rate collar.**

✗ **B)** Sell an interest rate cap.

✓ **C)** Buy an interest rate cap.

Explanation

Buying a cap, combined with a floating rate liability, limits the exposure to interest rate increases (i.e. no exposure to interest rate increases above strike rate). The floating rate borrower will still benefit from interest rate decreases.

(LOS 55.a)

Question #45 of 172

Question ID: 464261

Potter now wants to compute the cost to convert the bank's floating rate liability to a fixed rate liability for 6 months. What would be the cash flow required to implement this hedge using at-the-money interest rate options?

✗ **A) −$125,133.**

✗ **B)** −$246,894.

✓ **C)** +$125,133.

Explanation

This is the difference between the 0.5 year cap and the 0.5 year floor, both with a strike rate of 5.000%. See the values shown in Table 2.

So we have cash flow to convert floating to fixed = −$133,377 + $258,510 = $125,133

(LOS 55.a)

Question #46 of 172

Question ID: 464262

Potter is now considering some of the bank's floating rate assets. Which of the following transactions is the *most appropriate* to minimize the interest rate risk of these assets without sacrificing upside gains?

✓ **A) Buy a floor.**

✗ **B)** Buy a cap.

✗ **C)** Buy a collar.

Explanation

Buying a floor combined with a floating rate assets limits the exposure to interest rate decreases (i.e. no exposure to interest rate decreases below strike rate) while the floating rate holder is still able to benefit from interest rate increases. Ideally, Potter should consider matching the bank's asset position against the bank's liability position.

(LOS 55.a)

Question #47 of 172

Question ID: 464249

A swap spread is the difference between:

✗ **A)** **LIBOR and the fixed rate on the swap.**

✓ **B)** the fixed rate on an interest rate swap and the rate on a Treasury bond of maturity equal to that of the swap.

✗ **C)** the fixed-rate and floating-rate payment rates at the inception of the swap.

Explanation

A swap spread is the difference between the fixed rate on an interest rate swap and a Treasury bond of maturity equal to that of the swap.

Question #48 of 172

Question ID: 464292

Gill Westmore is the fixed income portfolio manager for Allied Insurance. Westmore has bought protection using a 2-year CDS on CDX-IG (125 constituent) index. The notional is $200 million. Company X, an index constituent defaults and trades at 25% of par.

The payoff on the CDS on account of default of X and the notional principal of the CDS after default are *closest* to:

	Payoff	Notional
✗ **A)**	**$1.5 million**	**$198 million**
✗ **B)**	$1.6 million	$200 million
✓ **C)**	$1.2 million	$198.4 million

Explanation

Notional principal attributable to bonds of company X = $200 million/125 = $1.6 million.

Payoff on the CDS = $1.6 million − (0.25)($1.6 million) = $1.2 million.

After default, the CDS continues with (200-1.6) $198.4 million of notional principal.

Question #49 of 172

Question ID: 464290

Assume that a three-year semi-annually settled cap with a strike rate of 8% and a notional amount of $100 million is being analyzed. The reference rate is six-month LIBOR. LIBOR for the next four semi-annual periods is as follows:

Period	*LIBOR*
1	7.5%
2	8.2%
3	8.1%
4	8.7%

What is the payoff for the cap for period 4?

✓ **A)** **$350,000.**

✗ **B)** $700,000.

✗ **C)** $0.

Explanation

The payoff for each semi-annual period is computed as follows:

Payoff = notional amount × (six-month LIBOR - cap rate)/2   so for period 4:

= $100 million × (8.7% - 8.0%)/2 = $350,000.

Question #50 of 172

Question ID: 464194

At the inception of a market-rate plain vanilla swap, the value of the swap to the fixed-rate payer is:

✗ **A)** **positive.**

✓ **B)** zero.

✗ **C)** either positive or negative.

Explanation

A market-rate swap is priced so that the value to either side is zero at the inception of the swap.

Question #51 of 172

Question ID: 464215

If the one year spot rate is 5%, the two-year spot rate is 5.5%, and the three year spot rate is 6%, the fixed rate on a 3-year annual pay swap is *closest* to:

✗ **A)** **1.99%.**

✓ **B)** 5.65%.

✗ **C)** 4.50%.

Explanation

The fixed rate on the swap is: $\dfrac{1-\dfrac{1}{1+0.06(3)}}{\dfrac{1}{1.05}+\dfrac{1}{1+0.055(2)}+\dfrac{1}{1+0.06(3)}}$

$$\frac{1-0.8475}{0.9524+0.9009+0.8475}$$

= 0.1525 / 2.7008 = 0.0565

Question #52 of 172

Question ID: 464163

Two call options have the same delta but option A has a higher gamma than option B. When the price of the underlying asset increases, the number of option A calls necessary to hedge the price risk in 100 shares of stock, compared to the number of option B calls, is a:

✓ **A) smaller (negative) number.**

✗ **B)** larger positive number.

✗ **C)** larger (negative) number.

Explanation

For call options larger gamma means that as the asset price increases, the delta of option A increases more than the delta of option B. Since the number of calls to hedge is (- 1/delta)x(number of shares), the number of calls necessary for the hedge is a smaller (negative) number for option A than for option B.

Question #53 of 172

Question ID: 464282

An issuer who wishes to issue a floating rate note with a collar would be equivalently issuing the note and:

✗ **A) buying a cap and a floor.**

✗ **B)** selling a cap and buying a floor.

✓ **C)** buying a cap and selling a floor.

Explanation

Issuing a floating rate note with a collar (a cap and a floor) is equivalent to issuing the note, buying a cap to put an upper limit on the interest cost, and selling a floor which would put a minimum on interest expense and offset the cost of the cap to some extent.

Question #54 of 172

Question ID: 464101

A two-period interest rate tree has the following expected one-period rates:

t = 0	t = 1	t = 2
		7.12%
	6.83%	
6.00%		6.84%

> 6.17%
>
> 6.22%

The price of a two-period European interest-rate call option on the one-period rate with a strike rate of 6.25% and a principal amount of $100,000 is *closest* to:

- ✗ **A) $449.33.**
- ✓ **B)** $423.89.
- ✗ **C)** $725.86.

Explanation

1. Calculate the payoffs on the call in percent for I++ and I+− (= I−+):
   I++ value = (0.0712 − 0.0625) / 1.0712 = 0.00812173.
   I+− value = (0.0684 − 0.0625) / 1.0684 = 0.00552228.
   Remember that the payoff on the call value is the present value of the interest rate difference based on the rate realized at t = 2 because the payment is received at t = 3.

2. Calculate the t = 1 values (the probabilities in an interest rate tree are 50%):
   At t = 1 the values are I+ = [0.5(0.00812173) + 0.5 (0.00552228)] / 1.0683 = 0.00638585.
   At t = 1 the values are I− = [0.5(0) + 0.5 (0.00552228)] / 1.0617 = 0.00260068.

3. Calculate the t = 0 value:
   At t = 0 the option value is [0.5(0.00638585) + 0.5(0.00260068)] / 1.06 = 0.00423893 0.00423893 × 100,000 = $423.89.

Question #55 of 172

Question ID: 464273

A cap on a floating rate note, from the bondholder's perspective, is equivalent to:

- ✗ **A) writing a series of interest rate puts.**
- ✓ **B)** writing a series of puts on fixed income securities.
- ✗ **C)** owning a series of calls on fixed income securities.

Explanation

For a bondholder, a cap, which puts a maximum on floating rate interest payments, is equivalent to writing a series of puts on fixed income securities. These would require the buyer to pay when rates rise and bond prices fall, negating interest rate increases above the cap rate. Writing a series of interest rate calls, not puts, would be an equivalent strategy. Calls on fixed income securities would pay when rates decrease, not when they increase.

Questions #56-61 of 172

Gina Davalos, CFA is a portfolio manager for the Herron Investments. She is interested in hedging the equity risk of one of her clients, Lou Gier. Gier has 200,000 shares of a stock with the symbol QJX that he believes could take a dive in the next 9 months. Davalos gathers the following information to suggest potential strategies to offset the potential loss.

General Information:

QJX Current Stock Price	$100.00
Risk-free rate	5.0%
QJX Dividend Yield	0.0%
Time to Maturity (years)	0.75

Option Information:

Strike Price	$100.00
Value of Call	$12.09
Delta on Call Option	0.6081
Value of Put (years)	$8.41

Equity Swap Information:

Terms	9 months
Settlement frequency	Quarterly
Fixed rate	6.0%
Return on QJX	Variable

Futures Information:

Terms	9 months
Current Futures Price	$105.50

Question #56 of 172

Question ID: 464142

The number of call option contracts that Davalos would need to trade to create a delta neutral hedge is *closest* to:

✗ **A)** **2,000 contracts.**

✗ **B)** 328,920 contracts.

✓ **C)** 3,289 contracts.

Explanation

The number of call options needed is 200,000 / 0.6081 = 328,920 options or approximately 3,289 contracts of 100 shares. Since Gier is long the stock, Davalos should short the calls. (LOS 53.e)

Question #57 of 172

Question ID: 464143

In order to create a delta-neutral hedge using put option contracts, Davalos would *most accurately* need to:

✓ **A)** **Buy 5,103 contracts.**

✗ **B)** Buy 2,000 contracts.

✗ **C)** Sell 510,271 contracts.

Explanation

The delta of a put option is the delta of the corresponding call option minus- 1. The delta of a QJX put option is thus -0.3919. The number of put options needed is 200,000 / -0.3909 = -510,271 options or approximately 5,103 contracts per 100 shares. Gier is long the stock, to hedge with puts Davalos should also take a long position in the puts. (LOS 53.e)

Question #58 of 172

Question ID: 464144

When a delta neutral hedge has been established using call options, which of the following statements is *most* accurate? As the price of the underlying stock:

✗ **A)** **increases, some option contracts would need to be sold in order to retain the delta neutral position.**

✗ **B)** changes, no changes are needed in the number of call options purchased.

✓ **C)** increases, some option contracts would need to be repurchased in order to retain the delta neutral position.

Explanation

The initial delta hedge is established by selling call options (i.e. taking a short position in calls). As the stock price increases, the delta of the call option increases as well, requiring fewer (short) option contracts to hedge against the underlying stock price movements. Therefore, some options contracts must be repurchased in order to maintain the hedge. (Purchasing option contracts will decrease the number of call options that we are short.) (LOS 53.e)

Question #59 of 172

Question ID: 464145

An equity swap to hedge the equity risk for Gier would result in receipt of a:

✗ **A)** **fixed rate of 4.5% for the year.**

✗ **B)** variable rate based on the total return of QJX stock.

✓ **C)** fixed rate of 1.5% per quarter.

Explanation

To offset the equity risk, Gier would pay a variable rate based on the total return of QJX and receive a fixed rate. The quoted rate is an annualized rate and since the swap is for three quarters or nine months, the full 6.0% will not be realized. The 6.0% annualized rate is equivalent to 1.5% per quarter. (LOS 54.e)

Question #60 of 172

Question ID: 464146

If the equity swap is implemented and after 3 months the stock price has increased to $106.00, the net cash flow for the swap is:

✗ **A)** **a gain of $900,000.**

✗ **B)** zero.

✓ **C)** a loss of $900,000.

Explanation

The equity swap requires Gier to pay a variable rate of total return on QJX and receive a fixed rate. If the stock appreciates, the swap results in a positive cash flow of 6.0%/4 × $20,000,000 = $300,000 and a negative cash flow of $20,000,000 × ($106/$100 - 1) = $1,200,000, summing to a net of outflow of $900,000. The swap plus the equity position result in an overall gain, as the gain on the stock more than offsets the loss on the equity swap. (LOS 54.e)

Question #61 of 172

Question ID: 464147

Based on the futures information, an arbitrage opportunity can be exploited by:

✗ **A)** **Selling the stock QJX and buying the futures.**

✗ **B)** Buying the futures and buying the stock QJX.

✓ **C)** Buying the stock QJX, and selling the futures.

Explanation

The calculated fair value of the futures contract is $100 × $(1+0.05)^{0.75}$ = $103.73. The asset is relatively underpriced and the futures contract is overpriced. By buying the stock and selling the futures we can lock in a profit greater than the risk-free rate with no risk. (LOS 51.b)

Question #62 of 172

Question ID: 464193

Regarding deep in-the-money options on futures, it is:

✗ **A)** **sometimes worthwhile to exercise calls early but not puts.**

✓ **B)** sometimes worthwhile to exercise both calls and puts early.

✗ **C)** never worthwhile to exercise puts or calls early.

Explanation

If puts or calls on futures are significantly in-the-money it may be worthwhile to exercise them early to generate the cash from the immediate mark to market of the futures contract when the option is exercised.

Question #63 of 172

Question ID: 464231

Which of the following statements regarding swaptions is *least* accurate? A swaption is often used to:

✗ **A)** **provide the right to terminate a swap.**

✗ **B)** hedge the rate on an anticipated swap transaction.

✓ **C)** create a synthetic bond position.

Explanation

A swaption is like an option on a bond with payments equal to the fixed payments on the swap. The others are common uses of swaps.

Questions #64-69 of 172

Jacob Bower is a bond strategist who would like to begin using fixed-income derivatives in his strategies. Bower has a firm understanding of the properties fixed-income securities. However, his understanding of interest rate derivatives is not nearly as strong. He decides to train himself on the valuation and sensitivity of interest rate derivatives using various interest rate scenarios. He considers the forward London Interbank Offered Rate (LIBOR) interest rate environment shown in Table 1. Using a rounded daycount (i.e., 0.25 years for each quarter) he has also computed the corresponding implied spot rates resulting from these LIBOR forward rates. These are included in Table 1.

Table 1 *90-Day LIBOR Forward Rates and Implied Spot Rates*		

Period (in months)	*LIBOR Forward Rates*	*Implied Spot Rates*
0 × 3	5.500%	5.5000%
3 × 6	5.750%	5.6250%
6 × 9	6.000%	5.7499%
9 × 12	6.250%	5.8749%
12 × 15	7.000%	6.0997%
15 × 18	7.000%	6.2496%

Bower has also estimated the LIBOR forward rate volatilities to be 20%. The particular fixed instruments that Bower would like to examine are shown in Table 2. He also wants to analyze the strategy shown in Table 3.

Table 2 *Interest Rate Instruments*		
Dollar Amount of Floating Rate Bond		$42,000,000
Floating Rate Bond paying LIBOR +		0.25%
Time to Maturity (years)		8
Cap Strike Rate	7.00%	
Floor Strike Rate	6.00%	
Interest Payments	quarterly	

Table 3 *Initial Position in 90-day LIBOR Eurodollar Contracts*		
Contract Month (from now)	*Strategy A (contracts)*	*Strategy B (contracts)*
3 months	300	100
6 months	0	100
9 months	0	100

Question #64 of 172

Question ID: 464276

Bower is a bit puzzled about how to use caps and floors. He wonders how he could benefit both from increasing and decreasing interest rates. Which of the following trades would *most likely* profit from this interest rate scenario?

✗ **A) Sell at the money cap and at the money floor.**

✗ **B)** Buy at the money cap and sell at the money floor.

✓ **C)** Buy at the money cap and at the money floor.

Explanation

This is a straddle on interest rates. The cap provides a positive payoff when interest rates rise and the floor provides a positive payoff when interest rates fall. (Study Session 17, LOS 55.a)

Question #65 of 172

Question ID: 464277

Bower shorts the floating rate bond given in Table 2. Which of the following will *best* reduce Bower's interest rate risk?

✗ **A) Buying an interest rate floor.**

✓ **B)** Shorting Eurodollar futures.

✗ **C)** Shorting an interest rate floor.

Explanation

If he adds a short position in Eurodollar futures to the existing liability in the correct amount, he is able to lock in a specific interest rate. A short Eurodollar position will increase in value if interest rates rise because the contract is quoted as a discount instrument so increases in rates reduce the futures price. (Study Session 16, LOS 52.g)

Question #66 of 172

Question ID: 464278

Bower has studied swaps extensively. However, he is not sure which of the following is the swap fixed rate for a one-year interest rate swap based on 90-day LIBOR with quarterly payments. Using the information in Table 1 and the formula below, what is the *most* appropriate swap fixed rate for this swap?

$$C = \frac{1 - Z_4}{Z_1 + Z_2 + Z_3 + Z_4}$$

where:

$$Z_n = \frac{1}{1 + R_n} = \text{price of } n\text{-period zero-coupon bond per \$ of principal}$$

✗ **A) 6.01%.**

✗ **B)** 5.65%.

✓ **C)** 5.75%.

Explanation

The swap fixed rate is computed as follows:

$$Z_{90\text{-}day} = \frac{1}{1 + (0.055 \times 90 / 360)}$$

$$= 0.98644$$

$$Z_{180\text{-}day} = \frac{1}{1 + (0.05625 \times 180 / 360)}$$

$$= 0.97264$$

$$Z_{270\text{-}day} = \frac{1}{1 + (0.057499 \times 270 / 360)}$$

$$= 0.95866$$

$$Z_{360\text{-}day} = \frac{1}{1 + (0.058749 \times 360 / 360)}$$

$= 0.94451$

$$\text{The quarterly fixed rate on the swap} = \frac{1 - 0.94451}{0.98644 + 0.97264 + 0.95866 + 0.94451}$$

> = 0.05549 / 3.86225 = 0.01437 = 1.437%

The fixed rate on the swap in annual terms is:

> 1.437% × 360 / 90 = 5.75%

(Study Session 17, LOS 54.c)

Question #67 of 172

Question ID: 464279

Bower would like to perform some sensitivity analysis on a one year collar to changes in LIBOR. Specifically, he wonders how the price of a collar (buying a cap and selling a floor) is affected by an increase in the LIBOR forward rate volatility. Using the information in Tables 1 and 2 which of the following is *most* accurate? The price of the collar will:

✓ **A)** **decrease.**

✗ **B)** increase.

✗ **C)** stay the same.

Explanation

The price of the floor will increase more than the price of the cap since the floor is closer to being at the money than the cap. Therefore, the floor price is more sensitive to volatility changes in the LIBOR forward rate. Since the price of the collar is equal to the price of the cap minus the price of the floor, the net effect is a price decrease for the collar. (Study Session 17, LOS 55.a)

Question #68 of 172

Question ID: 464280

Bower computes the implied volatility of a one year caplet on the 90-day LIBOR forward rates to be 18.5%. Using the given information what does this mean for the caplet's market price relative to its theoretical price? The caplet's market price is:

✗ **A)** **overvalued.**

✗ **B)** undervalued or overvalued.

✓ **C)** undervalued.

Explanation

Volatility and option prices are always positively related. Therefore, since the option implied volatility is lower than the estimated volatility, this implies that the caplet is undervalued relative to its theoretical value. (Study Session 17, LOS 55.a)

Question #69 of 172

Question ID: 464281

For this question only, assume Bower expects the currently positively sloped LIBOR curve to shift upward in a parallel manner. Using a plain vanilla interest rate swap, which of the following will allow Bower to best take advantage of his expectations? Purchase a:

✗ **A)** **floating rate bond and enter into a receive fixed swap.**

✗ **B)** receive fixed interest rate swap.

✓ **C)** pay fixed interest rate swap.

Explanation

Since the interest rates are expected to rise for all maturities, one can benefit from this rise by receiving a floating rate (LIBOR) and borrowing at a fixed rate (i.e. a pay fixed swap). (Study Session 16, LOS 54.c)

Question #70 of 172

Question ID: 464226

Consider a fixed-for-fixed 1-year $100,000 semiannual currency swap with rates of 5.2% in USD and 4.8% in CHF, originated when the exchange rate is $0.34. 90 days later, the exchange rate is $0.35 and the term structure is:

	90 days	*270 days*
LIBOR	5.2%	5.6%
Swiss	4.8%	5.4%

What is the value of the swap to the USD payer?

✗ **A)** **-$2,719.**

✗ **B)** $2,814.

✓ **C)** $2,719.

Explanation

The present value of the fixed payments on one CHF is $\frac{0.048\left(\frac{180}{360}\right)}{1+0.048\left(\frac{90}{360}\right)}+\frac{1+0.048\left(\frac{180}{360}\right)}{1+0.054\left(\frac{270}{360}\right)}=1.00786$

0.02372 + 0.98414 = 1.00786.

At the current exchange rate the value is 1.00786 × 0.35 = USD 0.35275.

The notional amount is 100,000/0.34 = 294,118 CHF so the dollar value of the CHF payments is 0.35275 × 294,118 = $103,750.

The present value of the USD payments is $\frac{0.052\left(\frac{180}{360}\right)}{1+0.052\left(\frac{90}{360}\right)}+\frac{1+0.052\left(\frac{180}{360}\right)}{1+0.056\left(\frac{270}{360}\right)}=1.01031$

0.02567 + 0.98464 = 1.01031

1.01031 × 100,000 = $101,031.

The value of the swap to the dollar payer is 103,750 - 101,031 = $2,719.

Question #71 of 172

Question ID: 464228

Consider a fixed-rate semiannual-pay equity swap where the equity payments are the total return on a $1 million portfolio and the following information:

- 180-day LIBOR is 5.2%
- 360-day LIBOR is 5.5%
- Dividend yield on the portfolio = 1.2%

What is the fixed rate on the swap?

✗ **A)** **5.4197%.**

✗ **B)** 5.1387%.

✓ **C)** 5.4234%.

Explanation

$$\frac{\left(1-\frac{1}{1.055}\right)}{\left(\frac{1}{1+0.052\left(\frac{180}{360}\right)}+\frac{1}{1+0.055\left(\frac{360}{360}\right)}\right)} = 0.027117 \times 2 = 5.4234\%$$

Question #72 of 172

Question ID: 464179

Which of the following statements concerning vega is *most* accurate? Vega is greatest when an option is:

✓ **A)** **at the money.**

✗ **B)** far out of the money.

✗ **C)** far in the money.

Explanation

When the option is at the money, changes in volatility will have the greatest affect on the option value.

Question #73 of 172

Question ID: 464114

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)** There are no taxes.

✗ **C)** Options valued are European style.

Explanation

The BSM model assumes there are no cash flows on the underlying asset.

Question #74 of 172

Question ID: 464274

Which of the following *best* describes an interest rate cap? An interest rate cap is a package or portfolio of interest rate options that provide a positive payoff to the buyer if the:

✗ **A) T-Bond futures exceeds the strike price.**

✗ **B)** reference rate is below the strike rate.

✓ **C)** reference rate exceeds the strike rate.

Explanation

An interest rate cap is a package of European-type call options (called caplets) on a reference interest rate.

Question #75 of 172

Question ID: 464240

The payoff on a receiver swaption is most like that of a:

✗ **A) put option on a discount bond.**

✓ **B)** call option on a coupon bond.

✗ **C)** put option on a coupon bond.

Explanation

The payoff on a receiver swaption is like that of a call option on a bond issued at the exercise date of the swaption, with a coupon equal to the fixed rate of the swap, and a term equal to that of the swap.

Question #76 of 172

Question ID: 464247

Compared to an equity swap, a currency swap has credit risk that is:

✗ **A) approximately the same during the life of the swap.**

✓ **B)** greater, later in the swap.

✗ **C)** greater, earlier in the swap.

Explanation

A currency swap has a final exchange of principal, moving the maximum credit risk later in the life of the swap.

Question #77 of 172

Question ID: 464291

Which of the following *best* represents an interest floor?

✓ **A) A portfolio of put options on an interest rate.**

✗ **B)** A put option on an interest rate.

✗ **C)** A portfolio of call options on an interest rate.

Explanation

A long floor (floor buyer) has the same general expiration-date payoff diagram as that for long interest rate put position.

Question #78 of 172

Question ID: 464186

At time = 0, for a put option at exercise price (X) on a newly issued forward contact at F_T (the forward price at time = 0), a portfolio with equal value could be constructed from being long in:

✗ **A) the underlying asset, long a put at X, and short in a pure-discount risk-free bond that pays X - F_T at option expiration.**

✓ **B)** a call at X and long in a pure-discount risk-free bond that pays X - F_T at option expiration.

✗ **C)** a risk-free pure-discount bond that pays F_T - X at option expiration and long in a put at X.

Explanation

Utilizing the basic put/call parity equation, we're looking for a portfolio that is equal to the portfolio mentioned in the stem (a put option). The put-call parity equation is $c_0 + (X - F_T) / (1+R)^T = p_0$. Since $(X - F_T) / (1+R)$ is actually just the present value of the bond at expiration, the relationship can be simplified to long call + long bond = put.

Question #79 of 172

Question ID: 464096

Referring to put-call parity, which one of the following alternatives would allow you to create a synthetic riskless pure-discount bond?

✗ **A) Sell a European put option; sell the same stock; buy a European call option.**

✓ **B)** Buy a European put option; buy the same stock; sell a European call option.

✗ **C)** Buy a European put option; sell the same stock; sell a European call option.

Explanation

According to put-call parity we can write a riskless pure-discount bond position as:
$X/(1+R_f)^T = P_0 + S_0 - C_0$.

We can then read off the right-hand side of the equation to create a synthetic position in the riskless pure-discount bond. We would need to buy the European put, buy the same underlying stock, and sell the European call.

Question #80 of 172

Question ID: 464233

A payer swaption gives its holder:

✗ **A) the right to enter a swap in the future as the floating-rate payer.**

✓ **B)** the right to enter a swap in the future as the fixed-rate payer.

✗ **C)** an obligation to enter a swap in the future as the fixed-rate payer.

Explanation

A payer swaption give its holder the right to enter a swap in the future as the fixed-rate payer.

Question #81 of 172

Question ID: 464217

A $10 million 1-year semi-annual-pay LIBOR-based interest-rate swap was initiated 90 days ago when LIBOR was 4.8%. The fixed rate on the swap is 5%, current 90-day LIBOR is 5% and 270-day LIBOR is 5.4%. The value of the swap to the fixed-rate payer is *closest* to:

- ✗ **A) $19,229.**
- ✓ **B)** $15,633.
- ✗ **C)** $12,465.

Explanation

The fixed rate payments are 0.05 × (180/360) × 10,000,000 = 250,000. The present value of the remaining payments are 250,000/(1 + 0.05 × (90/360)) + 10,250,000/(1+ 0.054 × (270/360)) = $10,097,947.

The floating payment in 90 days is 0.048 × (180/360) = 240,000 and the present value is 240,000/(1 + 0.05/4) = $237,037. The second floating-rate payment combined with 1 at the end of the swap has a present value of 1 on the first payment date. The present value of 1 is 1/(1 + 0.05 × (90/360)) = 0.987654321 so the present value of the second floating rate payment combined with the principal amount is $9,876,543. The total value is 9,876,543 + 237,037 = $10,113,580.

The value of the swap to the fixed-rate payer is 10,113,580 - 10,097,947 = $15,633.

Question #82 of 172

Question ID: 464242

The LIBOR yield curve is:

180-days	5.2%
360-days	5.4%

What is the value of a 1-year semiannual-pay LIBOR based receiver swaption (expiring today) on a $10 million 1-year 4.8% swap?

- ✗ **A) -$50,712.**
- ✓ **B)** $0.
- ✗ **C)** $50,712.

Explanation

First, find the discount factors. 1/(1+(0.052×(180/360))) = 0.97465887 and 1/(1+(0.054×(360/360))) = 0.94876660 Calculate the market fixed rate payments: (1 - 0.94876660) / (0.97465887 + 0.94876660) = 0.026637 and compare to the exercise rate payments 0.024. The value of the receiver swaption is zero since the exercise rate is below the market rate.

Question #83 of 172

Question ID: 464236

Mark Roberts anticipates utilizing a floating rate line of credit in 90 days to purchase $10 million of raw materials. To get protection against any increase in the expected London Interbank Offered Rate (LIBOR) yield curve, Roberts should:

- ✓ **A) buy a payer swaption.**
- ✗ **B)** buy a receiver swaption.
- ✗ **C)** write a receiver swaption.

Explanation

A payer swaption will give Roberts the right to pay a fixed rate below market if rates rise.

Question #84 of 172

Question ID: 464167

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

- ✗ **A)** **exercise price is lower.**
- ✗ **B)** underlying asset has less volatility.
- ✓ **C)** underlying asset has positive cash flows.

Explanation

Positive cash flows in the form of dividends will lower the price of the stock making it closer to being "in the money" which increases the value of the option as the stock price gets closer to the strike price.

Question #85 of 172

Question ID: 464098

Referring to put-call parity, which one of the following alternatives would allow you to create a synthetic stock position?

- ✗ **A)** **Buy a European call option; buy a European put option; invest the present value of the exercise price in a riskless pure-discount bond.**
- ✗ **B)** Sell a European call option; buy a European put option; short the present value of the exercise price worth of a riskless pure-discount bond.
- ✓ **C)** Buy a European call option; short a European put option; invest the present value of the exercise price in a riskless pure-discount bond.

Explanation

According to put-call parity we can write a stock position as: $S_0 = C_0 - P_0 + X/(1+R_f)^T$

We can then read off the right-hand side of the equation to create a synthetic position in the stock. We would need to buy the European call, sell the European put, and invest the present value of the exercise price in a riskless pure-discount bond.

Question #86 of 172

Question ID: 464195

The price and value of a plain vanilla interest-rate swap are:

- ✗ **A)** **equal in equilibrium.**
- ✓ **B)** never equal.
- ✗ **C)** only equal at the inception of a swap contract.

Explanation

The price of a swap is the fixed rate specified in the swap and is the same for the payer and the receiver. The value is the dollar value of the contract to the fixed-rate payer and is the opposite of the value to the floating-rate payer.

Question #87 of 172

Question ID: 464189

Put-call parity for options on forward contracts at the initiation of the option where the forward price at that time (time=0) is FT, can *best* be expressed as:

✗ **A)** **$c_0 - (X - FT) / (1 + R)^T = p_0$.**

✓ **B)** $c_0 + (X - FT) / (1 + R)^T = p_0$.

✗ **C)** $c_0 + X / (1 + R)^T - FT = p_0$.

Explanation

Put call parity for stocks (with discrete time discounting) is $c_0 + X / (1 + R)^T - S_0 = p_0$. Noting that for the forward contract on an asset with no underlying cash flows, $S_0 = FT / (1 + R)^T$, and substituting, we get $c_0 + (X - FT) / (1 + R)^T = p_0$.

Question #88 of 172

Question ID: 464203

Which of the following is *equivalent* to a pay-fixed swap with a tenor of two years with semi-annual swap payments and a fixed rate of 6% (exchanged for LIBOR)? The notional principal is $100,000,000.

✓ **A)** **A strip of three forward rate agreements, which obligates the party to pay a fixed rate of 6% and receive six-month LIBOR on a notional principal of $100,000,000.**

✗ **B)** A forward rate agreement, which obligates the party to pay a fixed rate of 6% and receive six-month LIBOR on a notional principal of $100,000,000.

✗ **C)** A strip of two forward rate agreements, which obligates the party to pay a fixed rate of 6% and receive six-month LIBOR on a notional principal of $100,000,000.

Explanation

In an interest rate swap, the first payment is known with certainty and will be made at month 6. The determination dates for the floating rate will be at months 6, 12, and 18 and the corresponding payment dates will be at months 12, 18, and 24. These correspond to the three forward rate agreements.

Question #89 of 172

Question ID: 464178

Which of the following *best* explains the sensitivity of a call option's value to volatility? Call option values:

✓ **A)** **increase as the volatility of the underlying asset increases because call options have limited risk but unlimited upside potential.**

✗ **B)** are not affected by changes in the volatility of the underlying asset.

✗ **C)** increase as the volatility of the underlying asset increases because investors are risk seekers.

Explanation

A higher volatility makes it more likely that options end up in the money and can be exercised profitably, while the down side risk is strictly limited to the option premium.

Question #90 of 172

Question ID: 464169

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

- ✓ **A) subtracting the present value of the dividend from the current stock price.**
- ✗ **B)** subtracting the future value of the dividend from the current stock price.
- ✗ **C)** adding the present value of the dividend to the current stock price.

Explanation

The option pricing formulas can be adjusted for dividends by subtracting the present value of the expected dividend(s) from the current asset price.

Question #91 of 172

Question ID: 464183

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) historical volatility.**
- ✗ **B)** option volatility.
- ✓ **C)** implied volatility.

Explanation

The question describes the process for finding the expected volatility implied by the market price of the option.

Question #92 of 172

Question ID: 464116

The value of a put option is positively related to all of the following EXCEPT:

- ✗ **A) time to maturity.**
- ✓ **B)** risk-free rate.
- ✗ **C)** exercise price.

Explanation

The value of a put option is negatively related to increases in the risk-free rate.

Question #93 of 172

Question ID: 464140

The price of a June call option with an exercise price of $50 falls by $0.50 when the underlying stock price falls by $2.00. The delta of a June put option with an exercise price of $50 is *closest* to:

- ✗ **A) -0.25.**
- ✗ **B)** 0.25.

✓ **C)** -0.75.

Explanation

The call option delta is:

$$\text{delta}_{\text{call}} = \frac{\$0.50}{\$2.00} = 0.25$$

The put option delta is 0.25 - 1 = -0.75.

Question #94 of 172

Question ID: 464177

Which of the following is *least likely* a common form of external credit enhancement?

✗ **A) A corporate guarantee.**

✗ **B)** Bond insurance.

✓ **C)** Portfolio insurance.

Explanation

External credit enhancements are financial guarantees from third parties that generally support the performance of the bond. Portfolio insurance is not a third party guarantee.

Question #95 of 172

Question ID: 464224

A U.S. firm (U.S.) and a foreign firm (F) engage in a fixed for floating currency swap. The fixed rate at initiation and at the end of the swap was 5%. The variable rate at the end of year 1 was 4%, at the end of year 2 was 6%, and at the end of year 3 was 7%. At the beginning of the swap, $2 million was exchanged at an exchange rate of 2 foreign units per $1. At the end of the swap period the exchange rate was 1.75 foreign units per $1.
At the termination of the swap, on account of exchange of principal, firm F gives firm U.S.:

✗ **A) $1,750,000.**

✓ **B)** $2 million.

✗ **C)** 4 million foreign units.

Explanation

At termination, the notional principal will be exchanged. Firm F gives back what it borrowed, $2 million, and the terminal exchange rate is not used.

Question #96 of 172

Question ID: 464222

Consider a one-year currency swap with semiannual payments. The payments are in U.S. dollars and euros. The current exchange rate of the euro is $1.30 and interest rates are

	180	*360*

	days	days
USD LIBOR	5.6%	6.0%
Euribor	4.8%	5.4%

What is the fixed rate in euros?

✓ **A) 5.318%.**

✗ **B)** 2.659%.

✗ **C)** 5.245%.

Explanation

The present values of 1 euro received in 180 days and 1 euro received in 360 days are:

1/(1 + 0.048 × (180/360)) = 0.9766 and 1/1.054 = 0.9488

The fixed rate in euros is (1 - 0.9488) / (0.9766 + 0.9488) = 0.026592 × (360/180) = 5.318%. The notional principal is 100,000/1.30 = 76,923 euros.

Question #97 of 172

Question ID: 464204

The fixed-rate receiver in a plain vanilla interest rate swap has a position equivalent to a series of:

✗ **A) long interest-rate puts.**

✗ **B)** short interest-puts and long interest-rate calls.

✓ **C)** long interest-rate puts and short interest-rate calls.

Explanation

The fixed-rate receiver has profits when short rates fall and losses when short rates rise, equivalent to buying puts and writing calls.

Question #98 of 172

Question ID: 464243

Cal Smart wrote a 90-day receiver swaption on a 1-year LIBOR-based semiannual-pay $10 million swap with an exercise rate of 3.8%. At expiration, the market rate and LIBOR yield curve are:

> Fixed rate 3.763%
>
> 180-days 3.6%
>
> 360-days 3.8%

The payoff to the writer of the receiver swaption at expiration is *closest* to:

✓ **A) -$3,600.**

✗ **B)** $0.

✗ **C)** $3,600.

Explanation

At expiration, the fixed rate is 3.763% which is below the exercise rate of 3.8%. The purchaser of the receiver swaption will exercise the option which allows them to receive a fixed rate of 3.8% from the writer of the option and pay the current rate of 3.763%.

The equivalent of two payments of (0.038 - 0.03763) × (180/360) × (10,000,000) will be made to the receiver swaption. One payment would have been received in 6 months and will be discounted back to the present at the 6-month rate. One payment would have been received in 12 months and will be discounted back to the present at the 12-month rate

The first payment, discounted to the present is (0.038 - 0.03763) × (180/360) × (10,000,000) × (1/1.018) = $1,817.28.

The second payment, discounted to the present is (0.038 - 0.03763) × (180/360) × (10,000,000) × (1/1.038) = $1,782.27

The total payoff for the writer is -$3,599.55.

Question #99 of 172

Question ID: 464296

In anticipation of an announcement of leveraged buyout of a publicly traded company, which of the following actions would be *most appropriate*?

✓ **A)** **Buy the stock of the company and buy CDS protection on company's debt.**

✗ **B)** Buy both the stock and the bonds of the company.

✗ **C)** Sell protection of the company's bond and buy put options on the company's stock.

Explanation

In the case of a leveraged buyout (LBO), the firm will issue a great amount of debt in order to repurchase all of the company's publicly traded equity. This additional debt will increase the CDS spread because default is now more likely. An investor who anticipates an LBO might purchase both the stock and CDS protection, both of which will increase in value when the LBO happens.

Question #100 of 172

Question ID: 464246

Which of the following statements related to credit risk during the life of a swap is *most accurate*:

✗ **A)** **Credit risk is greatest at the end of the swap term because creditworthiness of the counterparty is likely to have deteriorated since swap initiation.**

✗ **B)** Credit risk is greatest at the beginning of the swap term because there are significant payments yet to be made over the remaining term of the swap.

✓ **C)** Credit risk is greatest in the middle of the swap term when both the creditworthiness of the counterparty may have deteriorated since swap initiation and there are significant payments yet to be made over the remaining term of the swap.

Explanation

Credit risk is greatest in the middle of the swap term when both the creditworthiness of the counterparty may have deteriorated since swap initiation and there are significant payments yet to be made over the remaining term of the swap.

Question #101 of 172

Question ID: 464190

Regarding deep in-the-money options on forwards, it is:

✗ **A)** **sometimes worthwhile to exercise calls early but not puts.**

✗ **B)** sometimes worthwhile to exercise both calls and puts early.

✓ **C)** never worthwhile to exercise puts or calls early.

Explanation

Unlike futures, forwards do not generate any cash at exercise even when they are deep in-the-money so there is no advantage to early exercise.

Question #102 of 172

Question ID: 464188

Which of the following would have the same value at t = 0 as an at-the-money call option on a forward contract priced at FT (the forward price at time = 0)?

✓ **A)** **A put option on the forward at exercise price (X).**

✗ **B)** A put option, long the underlying asset, and short a risk-free bond that matures at X at option expiration.

✗ **C)** A put option, long the underlying asset, and short a risk-free bond that pays X-FT at option expiration.

Explanation

Put-call parity for options on forward contracts is $c_0 + (X - FT) / (1+R)^T = p_0$. Since X = FT for an at-the-money option, the put and the call have the same value for an at-the-money option.

Questions #103-108 of 172

John Fairfax is a recently retired executive from Reston Industries. Over the years he has accumulated $10 million worth of Reston stock and another $2 million in a cash savings account. He hires Richard Potter, CFA, a financial adviser from Stan Morgan, LLC, to help him develop investment strategies. Potter suggests a number of interesting investment strategies for Fairfax's portfolio. Many of the strategies include the use of various equity derivatives. Potter's first recommendation includes the use of a total return equity swap. Potter outlines the characteristics of the swap in Table 1. In addition to the equity swap, Potter explains to Fairfax that there are numerous options available for him to obtain almost any risk return profile he might need. Potter suggests that Fairfax consider options on both Reston stock and the S&P 500. Potter collects the information needed to evaluate options for each security. These results are presented in Table 2.

Table 1: Specification of Equity Swap

Term	3 years
Notional principal	$10 million
Settlement frequency	Annual, commencing at end of year 1
Fairfax pays to broker	Total return on Reston Industries stock
Broker pays to Fairfax	Total return on S&P 500 Stock Index

Table 2: Option Characteristics

	Reston	*S&P 500*
Stock price	$50.00	$1,400.00
Strike price	$50.00	$1,400.00
Interest rate	6.00%	6.00%
Dividend yield	0.00%	0.00%
Time to expiration (years)	0.5	0.5
Volatility	40.00%	17.00%
Beta Coefficient	1.23	1
Correlation	0.4	

Potter presents Fairfax with the prices of various options as shown in Table 3. Table 3 details standard European calls and put options. Potter presents the option sensitivities in Tables 4 and 5.

Table 3: Regular and Options (Option Values)

	Reston	*S&P 500*
European call	$6.31	$6.31
European put	$4.83	$4.83
American call	$6.28	$6.28
American put	$4.96	$4.96

Table 4: Reston Stock Option Sensitivities

	Delta
European call	0.5977
European put	−0.4023
American call	0.5973
American put	−0.4258

Table 5: S&P 500 Option Sensitivities

	Delta
European call	0.622
European put	−0.378
American call	0.621
American put	−0.441

Question #103 of 172

Question ID: 464123

Given the information regarding the various Reston stock options, which option will increase the *most* relative to an increase in the underlying Reston stock price?

✗ **A) American call.**

✓ **B)** European call.

✗ **C)** American put.

Explanation

Using its delta in Table 4, if the Reston stock increases by a dollar the European call on the stock will increase by 0.5977. (Study Session 17, LOS 53.a)

Question #104 of 172

Question ID: 464124

Fairfax is very interested in the total return swap and asks Potter how much it would cost to enter into this transaction. Which of the following is the cost of the swap at inception?

✗ **A)** **$45,007.**

✗ **B)** $340,885.

✓ **C)** $0.

Explanation

Swaps are always priced so that their value at inception is zero. (Study Session 17, LOS 54.a)

Question #105 of 172

Question ID: 464126

Fairfax would like to consider neutralizing his Reston equity position from changes in the stock price of Reston. Using the information in Table 4 how many standard Reston European options would have to be either bought or sold in order to create a delta neutral portfolio?

✗ **A)** **Sell 334,616 put options.**

✗ **B)** Buy 300,703 put options.

✓ **C)** Sell 334,616 call options.

Explanation

Number of call options = (Reston Portfolio Value / Stock PriceReston)(1 / Deltacall).
Number of call options = ($10,000,000 / $50.00/sh)(1 / 0.5977) = 334,616. (Study Session 17, LOS 53.e)

Question #106 of 172

Question ID: 464127

Fairfax remembers Potter explaining something about how options are not like futures and swaps because their risk-return profiles are non-linear. Which of the following option sensitivity measures does Fairfax need to consider to completely hedge his equity position in Reston from changes in the price of Reston stock?

✗ **A)** **Delta and Vega.**

✓ **B)** Delta and Gamma.

✗ **C)** Gamma and Theta.

Explanation

Vega measures the sensitivity relative to changes in volatility. Theta measures sensitivity relative to changes in time to expiration. (Study Session 17, LOS 53.d)

Question #107 of 172

Question ID: 464128

Fairfax has heard people talking about "making a portfolio delta neutral." What does it mean to make a portfolio delta neutral? The portfolio:

- ✗ **A)** **is insensitive to volatility changes in the returns on the underlying equity.**
- ✗ **B)** is insensitive to interest rate changes.
- ✓ **C)** is insensitive to stock price changes.

Explanation

The delta of the option portfolio is the change in value of the portfolio if the stock price changes. A delta neutral option portfolio has a delta of zero. (Study Session 17, LOS 53.e)

Question #108 of 172

Question ID: 464129

After discussing the various equity swap options with Fairfax, Potter checks his e-mail and reads a message from Clark Ali, a client of Potter and the treasurer of a firm that issued floating rate debt denominated in euros at London Interbank Offered Rate (LIBOR) + 125 basis points. Now Ali is concerned that LIBOR will rise in the future and wants to convert this into synthetic fixed rate debt. Potter recommends that Ali:

- ✗ **A)** **enter into a receive-fixed swap.**
- ✓ **B)** enter into a pay-fixed swap.
- ✗ **C)** take a short position in Eurodollar futures.

Explanation

The floating-rate debt will be effectively converted into fixed rate debt if he entered into a pay-fixed swap. A short position in Eurodollar futures would create a hedge, but in the wrong currency. (Study Session 17, LOS 54.d, e)

Question #109 of 172

Question ID: 464237

Wanda Brunner, CFA, is contemplating adding a swaption to her portfolio. Which of the following is least likely her goal?

- ✗ **A)** **interest rate speculation.**
- ✗ **B)** lock in a fixed rate.
- ✓ **C)** provide short-term liquidity.

Explanation

The three primary uses of swaptions are to lock in a fixed rate, interest rate speculation, and swap termination.

Questions #110-115 of 172

Al Bingly, CFA, is a derivatives specialist who attempts to identify and make short-term gains from trading mispriced options. One of the strategies that Bingly uses is to look for arbitrage opportunities in the market for European options. This strategy involves creating a synthetic call from other instruments at a cost less than the market value of the call itself, and then selling the call. During the course of his research, he observes that Hilland Corporation's stock is currently priced at $56, while a European-style put option with a strike price of $55 is trading at $0.40 and a European-style call option with the same strike price is trading at $2.50. Both options have 6 months remaining until expiration. The risk-free rate is currently 4 percent.

Bingly often uses the binomial model to estimate the fair price of an option. He then compares his estimated price to the market price. He observes that Dale Corporation's stock has a current market price of $200, and he predicts that its price will either be $166.67 or $240 in one year. The risk-free rate is currently 4 percent. He also observes that the price of a one-year call with a $220 strike price is $11.11.

Bingly also uses the Black-Scholes-Merton model to price options. His stated rationale for using this model is that he believes the prices of the stocks he analyzes follow a lognormal distribution, and because the model allows for a varying risk-free rate over the life of the option. His plan is to use a statistical technique to estimate the volatility of a stock, enter it into the Black-Scholes-Merton model, and see if the associated price is higher or lower than the observed market price of the options on the stock.

Bingly wishes to apply the Black-Scholes-Merton model to both non-dividend paying and dividend paying stocks. He investigates how the presence of dividends will affect the estimated call and put price.

Question #110 of 172

Question ID: 464104

In the case of the options on Hilland Corporation's stock, if Bingly were to establish a long protective put position, he could:

✓ **A)** **earn an arbitrage profit of $0.03 per share by selling the call and borrowing the remaining funds needed for the position at the risk-free rate.**

✗ **B)** not earn an arbitrage profit because he should short the protective put position.

✗ **C)** earn an arbitrage profit of $0.30 per share by selling the call and lending $57.20 at the risk-free rate.

Explanation

Under put-call parity, the value of the call = put + stock - PV(exercise price). Therefore, the equilibrium value of the call = $0.40 + $56 - $55/($1.04^{0.5}$) = $2.47. Thus, the call is overpriced, and arbitrage is available. If Bingly sells the call for $2.50 and borrows $53.93= $55/($1.04^{0.5}$), he will have $56.43 > $56.40 (= $56 + $0.40), which is the price he would pay for the protective put position. The arbitrage profit is the difference ($0.03 = $56.43 - $56.40).

Question #111 of 172

Question ID: 464105

The one-year call option on Dale Corporation:

✓ **A)** **is overpriced.**

✗ **B)** may be over or underpriced. The given information is not sufficient to give an answer.

✗ **C)** is underpriced.

Explanation

The up movement parameter U=1.20, and the down movement parameter D=0.833. We calculate the probability of an up move π_U = (1 + 0.04 - 0.833)/(1.2 - 0.833) = 0.564. The call is out of the money in the event of a down movement, and has an intrinsic value of $20 in the event of an up movement. Therefore, the estimated value of the call is C = (0.564) × $20 / (1.04) = $10.85. Thus, the price of $11.11 is too high and the call is overpriced.

Question #112 of 172

Question ID: 464106

Bingly's sentiments towards the Black-Scholes-Merton (BSM) model regarding a lognormal distribution of prices and a variable risk-free rate are:

✗ **A)** **correct for both reasons.**

✓ **B)** correct concerning the distribution of stocks but incorrect concerning the risk-free rate.

✗ **C)** incorrect for both reasons.

Explanation

The model requires many assumptions, e.g., the distribution of stock prices is lognormal and the risk-free rate is known and *constant*. Other assumptions are frictionless markets, the options are European, and the volatility is known and constant.

Question #113 of 172

Question ID: 464107

Which of the following is *least* accurate regarding the limitations of the BSM model?

✗ **A)** **The BSM is not useful in pricing options on bonds and interest rates.**

✓ **B)** The BSM is designed to price American options but not European options.

✗ **C)** The BSM is not useful in situations where the volatility of the underlying asset changes over time.

Explanation

The following are limitations of the BSM:

1. The assumption of a known and constant risk free rate means the BSM is not useful for pricing options on bond prices and interest rates.
2. The assumption of a known and constant asset return volatility makes the BSM not useful in situations where the volatility is not constant which occurs much of the time.
3. The assumption of no taxes and transaction costs makes the BSM less useful.
4. The BSM is designed to price European options and not American options.

Question #114 of 172

Question ID: 464108

If Bingly forecasts the volatility for a stock and find that it is significantly greater than that implied by the prices of the puts and calls of the stock, he would conclude that:

✗ **A)** **the puts are overpriced and the calls are underpriced.**

✓ **B)** puts and calls are underpriced.

✗ **C)** puts and calls are overpriced.

Explanation

There is a positive relationship between the volatility of the stock and the price of both puts and calls. A higher estimate of volatility implies that the prices of both puts and calls should be higher.

Question #115 of 172

Question ID: 464110

All else being equal, the greater the dividend paid by a stock the:

✓ **A)** **lower the call price and the higher the put price.**

✗ **B)** higher the call price and the lower the put price.

✗ **C)** lower the call price and the lower the put price.

Explanation

When dividend payments occur during the life of the option, the price of the underlying stock is reduced (on the ex-dividend date). All else being equal, the lower price reduces the value of call options and increases the value of put options.

Question #116 of 172

Question ID: 464295

Which of the following strategies would be *most appropriate* use of CDS given an expectation of credit curve steepening?

✗ **A)** **A curve flattening trade.**

✗ **B)** Engage in a naked CDS.

✓ **C)** A curve steepening trade.

Explanation

A credit curve steepening expectation would entail the credit spread for longer maturities increasing relative to the change in credit spread for shorter maturities. In such a scenario, one would buy protection for longer maturities and sell protection for shorter maturity (i.e., a curve steepening trade).

Question #117 of 172

Question ID: 464232

The writer of a receiver swaption has:

✗ **A)** **the right to enter a swap in the future as the floating-rate payer.**

✗ **B)** an obligation to enter a swap in the future as the floating-rate payer.

✓ **C)** an obligation to enter a swap in the future as the fixed-rate payer.

Explanation

A receiver swaption gives its owner the right to receive fixed, the writer has an obligation to pay fixed.

Question #118 of 172

Question ID: 464248

The credit risk of an interest-rate swap is greatest:

✓ **A)** **at the middle of the term.**

✗ **B)** just before the final payment must be made.

✗ **C)** late in the term.

Explanation

The credit risk in an interest-rate swap is greatest at the middle of the swap.

Question #119 of 172

Question ID: 464130

In order to form a dynamic hedge using stock and calls with a delta of 0.2, an investor could buy 10,000 shares of stock and:

✗ **A)** **buy 50,000 calls.**

✓ **B)** write 50,000 calls.

✗ **C)** write 2,000 calls.

Explanation

Each call will increase in price by $0.20 for each $1 increase in the stock price. The hedge ratio is -1/delta or -5. A short position of 50,000 calls will offset the risk of 10,000 shares of stock over the next instant.

Question #120 of 172

Question ID: 464263

To the issuer of a floating rate note, a cap is equivalent to:

✗ **A) writing a series of interest rate calls.**

✗ **B)** owning a series of calls on a fixed income security.

✓ **C)** owning a series of interest rate calls.

Explanation

The issuer of the note is borrowing at a floating rate, and will have higher interest expenses if rates increase. A cap is equivalent to owning a series of interest rate calls at the cap rate that will pay the difference between the market rate and the cap rate. If interest rates increase, the payoff from the calls will compensate the borrower for the higher interest expenses.

Question #121 of 172

Question ID: 464197

Over the life of a swap, the price of the swap:

✗ **A) is approximately equal to the market value of the swap.**

✗ **B)** fluctuates with changes in the yield curve.

✓ **C)** does not change.

Explanation

The price of a swap, quoted as the fixed rate in the swap, is determined at contract initiation and remains fixed for the life of the swap.

Question #122 of 172

Question ID: 464113

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

✗ **A) There are no cash flows on the underlying asset.**

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

✓ **C)** Changes in volatility are known and predictable.

Explanation

The BSM model assumes that volatility is known and *constant*. The term predictable would allow for non-constant changes in volatility.

Question #123 of 172

Question ID: 464239

Wanda Brunner, CFA, is contemplating adding a swaption to her portfolio. She makes the following two statements about the possible payoffs and cash flows of an interest rate swaption:

Statement 1: Exercising an in-the-money swaption effectively generates an annuity over the term of the underlying swap.

Statement 2: A positive payoff to a receiver swaption each quarter is the interest saved by receiving the higher fixed rate.

Which of the following statements are CORRECT?

- ✗ **A)** **Only statement 1 is correct.**
- ✗ **B)** Only statement 2 is correct.
- ✓ **C)** Both statements are correct.

Explanation

Exercising an in-the-money swaption effectively generates an annuity over the term of the underlying swap. The amount of each annuity payment is the interest savings that result from paying a rate lower than the market rate under a payer swaption or the extra interest that results from receiving a higher rate under a receiver swaption.

Question #124 of 172

Question ID: 464229

Consider a $5 million semiannual-pay floating-rate equity swap initiated when the equity index is 760 and 180-day LIBOR is 3.7%. After 90 days the index is at 767, 90-day LIBOR is 3.4 and 270-day LIBOR is 3.7. What is the value of the swap to the floating-rate payer?

- ✓ **A)** **−$3,526.**
- ✗ **B)** −$2,726.
- ✗ **C)** $3,526.

Explanation

1.0185 = 1 + 0.037(180/360)

1.0085 = 1 + 0.034(90/360)

767/760 - 1.0185/1.0085 = −0.00070579 × 5,000,000 = −$3,526

Note: The 1.0185/1.0085 is the present value of the floating rate side after 90 days.

Question #125 of 172

Question ID: 464213

An off-market forward rate agreement (FRA):

- ✗ **A)** **cannot be priced with market rates.**
- ✗ **B)** provides a series of payments.
- ✓ **C)** has a positive value at contract initiation.

Explanation

An off-market FRA has a contract rate that differs from the zero-value rate at the inception of the contract; by definition, it has a positive value to one of the parties to the FRA.

Question #126 of 172

Question ID: 464112

A bond analyst decides to use the BSM model to price options on bond prices. This model will *most likely* be inadequate because:

- ✓ **A)** **the risk free rate must be constant and known.**
- ✗ **B)** the price of the underlying asset follows a lognormal distribution.
- ✗ **C)** BSM cannot be modified to deal with cash flows like coupon payments.

Explanation

The BSM model is not useful for pricing options on bond prices and interest rates. In those cases, interest rate volatility is a key factor in determining the value of the option. BSM can be modified to deal with cash flows like coupon payments. The assumption that "the price of the underlying asset follows a lognormal distribution" is not applicable.

Question #127 of 172

Question ID: 464164

How is the gamma of an option defined? Gamma is the change in the:

- ✗ **A)** **vega as the option price changes.**
- ✗ **B)** option price as the underlying security changes.
- ✓ **C)** delta as the price of the underlying security changes.

Explanation

Gamma is the rate of change in delta. It measures how fast the price sensitivity changes as the underlying asset price changes.

Question #128 of 172

Question ID: 464293

Which of the following statements regarding settlement protocols with respect to CDS is *least* accurate?

- ✗ **A)** **When there is a credit event, the swap will be settled in cash or by physical delivery.**
- ✓ **B)** When a credit event has occurred, with physical settlement, the protection seller receives the reference obligation and the protection buyer receives the market value of the reference obligation immediately prior to the credit event.
- ✗ **C)** A super majority vote of the declarations committee of ISDA is needed for a credit event to be declared.

Explanation

In case of physical settlement, the protection buyer receives the notional principal and not the market value of the bond prior to the credit event.

Question #129 of 172

Question ID: 464166

When an option's gamma is higher:

✓ **A) a delta hedge will perform more poorly over time.**

✗ **B)** a delta hedge will be more effective.

✗ **C)** delta will be higher.

Explanation

Gamma measures the *rate of change* of delta (a high gamma could mean that delta will be higher or lower) as the asset price changes and, graphically, is the curvature of the option price as a function of the stock price. Delta measures the slope of the function at a point. The greater gamma is (the more delta changes as the asset price changes), the worse a delta hedge will perform over time.

Question #130 of 172

Question ID: 464180

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 long term historical data.

Explanation

The volatility is constant in the Black-Scholes model.

Questions #131-136 of 172

Ronald Franklin, CFA, has recently been promoted to junior portfolio manager for a large equity portfolio at Davidson-Sherman (DS), a large multinational investment-banking firm. He is specifically responsible for the development of a new investment strategy that DS wants all equity portfolio managers to implement. Upper management at DS has instructed its portfolio managers to begin overlaying option strategies on all equity portfolios. The relatively poor performance of many of their equity portfolios has been the main factor behind this decision. Prior to this new mandate, DS portfolio managers had been allowed to use options at their own discretion, and the results were somewhat inconsistent. Some portfolio managers were not comfortable with the most basic concepts of option valuation and their expected return profiles, and simply did not utilize options at all. Upper management of DS wants Franklin to develop an option strategy that would be applicable to all DS portfolios regardless of their underlying investment composition. Management views this new implementation of option strategies as an opportunity to either add value or reduce the risk of the portfolio.

Franklin gained experience with basic options strategies at his previous job. As an exercise, he decides to review the fundamentals of option valuation using a simple example. Franklin recognizes that the behavior of an option's value is dependent on many variables and decides to spend some time closely analyzing this behavior. His analysis has resulted in the information shown in Exhibits 1 and 2 for European style options.

Exhibit 1: Input for European Options	
Stock Price (S)	100

Strike Price (X)	100
Interest Rate (r)	0.07
Dividend Yield (q)	0.00
Time to Maturity (years) (t)	1.00
Volatility (Std. Dev.)(Sigma)	0.20
Black-Scholes Put Option Value	$4.7809

Exhibit 2: European Option Sensitivities		
Sensitivity	*Call*	*Put*
Delta	0.6736	-0.3264
Gamma	0.0180	0.0180
Theta	-3.9797	2.5470
Vega	36.0527	36.0527
Rho	55.8230	-37.4164

Question #131 of 172

Question ID: 464132

Using the information in Exhibit 1, Franklin wants to compute the value of the corresponding European call option. Which of the following is the *closest* to Franklin's answer?

✗ **A)** **$5.55.**

✓ **B)** $11.54.

✗ **C)** $4.78.

Explanation

This result can be obtained using put-call parity in the following way:

> Call Value = Put Value − Xe^{-rt} + S = $4.78 − 100.00e^{(-0.07 \times 1.0)}$ + 100 = $11.54

The incorrect value of $4.78 does not discount the strike price in the put-call parity formula. (Study Session 17, LOS 53.i)

Question #132 of 172

Question ID: 464133

Franklin is interested in the sensitivity of the European call option to changes in the volatility of the underlying equity's returns. What happens to the value of the call option if the volatility of the underlying equity's returns *decreases*? The call option value:

✓ **A)** **decreases.**

✗ **B)** increases or decreases.

✗ **C)** increases.

Explanation

Due to the limited potential downside loss, changes in volatility directly effect option value. Vega measures the option's sensitivity relative to volatility changes. (Study Session 17, LOS 53.d)

Question #133 of 172

Question ID: 464134

Franklin is interested in the sensitivity of the European put option to changes in the volatility of the underlying equity's returns. What happens to the value of the put option if the volatility of the underlying equity's returns *increases*? The put option value:

✗ **A)** **increases or decreases.**

✗ **B)** decreases.

✓ **C)** increases.

Explanation

Due to the limited potential downside loss, changes in volatility directly effect option value. Vega measures the option price sensitivity relative to the volatility of the underlying stock. (Study Session 17, LOS 53.d)

Question #134 of 172

Question ID: 464135

Franklin wants to know how the put option in Exhibit 1 behaves when all the parameters are held constant except the delta. Which of the following is the *best* estimate of the change in the put option's price when the underlying equity increases by $1?

✗ **A)** **−$3.61.**

✓ **B)** −$0.33.

✗ **C)** −$0.37.

Explanation

The correct value is simply the delta of the put option in Exhibit 2.

The incorrect value −$3.61 represents the change due to the volatility divided by 10 multiplied by −1.
The incorrect value −$0.37 calculates the change by dividing the short-term interest rate divided by 100. (Study Session 17, LOS 53.e)

Question #135 of 172

Question ID: 464136

Franklin computes the rate of change in the European put option delta value, given a $1 increase in the underlying equity. Using the information in Exhibits 1 and 2, which of the following is the *closest* to Franklin's answer?

✓ **A)** **0.0180.**

✗ **B)** −0.3264.

✗ **C)** 0.6736.

Explanation

The correct value 0.0180 is referred to as the put option's Gamma.

The incorrect value −0.3264 is the delta of the put option.
The incorrect value 0.6736 is the call option's delta. (Study Session 17, LOS 53.e)

Question #136 of 172

Question ID: 464137

Franklin wants to know if the option sensitivities shown in Exhibit 2 have minimum or maximum bounds. Which of the following are the minimum and maximum bounds, respectively, for the put option delta?

✓ **A)** **−1 and 0.**

✗ **B)** There are no minimum or maximum bounds.

✗ **C)** −1 and 1.

Explanation

The lower bound is achieved when the put option is far in the money so that it moves exactly in the opposite direction as the stock price. When the put option is far out of the money, the option delta is zero. Thus, the option price does not move even if the stock price moves since there is almost no chance that the option is going to be worth something at expiration. (Study Session 17, LOS 53.e)

Question #137 of 172

Question ID: 464115

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

✗ **A) There are no cash flows over the term of the options.**

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

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

Explanation

The yield curve is assumed to be flat so that the risk-free rate of interest is known and *constant* over the term of the option. Having a fixed yield curve does not necessarily imply that the yield curve is flat.

Question #138 of 172

Question ID: 464102

A stock is priced at 40 and the periodic risk-free rate of interest is 8%. The value of a two-period European call option with a strike price of 37 on a share of stock using a binomial model with an up factor of 1.20 is *closest* to:

✗ **A) $9.25.**

✗ **B)** $3.57.

✓ **C)** $9.13.

Explanation

First, calculate the probability of an up move or a down move:
U = 1.20 so D = 0.833

P_u = (1 + 0.08 − 0.833) / (1.20 − 0.833) = 0.673
P_d = 1 − 0.673 = 0.327

Two up moves produce a stock price of 40 × 1.44 = 57.60 and a call value at the end of two periods of 20.60. An up and a down move leave the stock price unchanged at 40 and produce a call value of 3. Two down moves result in the option being out of the money. The value of the call option is discounted back one year and then discounted back again to today. The calculations are as follows:

C^+ = [20.6(0.673) + 3(0.327)] / 1.08 = 13.745

C^- = [3(0.673) + 0 (0.327)] / 1.08 = 1.869

Call value today = [13.745(0.673) + 1.869(0.327)] / 1.08 = 9.13

Question #139 of 172

Question ID: 464210

Which of the following is *equivalent* to a plain vanilla receive-fixed interest rate swap?

✓ **A)** **A long position in a bond coupled with the issuance of a floating rate note.**

✗ **B)** A short position in a bond coupled with a long position in a floating rate note.

✗ **C)** A short position in a bond coupled with the issuance of a floating rate note.

Explanation

A long position in a fixed rate bond pays fixed coupons. The short floating rate note requires floating-rate payments. Together, these are the same cash flow as a receive-fixed swap.

Question #140 of 172

Question ID: 464211

A plain vanilla interest-rate swap to the fixed-rate payer is equivalent to issuing a fixed-rate bond and:

✓ **A)** **buying a floating-rate bond.**

✗ **B)** selling a series of interest rate puts.

✗ **C)** selling a series of interest rate calls.

Explanation

Paying fixed and receiving floating in a swap is equivalent to issuing a fixed-rate bond and investing the proceeds in a floating rate bond.

Question #141 of 172

Question ID: 464252

A swap spread depends primarily on the:

✗ **A)** **shape of the reference rate yield curve.**

✓ **B)** general level of credit risk in the overall economy.

✗ **C)** credit of the parties involved in the swap.

Explanation

The swap spread depends primarily on the general level of credit risk in the overall economy.

Questions #142-147 of 172

Max Perrot, CFA, works for WWF, a mortgage banking company which originates residential mortgage loans. On a monthly basis, WWF issues agency mortgage-backed securities (MBS) backed by their loans. WWF sells the MBS in the open market soon after securitization, but retains the servicing rights to the loans. WWF currently owns the third largest mortgage servicing portfolio in the U.S. Perrot has recently been promoted to Senior Vice President of Asset and Liability Management for WWF. Perrot's new responsibilities encompass hedging WWF's newly created MBS prior to their sale, as well as managing the interest rate exposure on the servicing portfolio. Both types of assets are extremely sensitive to changes in interest rates, though not necessarily in the same manner.

Although WWF has retained all of the servicing rights of its loans in the past, they are not opposed to the selling of portions of the portfolio if market conditions are right. WWF's management wants Perrot in his new position to focus primarily on preserving the value of the servicing portfolio through hedging strategies that are cost effective to execute. Also, any hedge strategy used by Perrot must be extremely liquid in the event that a portion of the servicing portfolio is sold and the hedge needs to be unwound. The upper management of WWF anticipates a period of volatility in interest rates, and they have asked Perrot to project expected returns of a hedged position under a variety of interest rates scenarios.

Perrot's predecessor lacked experience in hedging with swaps and futures contracts, but he had used them periodically with lackluster results. Through his inaction, he had exposed the firm to significant asset and liability mismatch, which had increased dramatically over the past two years as both production and the servicing portfolio had grown. Perrot, on the other hand, had extensive experience with hedging with derivatives in his prior job. He is familiar with executing hedging strategies utilizing not only swap and futures, but also with options such as caps and floors. He decides that before he presents any potential hedging strategy to WWF's management, he would first like to bring them up to speed on the basic hedging concepts. He prepares a brief presentation on the relationships between interest rates and options, and outlines some basic hedging strategies. He anticipates many questions that may arise from his presentation, and prepares a handout in a question and answer format.

Question #142 of 172

Question ID: 464284

Which of the following *best* explains the relationship between interest rate swaps and forward contracts? Interest rate swaps:

✗ **A)** **are equivalent to forward contracts.**

✓ **B)** are equivalent to a series of forward contracts.

✗ **C)** have the same payoff as a package of forward contracts but not the same value.

Explanation

A swap agreement is equivalent to a series of forward contracts. As long as the underlying details are the same, an interest rate swap will have the same payoff and the same value as a series of forward contracts. (Study Session 17, LOS 54.b)

Question #143 of 172

Question ID: 464285

Which of the following *most* accurately describes the relationship between an interest rate floor and a bond option? Buying an interest rate floor is equivalent to:

✗ **A)** **buying a portfolio of put options on a bond.**

✓ **B)** buying a portfolio of call options on a bond.

✗ **C)** selling a portfolio of put options on a bond.

Explanation

For a call option on a fixed-income instrument, if interest rates decrease, the fixed-income instrument's price increases. So the call option value increases. This is the same payoff structure as an interest rate floor, which provides a positive payoff if the interest rate is below the strike rate. (Study Session 17, LOS 55.a)

Question #144 of 172

Question ID: 464286

Assume that a three-year semi-annually settled floor with a strike rate of 8% and a notional amount of $100 million is being analyzed. The reference rate is six-month London Interbank Offered Rate (LIBOR). Suppose that LIBOR for the next four semi-annual periods is as follows:

Period	*LIBOR*

1	7.5%
2	8.2%
3	8.1%
4	8.7%

What is the payoff for the floor for period 1?

✗ **A)** **$500,000.**

✓ **B)** $250,000.

✗ **C)** $0.

Explanation

The payoff for each semi-annual period is computed as follows:

> Payoff = notional amount × (floor rate − six-month LIBOR) / 2

so for period 1:

> = $100 million × (8.0% − 7.5%) / 2 = $250,000

(Study Session 17, LOS 55.b)

Question #145 of 172

Question ID: 464287

Which of the following *best* explains the difference between an interest rate put option and a put option on a fixed income security? The interest rate put option value:

✗ **A)** **increases if interest rates increase just as the value of a put option on a fixed income security increases.**

✗ **B)** decreases if interest rates increase just as the value of a put option on a fixed income security decreases.

✓ **C)** decreases if interest rates increase while the value of a put option on a fixed income security increases if interest rates increase.

Explanation

An interest rate put option pays off the difference between the strike rate and the current interest rate if that difference is positive. So the value of the interest rate option will be high if interest rates decrease below the strike rate. In contrast, a put option on a fixed income security has a high value if interest rates increase because then the fixed-income security's price decreases below the value based strike price. (Study Session 17, LOS 55.a)

Question #146 of 172

Question ID: 464288

A LIBOR based floating rate bond combined with a LIBOR based collar (a short position in an interest rate cap and a long position in an interest rate floor both at the same strike rate) is equivalent to a:

✓ **A)** **fixed-rate bond.**

✗ **B)** pay-fixed swap position.

✗ **C)** call option on a bond.

Explanation

The effective rate above the cap strike and below the floor strike, when combined with the floating rate on a bond, is constant. (Study Session 17, LOS 55.b)

Question #147 of 172

Question ID: 464289

Which of the following is *most likely* a reason why dynamic riskless arbitrage is difficult in real markets?

✓ **A)** **Continuous rebalancing.**

✗ **B)** Securities are subject to insider trading.

✗ **C)** Short sale constraints exist.

Explanation

The continuous rebalancing required with dynamic riskless arbitrage is not practical. For one thing, it leads to significant transaction costs. (Study Session 17, LOS 54.e)

Question #148 of 172

Question ID: 464245

Current and potential credit risk in a swap are:

✗ **A)** **greatest between payment dates.**

✗ **B)** equal at all times over the term of a swap.

✓ **C)** not equal at the inception of the swap.

Explanation

Current credit risk is the risk of not receiving a payment currently due, since there is none at the inception of the swap, current credit risk is zero. Potential credit risk is the risk that payments possibly due in the future will not be made.

Question #149 of 172

Question ID: 464196

The price of an interest rate swap is the:

✓ **A)** **fixed rate of interest.**

✗ **B)** market value of the swap.

✗ **C)** cost to purchase a swap.

Explanation

The price of an interest rate swap is quoted as the rate on the fixed-rate payments. The floating rate is a known reference rate, such as London Interbank Offered Rate (LIBOR), but does not need to be quoted.

Question #150 of 172

Question ID: 464244

The London Interbank Offered Rate (LIBOR) yield curve is:

- 180-days: 5.2%.
- 360-days: 5.4%.

What is the value of a LIBOR-based payer swaption (expiring today) on a $10 million 1-year semi-annual 4.8% swap?

✗ **A) −$50,712.**

✗ **B)** $0.

✓ **C)** $50,712.

Explanation

1. Determine the discount factors.

   180 day: 1 / [1 + (0.052 × (180 / 360))] = 0.974659

   360 day: 1 / [1 + (0.054 × (360 / 360))] = 0.948767

2. Then, plug as follows:

   (1 − 0.9487666) / (0.974659 + 0.9487667) = 0.026637

3. The value of the payer swaption is the savings between the exercise rate and the market rate:

> (0.026637 − 0.024) × (0.97465887 + 0.9487666) × 10,000,000 = $50,712.

Question #151 of 172

Question ID: 464216

A U.S. firm (U.S.) and a foreign firm (F) engage in a four year plain-vanilla annual pay currency swap. The U.S. firm pays fixed in the FC and receives floating in dollars. The fixed rate at initiation and at the end of the swap was 5%. The variable rate at the end of year 1 was 4%, at the end of year 2 was 6%, and at the end of year 3 was 7%. At the beginning of the swap, $2 million was exchanged at an exchange rate of 2 foreign units per $1. At the end of the swap period the exchange rate was 1.75 foreign units per $1.
At the end of year 3, firm F will pay firm U.S.:

✗ **A) 280,000 foreign units.**

✗ **B)** $140,000.

✓ **C)** $120,000.

Explanation

A plain-vanilla currency swap pays floating on dollars and fixed on foreign. The floating rate cash flows on the settlement date are based on the previous period's ending floating interest rate 0.06 x $2,000,000 = $120,000.

Question #152 of 172

Question ID: 464199

For a 1-year quarterly-pay swap, an equivalent position with short puts and long calls would involve:

✗ **A)** **three put-call combinations on the last three settlement dates of the swap.**

✗ **B)** put-call combinations expiring on each of the four settlement dates.

✓ **C)** three put-call combinations expiring on the first three settlement dates of the swap.

Explanation

Interest rate options pay one period after exercise. Options expiring on settlements at t = 1,2,3, will mimic the uncertain swap payments at t = 2,3,4.

Question #153 of 172

Question ID: 464198

The fixed-rate on a semiannual 2-year interest rate swap is *closest* to the:

✗ **A)** **coupon rate on a 2-year par bond with the same credit risk as the fixed-rate payer.**

✓ **B)** coupon rate on a 2-year par bond with the same credit risk as the reference rate.

✗ **C)** current 180-day T-bill rate.

Explanation

The fixed-rate on a swap is calculated using the yield curve for the floating rate reference, usually London Interbank Offered Rate (LIBOR). Therefore, the fixed rate reflects the credit spread of that rate over the riskless rate of return.

Question #154 of 172

Question ID: 464192

Early exercise of in-the-money American options on:

✗ **A)** **both futures and forwards is sometimes worthwhile.**

✗ **B)** forwards is sometimes worthwhile but never is for options on futures.

✓ **C)** futures is sometimes worthwhile but never is for options on forwards.

Explanation

Early exercise of in-the-money American options on futures is sometimes worthwhile because the immediate mark to market upon exercise will generate funds that can earn interest. It is never worthwhile for options on forwards because no funds are generated until the settlement date of the forward contract.

Question #155 of 172

Question ID: 464272

A floor on a floating rate note, from the bondholder's perspective, is equivalent to:

✗ **A)** **writing a series of interest rate puts.**

✓ **B)** owning a series of calls on fixed income securities.

✗ **C)** owning a series of puts on fixed income securities.

Explanation

A floor, which puts a minimum on floating rate interest payments is equivalent to owning calls on fixed income securities which will pay when interest rates fall. Owning interest rate puts, rather than writing them, would be equivalent to the floor. Puts on fixed income securities pay when interest rates increase.

Question #156 of 172

Question ID: 464250

The swap spread will increase with:

✗ **A)** **the variability of interest rates.**

✗ **B)** a deterioration in one party's credit.

✓ **C)** an increase in the credit spread embedded in the reference.

Explanation

The swap spread is the spread between the fixed-rate on a market-rate swap and the Treasury rate on a similar maturity note/bond. Since the fixed rate is calculated from the reference rate yield curve, it is increased as the credit spread embedded in the reference rate yield curve increases.

Question #157 of 172

Question ID: 464207

Suppose a forward rate agreement (FRA) calls for the exchange of six-month LIBOR one year from now for a payment of a fixed rate of interest of 8%. In other words, pay floating and receive fixed. Which of the following structures is *equivalent* to this FRA? A long:

✗ **A)** **call and a short put on LIBOR with a strike rate of 8% and six months to expiration.**

✓ **B)** put and a short call on LIBOR with a strike rate of 8% and twelve months to expiration.

✗ **C)** call and a short put on LIBOR with a strike rate of 8% and twelve months to expiration.

Explanation

The strike rate of the options corresponds to the fixed rate of the FRA. The expiration of the option coincides with the LIBOR determination date.

Question #158 of 172

Question ID: 464191

Which of the following statements is *most accurate*?

✗ **A)** **American options on forwards are more valuable than comparable European options on forwards.**

✓ **B)** American options on futures are more valuable than comparable European options on futures.

✗ **C)** European options on futures are more valuable than comparable American options on futures.

Explanation

Because of the mark-to-market feature of futures contracts, American options on futures are more valuable than comparable European options. The value of American and European options on forwards are the same.

Question #159 of 172

Question ID: 464201

A swap is equivalent to a series of:

✗ **A) interest rate calls.**

✗ **B)** FRAs priced at market rates.

✓ **C)** off-market FRAs.

Explanation

Since the fixed rate on the swap is the same at every settlement date, a series of FRAs at those fixed rates will have values that differ from zero to the extent the fixed rate and the zero-value rate differ. This makes them off-market FRAs.

Question #160 of 172

Question ID: 464117

The value of a European call option on an asset with no cash flows is positively related to all of the following EXCEPT:

✗ **A) time to exercise.**

✗ **B)** risk-free rate.

✓ **C)** exercise price.

Explanation

The value of a call option decreases as the exercise price increases.

Question #161 of 172

Question ID: 464187

Which of the following is a correct specification of put-call parity for options on futures?

✗ **A)** $C_0 + X - \frac{F_T}{(1+R_f)^T} = P_0.$

✗ **B)** $P_0 + X - \frac{F_T}{(1+R_f)^T} = C_0.$

✓ **C)** $C_0 + \frac{(X - F_T)}{(1+R_f)^T} = P_0.$

Explanation

Begin with put-call parity for a stock, $C_0 + \frac{X}{(1+R_f)^T} = P_0 + S_0$, and substitute $\frac{F_T}{(1+R_f)^T}$ for S_0.

Question #162 of 172

Question ID: 464230

Consider a 1-year semiannual equity swap based on an index at 985 and a fixed rate of 4.4%. 90 days after the initiation of the swap, the index is at 982 and London Interbank Offered Rate (LIBOR) is 4.6% for 90 days and 4.8% for 270 days. The value of the swap to the equity payer, based on a $2 million notional value is *closest* to:

✓ **A) $22,564.**

✗ **B)** $22,314.

✗ **C)** −$22,564.

Explanation

$$= \frac{982}{985} - \frac{\frac{0.044}{2}}{1+\left(0.046\times\frac{90}{360}\right)} - \frac{\frac{0.044}{2}}{1+\left(0.048\times\frac{270}{360}\right)} - \frac{1}{1+\left(0.048\times\frac{270}{360}\right)}$$

$$= \frac{982}{985} - \frac{0.022}{1.0115} - \frac{0.022}{1.036} - \frac{1}{1.036}$$

$$= 0.996954 - 0.021750 - 0.021236 - 0.965251$$

$$= -0.0112821 \times 2{,}000{,}000 = -\$22{,}564$$

−$22,564 is the value to the fixed-rate payer, thus $22,564 is the value to the equity return payer.

Question #163 of 172

Question ID: 464181

Which of the following *best* describes the implied volatility method for estimated volatility inputs for the Black-Scholes model? Implied volatility is found:

✗ **A) using the most current stock price data.**

✗ **B)** using historical stock price data.

✓ **C)** by solving the Black-Scholes model for the volatility using market values for the stock price, exercise price, interest rate, time until expiration, and option price.

Explanation

Implied volatility is found by "backing out" the volatility estimate using the current option price and all other values in the Black-Scholes model.

Questions #164-169 of 172

Joel Franklin, CFA, has recently been promoted to junior portfolio manager for a large equity portfolio at Davidson Sherman (DS), a large multinational investment banking firm. The portfolio is subdivided into several smaller portfolios. In general, the portfolios are composed of U.S. based equities, ranging from medium to large-cap stocks. Currently, DS is not involved in any foreign markets. In his new position, he will now be responsible for the development of a new investment strategy that DS wants all of its equity portfolios to implement. The strategy involves overlaying option strategies on its equity portfolios. Recent performance of many of their equity portfolios has been poor relative to their peer group. The upper management at DS views the new option strategies as an opportunity to either add value or reduce risk.

Franklin recognizes that the behavior of an option's value is dependent upon many variables and decides to spend some time closely analyzing this behavior. He took an options strategies class in graduate school a few years ago, and feels that he is fairly knowledgeable about the valuation of options using the Black-Scholes model. Franklin understands that the volatility of the underlying asset returns is one of the most important contributors to option value. Therefore, he would like to know when the volatility has the largest effect on option value. Upper management at DS has also requested that he further explore the concept of a delta neutral portfolio. He must determine how to create a delta neutral portfolio, and how it would be expected to perform under a variety of scenarios. Franklin is also examining the change in the call option's delta as the underlying equity value changes. He also wants to determine the minimum and maximum bounds on the call option delta. Franklin has been authorized to purchase calls or puts on the equities in the portfolio. He may not, however, establish any uncovered or "naked" option positions. His analysis has resulted in the information shown in Exhibits 1 and 2 for European style options.

Exhibit 1	
Input for European Options	
Stock Price (S)	100
Strike Price (X)	100
Interest Rate (r)	0.07
Dividend Yield (q)	0
Time to Maturity (years) (t)	1
Volatility (Std. Dev.) (sigma)	0.2
Black-Scholes Put Option Value	$4.7809

Exhibit 2		
European Option Sensitivities		
Sensitivity	*Call*	*Put*
Delta	0.6736	−0.3264
Gamma	0.0180	0.0180
Theta	−3.9797	2.5470
Vega	36.0527	36.0527
Rho	55.8230	−37.4164

Question #164 of 172

Question ID: 464156

What does it mean to make an options portfolio delta neutral? The option portfolio:

- ✓ **A) is insensitive to price changes in the underlying security.**
- ✗ **B)** moves exactly in line with the stock price.
- ✗ **C)** moves exactly in the opposite direction with the stock price.

Explanation

The delta of the option portfolio is the change in value of the portfolio if the underlying stock price changes. A delta neutral option portfolio has a delta of zero. (Study Session 17, LOS 53.e)

Question #165 of 172

Question ID: 464157

Which of the following *most* accurately describes the sensitivity of the call option's delta to changes in the underlying asset's price? The sensitivity to changes in the price of the underlying is the greatest when the call option is:

- ✓ **A) at the money.**
- ✗ **B)** in the money.
- ✗ **C)** it depends on the other inputs.

Explanation

When the option is at the money, delta is most sensitive to changes in the underlying asset's price. (Study Session 17, LOS 53.f)

Question #166 of 172

Question ID: 464158

Which of the following *most* accurately describes when the call option delta reaches its minimum bound? The call option reaches its minimum bound when call option is:

✓ **A)** **far out of the money.**

✗ **B)** at the money.

✗ **C)** the option's delta has no minimum bound.

Explanation

When a call option is far out of the money its value is insensitive to changes in value of the underlying. This is because the chances that it is going to end up in the money at expiration are very small. (Study Session 17, LOS 53.e)

Question #167 of 172

Question ID: 464159

If the portfolio has 10,000 shares of the underlying stock and he wants to completely hedge the price risk using options, what kind of options should Franklin buy?

✗ **A)** **Call options.**

✗ **B)** Call and put options.

✓ **C)** Put options.

Explanation

Buying put options will allow Franklin to completely hedge the stock price risk. (Study Session 17, LOS 53.e)

Question #168 of 172

Question ID: 464160

Compute the number of shares of stock necessary to create a delta neutral portfolio consisting of 100 long put options in Exhibit 2 and the stock.

✗ **A)** **67.36.**

✗ **B)** −32.64.

✓ **C)** 32.64.

Explanation

This is simply −100 times the put option delta. Since each share has a delta of 1, we only need 32.64 shares (long) to create a delta neutral portfolio. (Study Session 17, LOS 53.e)

Question #169 of 172

Question ID: 464161

Compute the number of shares of stock necessary to create a delta neutral portfolio consisting of 100 long call options in Exhibit 2 and the stock.

✗ **A)** **67.36.**

✗ **B)** −32.64.

✓ **C)** −67.36.

Explanation

This is simply −100 times the call option delta. Since each share has a delta of 1, we only need −67.36 (short) shares to create a delta neutral portfolio. (Study Session 17, LOS 53.e)

Question #170 of 172

Question ID: 464223

The current U.S. dollar ($) to Canadian dollar (C$) exchange rate is 0.7. In a $1 million currency swap, the party that is entering the swap to hedge existing exposure to C$-denominated fixed-rate liability will:

✗ **A)** **pay floating in C$.**

✗ **B)** receive floating in C$.

✓ **C)** pay C$1,428,571 at the beginning of the swap.

Explanation

The party that is entering the swap to hedge existing exposure to C$-denominated fixed-rate liability will want to receive-fixed C$. They will pay 1,000,000/0.7 = C$1,428,571 (principal) at swap inception (in exchange for USD 1 million) and get the same amount (C$1,428,571) back at termination (in exchange for paying back the USD 1 million).

Question #171 of 172

Question ID: 464206

Suppose a forward rate agreement (FRA) calls for the exchange of six-month London Interbank Offered Rate (LIBOR) two years from now for a payment of a fixed rate of interest of 6%. Which of the following structures is equivalent to this long FRA? A long:

✗ **A)** **put and a short call on LIBOR with a strike rate of 6% and two years to expiration.**

✗ **B)** call on LIBOR with a strike rate of 6% and eighteen months to expiration.

✓ **C)** call and a short put on LIBOR with a strike rate of 6% and two years to expiration.

Explanation

The strike rate of the options corresponds to the fixed rate of the FRA. The expiration of the option coincides with the determination date of the LIBOR-based payment which is paid two years from now.

Question #172 of 172

Question ID: 464241

Consider a 3-year quarterly-pay bond to be issued in 180 days with a 7% coupon. A 180-day put option on this bond, with an exercise price rate of 7%, has a payoff equal to that of a:

✗ **A)** **receiver swap.**

✓ **B)** payer swaption.

✗ **C)** receiver swaption.

Explanation

The payoff on a payer swaption is equivalent to that of a put option on a bond as described in the question. A payer swaption is the right to enter into a specific swap at some date in the future as the fixed-rate payer at a rate specified in the swaption. If swap fixed rates increase (as interest rates increase), the right to enter the pay-fixed side of a swap (a payer swaption) becomes more valuable. Similarly, when rates increase, bond prices fall and a put option on the bond becomes more valuable. Consider that a put option on a bond gives one a right to sell the bond at a fixed price. One would exercise the put option only if the market price of the bond is lower than the exercise price of the put option.