

46. You are to price options on a futures contract. The movements of the futures price are modeled by a binomial tree. You are given:
- (i) Each period is 6 months.
 - (ii) $u/d = 4/3$, where u is one plus the rate of gain on the futures price if it goes up, and d is one plus the rate of loss if it goes down.
 - (iii) The risk-neutral probability of an up move is $1/3$.
 - (iv) The initial futures price is 80.
 - (v) The continuously compounded risk-free interest rate is 5%.

Let C_I be the price of a 1-year 85-strike European call option on the futures contract, and C_{II} be the price of an otherwise identical American call option.

Determine $C_{II} - C_I$.

- (A) 0
 - (B) 0.022
 - (C) 0.044
 - (D) 0.066
 - (E) 0.088
47. Several months ago, an investor sold 100 units of a one-year European call option on a nondividend-paying stock. She immediately delta-hedged the commitment with shares of the stock, but has not ever re-balanced her portfolio. She now decides to close out all positions.
- You are given the following information:
- (i) The risk-free interest rate is constant.
 - (ii)

	Several months ago	Now
Stock price	\$40.00	\$50.00
Call option price	\$ 8.88	\$14.42
Put option price	\$ 1.63	\$ 0.26
Call option delta	0.794	

The put option in the table above is a European option on the same stock and with the same strike price and expiration date as the call option.

Calculate her profit.

- (A) \$11
- (B) \$24
- (C) \$126
- (D) \$217
- (E) \$240

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49. You use the usual method in McDonald and the following information to construct a one-period binomial tree for modeling the price movements of a nondividend-paying stock. (The tree is sometimes called a forward tree).

- (i) The period is 3 months.
- (ii) The initial stock price is \$100.
- (iii) The stock's volatility is 30%.
- (iv) The continuously compounded risk-free interest rate is 4%.

At the beginning of the period, an investor owns an American put option on the stock. The option expires at the end of the period.

Determine the smallest integer-valued strike price for which an investor will exercise the put option at the beginning of the period.

- (A) 114
- (B) 115
- (C) 116
- (D) 117
- (E) 118