

True/False or Fill in the Blank (2 points each)

1. T F A futures trader's margin account is settled only when the contract is offset.
2. T F Basis patterns reflect local market conditions rather than national or global markets.
3. T F In the futures market it is possible for buyers to make more money than sellers lose.
4. T F Option premiums are set at predetermined levels by the exchange.
5. T F Futures contracts are legally binding contracts to make or take delivery of the commodity.
6. T F Options contracts are on the underlying futures contract and not the commodity itself.
7. T F Because options only involve puts and calls, they offer limited potential for speculators.
8. T F Futures buyers have limited risk and unlimited potential, and it is the opposite for sellers.
9. Basis is the difference between the cash price and the futures price.
10. A put option contains the right to sell a futures contract.
11. Hedgers are willing to make or take physical delivery because they are producers or users of the commodity.
12. Speculators have no use for the physical commodity and are attempting to profit from price movements.
13. Brokers exercise trades and are paid a commission.

Short Answer (6 points each)

14. Name 3 of the 5 factors that affect the value of an option premium.

- 1) The strike price of the option
- 2) The futures price
- 3) The volatility of the futures price
- 4) The time of maturity of the option
- 5) The interest rate

15. On Feb. 18th, December 2011 Live Cattle futures were priced at \$120.20 per cwt. Given that futures price, is a \$118 put option in-the-money or out-of-the-money? Is a \$116 call option in-the-money or out-of-the-money? What is the intrinsic value for both of these options?

The \$118 put is out-of-the-money and has an intrinsic value of \$0.00.

The \$116 call is in-the-money and has an intrinsic value of \$4.20, \$120.20 - \$116.00.

Matching (2 points each)

Answer questions matching the following action to the appropriate statement. Terms may be used more than once.

- | | |
|-----------------------|----------------------------|
| a) Sell a call option | d) Buy a put option |
| b) Buy a call option | e) Sell a futures contract |
| c) Sell a put option | f) Buy a futures contract |

16. f Benefit from a price increase, but hurt by a price decrease.
17. a Receive a premium, but maybe obligated to sell a futures contract at the strike price.
18. b Have the right, but not the obligation, to buy a futures contract at the strike price.
19. e Receive payment into a margin account if futures price decreases.
20. d Limited risk if futures prices rise, but unlimited profit potential if they fall.
21. c Known profit for futures prices above the strike price, but unlimited losses otherwise.
22. b Protects buyer of commodity from higher prices but doesn't prevent lower prices.
23. d Have the right, but not the obligation, to sell a futures contract at the strike price.
24. f Must pay into a margin account if futures price decreases.

Margins (12 points)

25. I am a hedger that went short on November 2011 soybeans on Jan. 24, 2011. Fill out my margin account for one futures contract.

Date	Futures Price	Gain/Loss	Margin Call	Account Balance
2/14/2011	\$13.655	X	X	\$3,250.00
2/15/2011	\$13.3275	\$1,637.50 (13.655-13.3275)*5000	\$0.00	\$4,887.50
2/16/2011	\$13.2875	\$200.00 (13.3275-13.2875)*5000	\$0.00	\$5,087.50
2/17/2011	\$13.735	-\$2,237.50 (13.2875-13.735)*5000	\$400.00 (3250-2850)	\$3,250.00
2/18/2011	\$13.42	\$1,575.00 (13.735-13.42)*5000	\$0.00	\$4,825.00

Ranking (16 points)

26. A farrow-to-finish hog producer will have 1,000 hogs to sell in December. He plans to buy 10,000 bushels of corn to finish the hogs and will use the December lean hog and corn futures and options to manage price risk. This farmer is a hedger and has two concerns 1) rising corn prices and 2) falling hog prices. These prices are available on February 18, 2011.

Dec. '11 Corn (Prices and Premiums in \$/bu.)			Dec '11 Lean Hogs (Prices and Premiums in \$/cwt.)		
Futures Price	6.12		Futures Price	84.50	
Expected Basis	-0.30		Expected Basis	-2.00	
Strike Price	Option Premiums		Strike Price	Option Premiums	
	Put	Call		Puts	Calls
6.00	0.68	0.80	80.00	3.67	8.15
6.10	0.74	0.76	82.00	4.45	6.92
6.20	0.80	0.73	84.00	5.30	5.80
6.30	0.86	0.68	86.00	6.22	4.75
6.40	0.92	0.64	88.00	7.25	3.82

Using this data and ignoring commissions he has calculated the following marketing alternatives.

Hogs:

Expected Hedged Price = \$82.50

Expected Floor Price:

- Buy \$80 Put = \$74.33
- Buy \$82 Put = \$75.55
- Buy \$84 Put = \$76.70
- Buy \$86 Put = \$77.78
- Buy \$88 Put = \$78.75

Corn:

Expected Hedged Price = \$5.82

Expected Ceiling Price:

- Buy \$6.00 Call = \$6.50
- Buy \$6.10 Call = \$6.56
- Buy \$6.20 Call = \$6.63
- Buy \$6.30 Call = \$6.68
- Buy \$6.40 Call = \$6.74

Now it is December 1, 2011. The basis is as expected. Complete the table below by ranking the producer's **net price** for corn and hogs for the different futures scenarios indicated. Rank the strategy with the **best net price** for the producer as 1, the 2nd best net price as 2, and so on.

	Corn Prices		Hog Prices	
	\$4.00	\$8.00	\$60.00	\$100.00
Futures on 12/1/11				
Taking the cash price	1	4	4	1
Using a futures hedge	4	1	1	4
Using an in-the-money option	3	2	2	3
Using an out-of-the-money option	2	3	3	2

For corn, the producer's best net price is the lowest price.

If corn futures are at \$4.00, then the cash price is \$3.70 (Futures price + Basis). The futures hedge has a net price of \$5.82 (Original futures price + Basis). An in-the-money call option, like the \$6.00 call, has a net price of \$4.50, the \$3.70 cash price plus the \$0.80 call premium. An out-of-the-money call option, like the \$6.40 call, has a net price of \$4.34, the \$3.70 cash price plus the \$0.64 call premium.

If corn futures are at \$8.00, then the cash price is \$7.70. The futures hedge has a net price of \$5.82 (Original futures price + Basis). An in-the-money call option, like the \$6.00 call, has a net price of \$6.50, the ceiling price from the call option ($\$6.00 - \$0.30 + \$0.80$, Strike price + Basis + Premium). An out-of-the-money call option, like the \$6.40 call, has a net price of \$6.74, the ceiling price from the call option ($\$6.40 - \$0.30 + \$0.64$, Strike price + Basis + Premium).

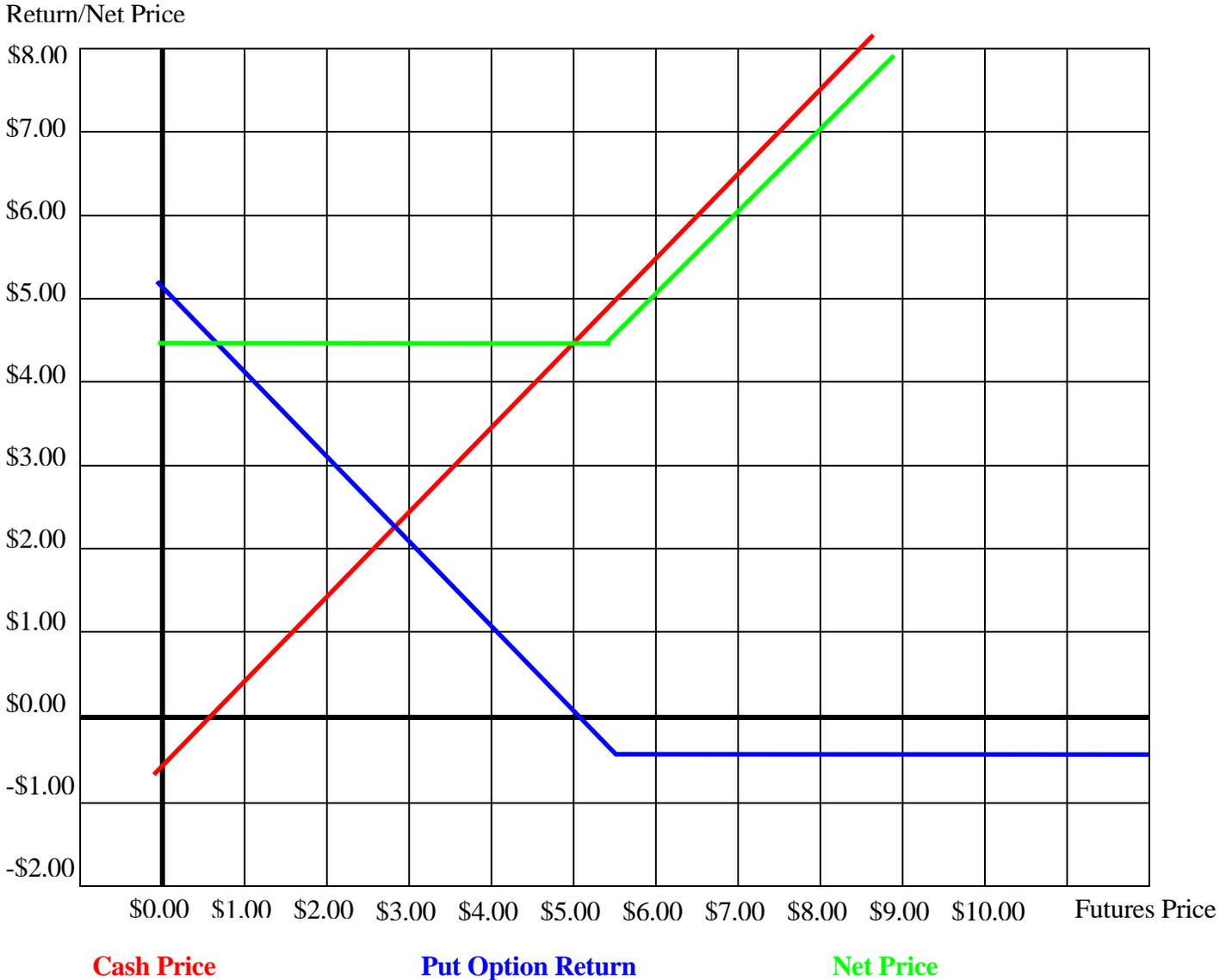
For hogs, the producer's best net price is the highest price.

If hog futures are at \$60.00, then the cash price is \$58.00 (Futures price + Basis). The futures hedge has a net price of \$82.50 (Original futures price + Basis). An in-the-money put option, like the \$88.00 put, has a net price of \$78.75, the floor price from the put option ($\$88.00 - \$2.00 - \$7.25$, Strike price + Basis - Premium). An out-of-the-money put option, like the \$80.00 put, has a net price of \$74.33, the floor price from the put option ($\$80.00 - \$2.00 - \$3.67$, Strike price + Basis - Premium).

If hog futures are at \$100.00, then the cash price is \$98.00 (Futures price + Basis). The futures hedge has a net price of \$82.50 (Original futures price + Basis). An in-the-money put option, like the \$88.00 put, has a net price of \$90.25, the \$98.00 cash price less the \$7.25 put premium. An out-of-the-money put option, like the \$80.00 put, has a net price of \$94.33, the \$98.00 cash price less the \$3.67 put premium.

Math and Graph (16 points, please show your work)

27. A corn producer is looking to put a floor price on her upcoming production. She buys a \$5.50 put option on Dec. 2011 corn. The premium for the option is \$0.42 and the commission is 2 cents per bushel. When she offsets or exercises the option, there is no additional commission. She expects a harvest time basis of -\$0.50 per bushel. Please graph the relevant price, option return, and net price lines. What is her floor price? At what price does she breakeven on the option? If the Dec. 2011 corn futures price falls to \$5.25 and the harvest time basis in -\$0.50, what is her net price?



Her floor price from the \$5.50 put is \$4.56 ($\$5.50 - \$0.50 - \$0.42 - \0.02 , Strike price + Basis - Premium - Commission). She breaks even on the put option at \$5.06 ($\$5.50 - \$0.42 - \0.02, Strike price - Premium - Commission). If the Dec. 2011 corn futures price falls to \$5.25 and the harvest time basis in -\$0.50, her net price is \$4.56, the \$4.75 cash price (Futures price + Basis) less the

\$0.19 option loss. At a futures price of \$5.25, the put option returns \$0.25 ($\$5.50 - \5.25), but she paid \$0.44 in premium and commission for the option. So the net return on the option is $-\$0.19$ ($\$0.25 - \0.44).

Extra Credit (5 points)

In question #27, assume that Dec. 2011 corn futures are currently \$6.12. At expiration, how high would futures prices have to be before the \$5.50 put would have a higher net price than hedging in the futures?

If the current futures price is \$6.12, then she could hedge by selling Dec. 2011 corn futures. Her hedged price would be \$5.60 ($\$6.12 - \$0.50 - \0.02, Futures price + Basis - Commission). Based on my graph, the net price line rises above \$5.60 when futures prices are somewhere in the \$6.50 range. When futures prices are in the \$6.50 range, I know the put option will expire with no value, so we need the cash price minus the put option premium and commission to be \$5.60 or higher for the option strategy to have a higher net price than hedging. Since the put option premium and commission are \$0.44, the cash price would need to be at \$6.04 or higher. Given a basis of $-\$0.50$, then the futures price must be at \$6.54 or higher for the option strategy to have a higher net price than hedging.

Or another way to look at it is that at the strike price of \$5.50 the vertical difference between the put floor price (\$4.56) and the futures hedge price (\$5.60) is \$1.04. Because the cash and put net price line is at a 45 degree angle, rise = run so the futures price where the option strategy intersects the hedged price (futures) is \$6.54 (strike price + hedge price - floor price = $\$5.50 + 5.60 - \4.56).