

CONCEPT NOTE • HULL CH 10

A right for the buyer, an obligation for the writer

How calls and puts work. What the four basic positions pay, how to read a real option chain, what a stock split does to your contract, and why only the writer posts margin.

THE IDEA

An option splits a trade in two. The buyer pays a premium for a right they will use only if it pays. The writer collects that premium and takes on the obligation to perform. Every shape and rule in this note, from capped and uncapped losses to who posts margin, follows from that asymmetry.

Calls and puts

A **call** gives its holder the right to buy the underlying at a fixed **strike price** on or before the expiry date. A **put** gives the right to sell. A **European** option can be exercised only at expiry, an **American** one on any day up to it. Listed US stock options are American; options on the S&P 500 index itself are European and settle in cash.

Write S_0 for the share price today, S_T for the price at expiry, K for the strike, and c and p for the call and put premiums, all in dollars per share. The holder exercises only when it pays, so at expiry:

$$\text{call payoff} = \max(S_T - K, 0) \quad \text{put payoff} = \max(K - S_T, 0)$$

Payoff is not profit. The buyer's profit is the payoff minus the premium paid up front. The writer's payoff is the buyer's with the sign flipped, and the writer's profit adds back the premium received. (This ignores interest on the premium, which over a few weeks is pennies.)

The four positions

- **Long call.** The most you can lose is the premium. The upside has no ceiling. Breakeven is $K + c$.
- **Long put.** Loss is again capped at the premium, and the gain is capped too, at $K - p$, only because the stock cannot fall below zero. Breakeven is $K - p$.
- **Short call and short put.** The writer's diagram is the buyer's turned upside down. The best case is keeping the premium. The short call's loss has no limit; the short put can lose up to $K - p$.

Add a long call and a short put at the same strike and the kinks cancel: you get a straight line through K , which is a long forward struck at K . That observation is the starting point for put-call parity.



The four basic positions on the Apple November 335 strike, using the mid prices from the chain below (call 12.05, put 11.25). Dots mark breakeven.

Moneyiness, intrinsic value and time value

An option is **in the money** if exercising it now would pay (a call with $S_0 > K$, a put with $S_0 < K$), **at the money** if S_0 is close to K , and **out of the money** otherwise. Its **intrinsic value** is what exercise would pay today: $\max(S_0 - K, 0)$ for a call and $\max(K - S_0, 0)$ for a put. Everything above that is **time value**, the price of the chance that the option is worth more by expiry. It shrinks to zero as expiry arrives.

An option chain lists one row per strike, calls on one side and puts on the other. Beyond the bid and ask, three things on it matter, shown here from the same Apple chain as the box below:

- **Last** is the last trade, which can be stale. The November 355 put last traded at 25.12 while it was quoted 23.05 / 24.30: one contract had changed hands all day. Trade off the bid and ask, not the last.
- **Volume** is contracts traded today. **Open interest** is contracts still outstanding. By noon the November 340 call had traded 2,509 contracts against open interest of 13,029. Every open contract has a writer, so open interest rises when a new buyer meets a new writer and falls when either closes out.
- **Expiries.** The Apple chain listed 25 expiry dates that day, from same-day options out to January 2029. Standard monthly options expire on the third Friday.

REAL MARKET DATA

Apple, quotes from Friday, October 9, 2026, about noon ET (CBOE, 15-minute delayed). Stock at 334.63. Options expiring Friday, November 20, 2026, 42 days away. Prices are per share; one contract covers 100 shares. Time value is measured from the mid of bid and ask.

STRIKE	CALL BID / ASK	INTRINSIC	TIME VALUE	PUT BID / ASK	INTRINSIC	TIME VALUE
320	21.05 / 21.55	14.63	6.67	5.55 / 5.70	0	5.63
335	11.95 / 12.15	0	12.05	11.10 / 11.40	0.37	10.88
350	5.55 / 5.80	0	5.68	19.75 / 20.35	15.37	4.68

- The 320 call is in the money and the 350 call out of it; for puts, the reverse. At 335 both are at the money.
- **Time value peaks at the money:** 12.05 on the 335 call against 6.67 and 5.68 either side. That is where the outcome is least certain.
- Buying one 335 call costs the ask times 100, \$1,215. Selling one brings in the bid, \$1,195. A round trip costs \$20 before the stock moves at all.

When the company changes the shares

The rule behind every adjustment: **the total value of your position should not change because of something the company did.**

- An ***n*-for-*m* split** multiplies the shares per contract by n/m and multiplies the strike by m/n . A put on 100 shares at 90, after a 3-for-1 split, is a put on 300 shares at 30. Both are 9,000 of total strike.
- A **stock dividend** is a split in different clothes: a 25% stock dividend turns 4 shares into 5, so it is a 5-for-4 split.
- An **ordinary cash dividend changes nothing**. It is expected, so it is already in the option's price; adjusting the contract as well would compensate the holder twice. A large, unexpected special dividend can trigger an adjustment.

In practice the US clearing house handles whole-number splits by multiplying the number of contracts and dividing the strike, so each contract still covers 100 shares: when Apple split 4-for-1 in August 2020, every Apple option became four options at a quarter of the strike. A fractional split such as 3-for-2 instead changes the deliverable to 150 shares per contract, which is why chains sometimes show oddly labeled “adjusted” series.

Writing options, and why only the writer posts margin

Go back to the short call: capped gain, unlimited loss. That shape is the reason for margin. The **buyer** pays the premium in full and owes nothing more, so there is nothing to secure and no margin. The **writer** has an obligation that grows as the market moves against them, so the broker requires collateral and marks it to market daily, as a futures clearing house does.

A **covered call**, written on shares you already own, is pre-funded: the shares are there to deliver, so it needs no further margin. A **naked** option is the case the rules target. The standard exchange minimum for a naked equity option is the premium received plus 20% of the share price, less any amount by which the option is out of the money, with a floor of the premium plus 10% of the share price (10% of the strike, for a put). Brokers often ask for more.

WORKED EXAMPLE

Write one Apple November 350 call naked at the bid of 5.55. With the stock at 334.63 the call is 15.37 out of the money. Per share:

$$5.55 + 0.20 \times 334.63 - 15.37 = 57.11 \quad \text{floor: } 5.55 + 0.10 \times 334.63 = 39.01$$

The larger number applies: \$5,710.60 per contract, of which the \$555 premium you collected is part.

What the diagrams leave out

- **Early assignment.** A writer of an American option can be assigned on any day, not only at expiry. Exercise notices are allocated among writers at random.
- **Automatic exercise.** At expiry, an option in the money by a cent or more is exercised for you unless you say otherwise. An in-the-money option you forgot about, long or short, becomes a stock position on Monday.

CHECK YOURSELF

1. You buy a put with strike 60 for 3.40. The stock ends at 52. What is your profit per share and per contract, and where is breakeven?
2. You write a put with strike 40 for 1.85. What are the breakeven and the largest possible loss on one contract?
3. You hold a put on 100 shares with strike 48. What do you hold after (a) a 3-for-2 split, (b) instead, a 20% stock dividend, (c) instead, a cash dividend of 0.50?
4. A stock trades at 80. You write one naked call with strike 85 for 2.10. What is the standard minimum margin?

ANSWERS

1. Payoff $60 - 52 = 8.00$, profit $8.00 - 3.40 = 4.60$ a share, \$460 a contract. Breakeven $60 - 3.40 = 56.60$.
2. Breakeven $40 - 1.85 = 38.15$. The worst case is the stock going to zero: $(40 - 1.85) \times 100 = \$3,815$.
3. After the split, 150 shares at 32. After the stock dividend, which is a 6-for-5 split, 120 shares at 40. After the cash dividend, unchanged: 100 shares at 48. Total strike is 4,800 in every case.
4. $2.10 + 0.20 \times 80 - (85 - 80) = 13.10$, against a floor of $2.10 + 8.00 = 10.10$. Margin is \$1,310.