Akuna Capital Options Trading 101 - Section 2 Notes

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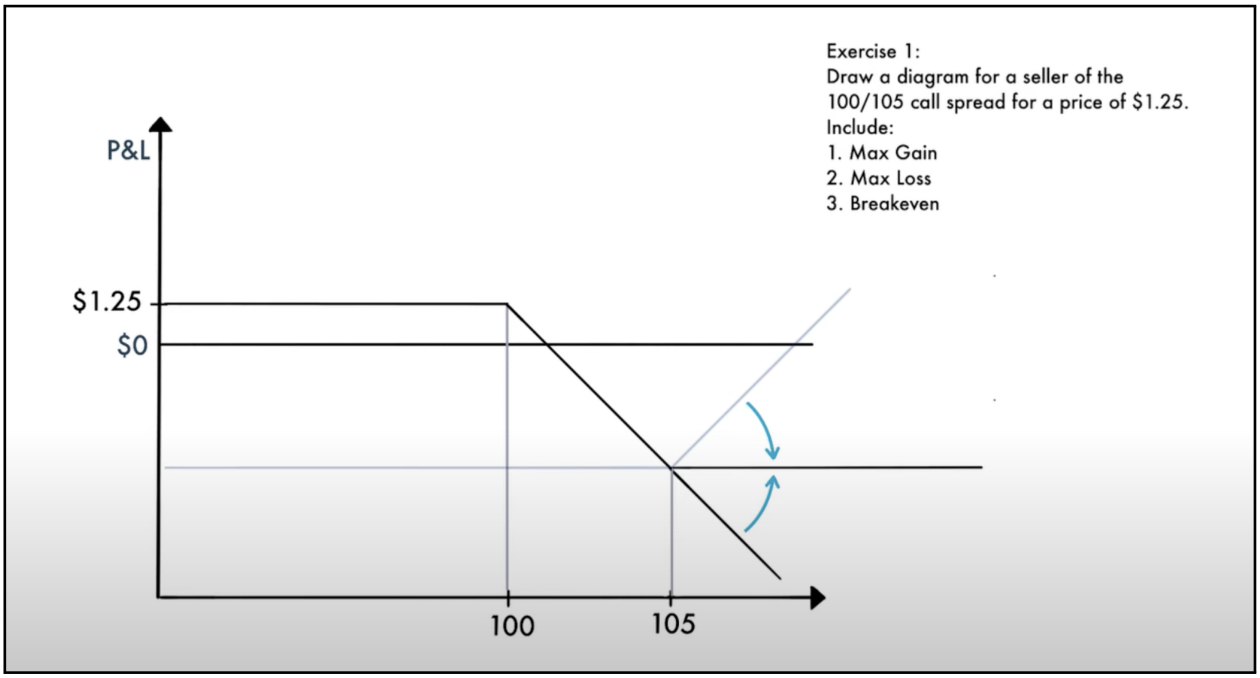
Payoff Diagrams



Great question.

In a **bull call spread** (or **bear call spread** for the seller), the **maximum intrinsic value** of the spread is:

$$K_2 - K_1$$

because that is the **largest possible difference** in value between the two strike prices **at expiration**.

Here's why:

You're dealing with a **call spread** that includes:

- A **short call at** $K_1 = 100$ (you sold this)
- A **long call at** $K_2 = 105$ (you bought this)

At expiration, there are only three scenarios:

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1. Underlying ≤ 100

Both calls expire worthless.
→ Intrinsic value = 0.

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2. 100 < Underlying < 105

- The 100 call is in the money.
- The 105 call is out of the money.

→ The spread's intrinsic value = Underlying – 100.

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3. Underlying ≥ 105

- Both calls are in the money.
- The 100 call has value: Underlying – 100.
- The 105 call has value: Underlying – 105.

Since you are **short the 100 call** and **long the 105 call**, your **net payoff** is:

$$(105 - \text{Underlying}) - (100 - \text{Underlying}) = 5$$

So the **spread's total value caps out at**:

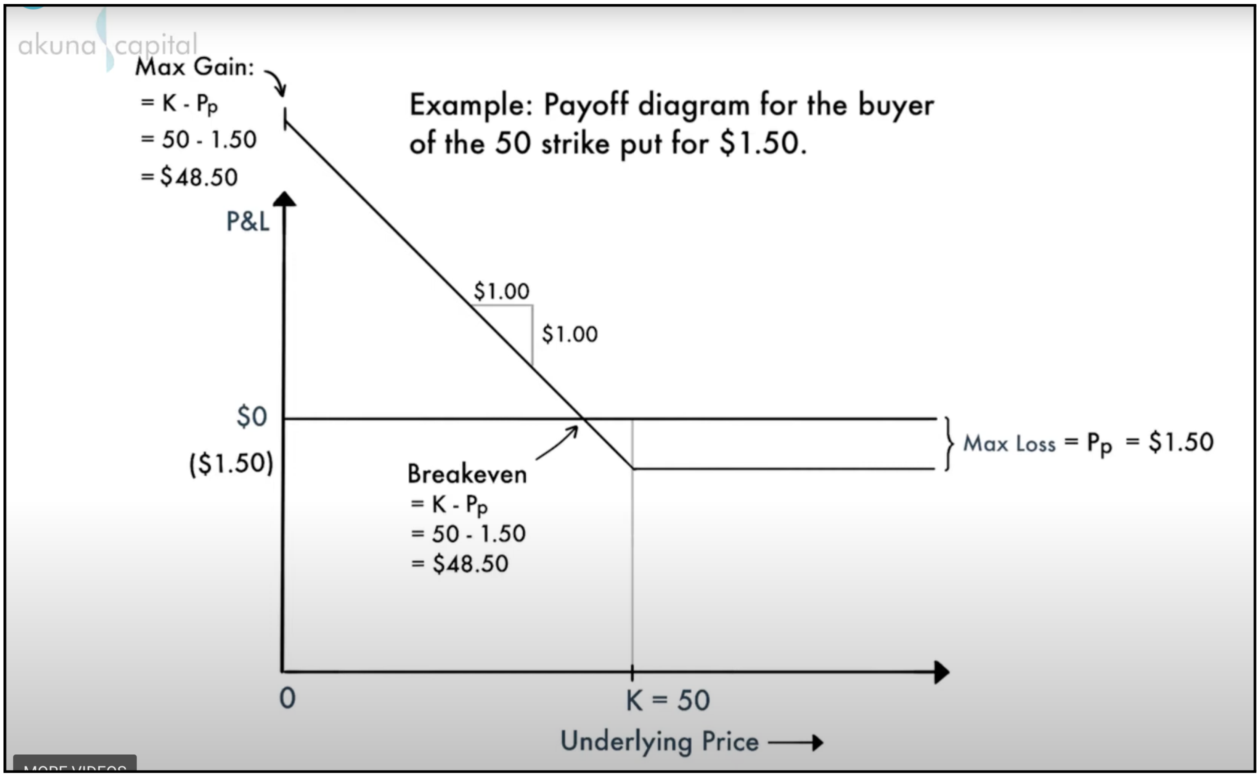
$$K_2 - K_1 = 105 - 100 = 5$$

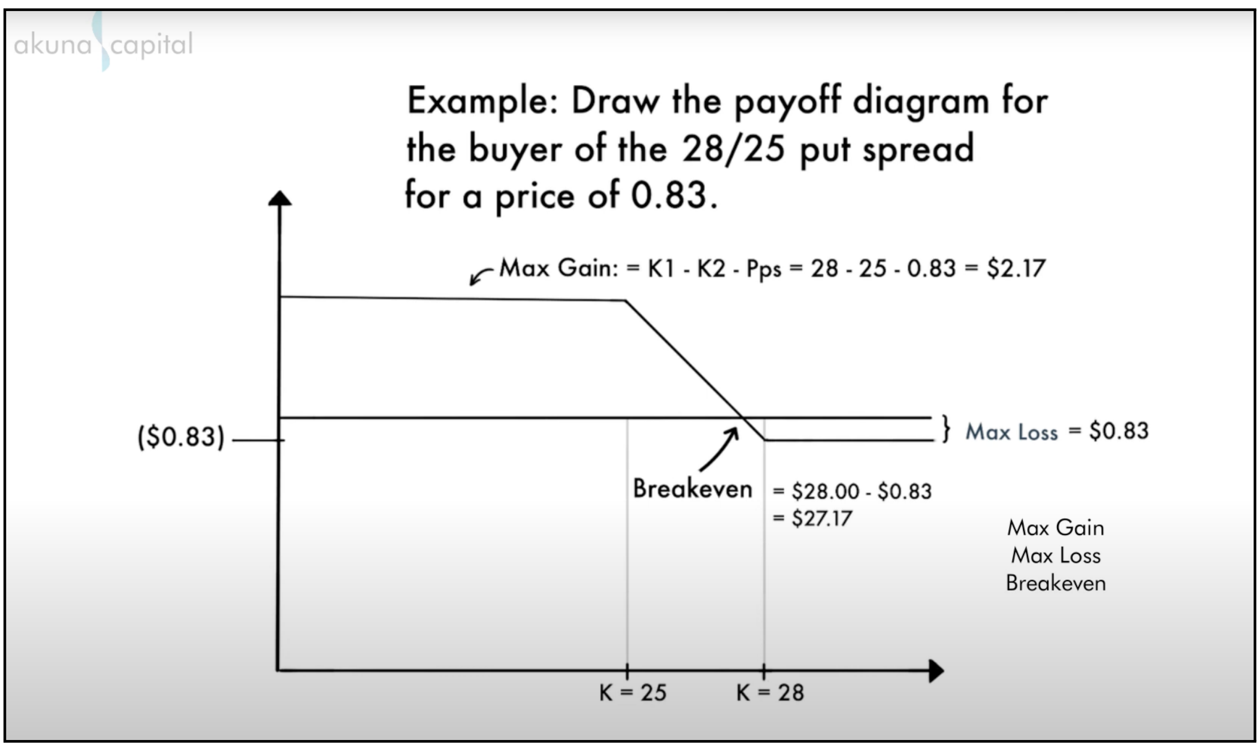
This is the **maximum possible intrinsic value** because beyond that point, both options gain value equally, and the difference between their payoffs stays fixed at 5.

Therefore:

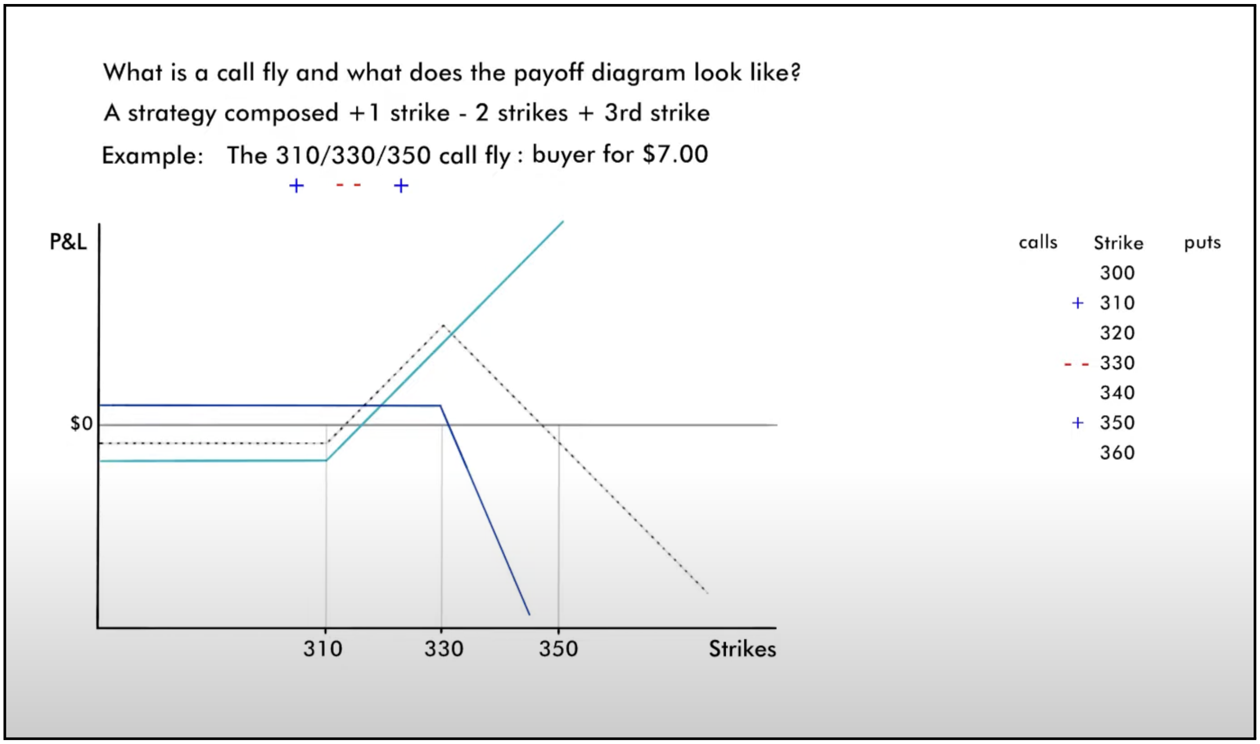
- $K_2 - K_1$ is the worst-case payout you owe if you're the seller.
- If you were paid a premium P_{cs}, then your **maximum loss** is:
$K_2 - K_1 - P_{cs}$

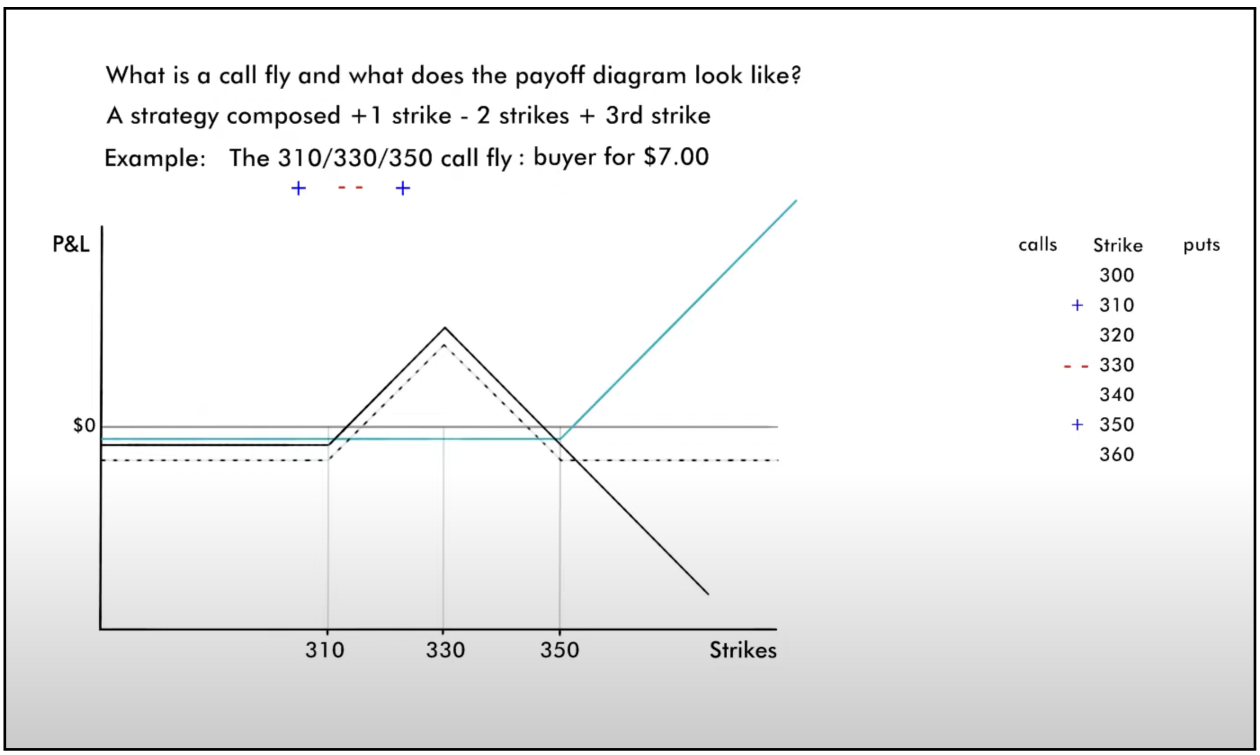
In this video, we're going to talk about payoff diagrams. We're gonna focus on calls and call spreads. Payoff diagrams are simply plots of profits and losses at expiration for buying or selling an option strategy, for various underlying settlement prices. When drawing these, the Y-axis typically plots P&L, while the X-axis plots the underlying price. Usually, we'll draw a horizontal line along the zero P&L number, since we're concerned with plotting where we make and lose money. So I like to start with that point at zero, down the middle. Now, if we're buying an underlying, a stock or a future, say, for some price, we could show a payoff diagram simply by drawing a 45-degree line as follows. This shows that for every dollar the underlying increases, we make one dollar. This isn't too interesting, since the underlying is the driving force and also one of our axes. However, let's take an example where we have some options struck at 50. We'll use K to denote the strike on our X-axis. In this example, let's draw the payoff diagram for the buyer of a call of strike K for the price of \$2. This is to say that the call was purchased for a price of \$2 and will have various payoffs depending on where the underlying future finishes at expiration. Going back to our definition of a call option as the right but not the obligation to purchase the underlying instrument for price K, its strike price, at expiration allows us to start our diagram. We know that below a price of 50 in this example, the call will be worthless, and we'll lose the entire premium paid for it. So we can label the \$2 as a loss for all points below \$50. Once we reach the 50 strike, the call goes from out-of-the-money, or worthless, to in-the-money, or worth something, and starts having some value. This value is directly related to the underlying on a one-to-one ratio, meaning that for every \$1 increase in the underlying, our call will also gain \$1 in value. When plotting payoff diagrams, I like to note a few key points. These are the maximum loss, the maximum gain, and our break-even point. For our max loss, we simply look for the lowest value on this diagram, which in this case is minus \$2. For our max gain, we'll notice that since the call gains \$1 for every \$1 in the underlying, theoretically we could have unlimited gains, since the upside for a future is limitless. So our maximum gain is infinite for a call option. Finally, we can find our break-even point for this call. This is the minimum price at which the future has to finish to ensure that we make money. Anything past this point is profit. To find this point for a call, we simply take the strike, in this case 50, and add the price we paid for the option. Therefore, the underlying has to finish above 52 in this example for us to recoup the cost of the option. Anything above that point is profit; anything below it moves us back into an overall loss. Let's take a minute here and look at the completed diagram and think about why someone might want to trade a call option. The first of these reasons is a bet on the upside move. Because we make money if the future goes up, buying a call is a way to gain this exposure with minimal cash outlay—in this case, just \$2. The second is the ability for unlimited upside. If someone wants to bet that there's going to be a big move up, the way to do it is to buy a call option, since you get this unlimited upside exposure. Third is the fact that you know what your max loss is. Therefore, you have limited downside. The buyer of this call knows that even if he's completely wrong, he'll only lose \$2. The last two reasons are a bit more advanced, but I've listed them here so you can think about them. The fourth reason why someone might want to buy a call is because of an increase in volatility. Since the price of an option is based on the volatility that's used to price the option, we simply need the volatility to increase to make the price worth more than \$2 before we sell it out. And finally, you can use your call to protect short underlying positions. Again, we'll get into this as we move further along in our lessons, but having unlimited upside can protect us from a position that has unlimited downside with an increase in future value. Next, I'd like to pause the video and have you attempt to do a payoff diagram for the following example. Draw the diagram for the seller of the 100–105 call spread for a price of 1.25. Don't forget to include the maximum gain, the maximum loss, and the break-even prices. And I'll remind you that the seller of the 1.25 call spread has sold the 100 strike call and bought the 105 strike call. Take a minute, work through this example, and we'll go over it together when you're done. To draw this diagram, we first remember that if we sell a call spread, we take in \$1.25, which is the premium of the spread. We keep this premium anytime the spread finishes out-of-the-money—in this case, below the 100 strike. Once we get to 100, we start losing money on the 100 strike call we sold. We lose this one-to-one with an increase in the underlying, and this continues until we reach the 105 strike. Once we reach this point, because we bought the 105 call, our gains start offsetting our losses. We can see this by drawing the payoff diagram for the 105 call here in gray. We must then add the vectors of the points to the right of the 105 line to see our result. When we do so, we get a straight line to the right of the 105 strike. If we remove all the temporary lines, we get our finished payoff diagram. Let's again look at our max gain. In this case, as the seller of the call spread, that would be 1.25. Additionally, we can look at our max loss. Now, the easiest way to calculate the max loss is to recall that the maximum value of the call spread can only be the difference between the strikes, or $K_2 - K_1$, where K_2 is the 105 strike and K_1 is the 100 strike in this example. Did you see what happened? Since we know we've taken in \$1.25 in selling the call spread, we can calculate our max loss by taking $K_2 - K_1$ and subtracting the call spread price to arrive at our answer of \$3.75 in this example. Finally, let's calculate the break-even point. If we take our K_1 strike, 100, and add the price that we took in by selling the call spread, 1.25, we can see that we can calculate our break-even by adding these two figures to get 101.25 for this example. In our next lesson, we'll explore puts and put spreads before moving on to more complex strategies.





Welcome. In this video, we'll go through some payoff diagrams for puts and put spreads. You should have already watched the call and call spread video in this series. That video goes into a bit more detail on going through the steps of payoff diagrams. Here are the topics we'll cover in this video. First, we'll review the purpose of a payoff diagram, then we'll go through a single put payoff, and finally, we'll work through a put spread payoff together. In the call and call spread video, we discussed that payoff diagrams are plots of profits and losses at expiration of buying or selling option strategies for various underlying settlement prices. P&L is on the Y-axis, and underlying price on the X-axis. So we'll jump right into an example where we want to plot a payoff diagram of a single put option on the 50 strike, where the buyer paid \$1.50 for the option. Since the put is the right, but not the obligation, to sell the underlying at a price of \$50, that option is worthless if the underlying price finishes anywhere above \$50, since that's the strike. Therefore, the put option would be worth zero, but the buyer of the put paid \$1.50 for this option, so they would lose the \$1.50 anywhere above that strike. So we draw a straight line to the right of 50 at negative \$1.50 to represent this. Now, if the underlying—which can be stock, futures, an index, an ETF, or what have you—finishes below 50, the option on the underlying would be worth something to the buyer, since it allows the buyer to sell the underlying at a price of \$50. If the underlying finishes, say, at 25, the option would be worth 25. But remember, we paid something, in this case, \$1.50 for it. So we'd end up only making \$23.50. Since the option makes \$1 for every \$1 the underlying finishes below 50, we can draw a straight line at 45 degrees from 50 as shown. And of course, we make that \$1 in the option for every \$1 further down that the underlying finishes. So now let's look at the three items we noted in the call video that we want to point out: maximum gain, maximum loss, and break-even points. Our maximum gain would come if the underlying finishes at a price of zero. Therefore, we can calculate our gains here as K minus the closing price, minus the price we paid for the put. In this case, since the closing price is 0, that simplifies to just K minus the price of the put, or 50 minus \$1.50, to give us a max gain of \$48.50 on this option. Now let's look at our max loss. As with any option we purchase, our maximum loss is just the price that we paid for the option—in this case, \$1.50. Finally, let's look at our break-even price. This shows us the price at which we recoup the money we paid for that option. We find that by subtracting the put price from the strike K. In this example, that's simply 50 minus \$1.50, or 48.5. Therefore, we need the underlying to go below 48.5 for us to break even. Anything below that and we start making a profit, and anything to the right of that is a loss. Now, just as we did in the call video, I'd like you to pause this video and work out what our payoff would be for the buyer of the 28–25 put spread, who paid \$0.83 for that spread. Remember, the buyer of this spread bought the 28 strike (the higher strike) and sold the 25 strike (the lower strike). Take a minute, pause the video, and we'll see if our answers match. Okay, hopefully that was pretty straightforward. We'll start with a straight line to the right of the 28 strike at minus \$0.83. This is the price we paid for the put spread. If the underlying finishes above that strike, both puts finish worthless, and we lose the premium paid of \$0.83. Once we move to the left of the 28 strike, the 28 put we purchased has started making money one-to-one with the underlying price movement. So we draw a 45-degree line up from there until we hit 25. When we get to this 25 line, we start losing \$1 for every \$1 the underlying moves below it. This is because we sold the 25 strike put. This \$1 for \$1 loss offsets the \$1 for \$1 gain we're making from the 28 line, and so we end up with a straight line across for all prices down to zero. In the call video, we went into more detail and we added the vectors, but here we skipped that step and just used reasoning and a little intuition. They both yield the same result. So now let's plot the same three items we do in every payoff diagram. Our max loss, of course, is the price we paid for the put spread of \$0.83. This occurs any time the underlying finishes above the strike 28. Our max gain we can calculate by noting that the most we can make in buying a put spread is the difference between the strikes minus the price we paid for the spread. So in this case, the most you can make by buying the 28–25 put spread is \$3. But we paid \$0.83 for that spread, so we end up with $K_1 - K_2 - P_{ps}$, or 28 minus 25 minus \$0.83, for a total maximum gain of \$2.17. Finally, our break-even would be the price K_1, the higher strike put, minus the price we paid for the put spread. So we need the underlying to be below 27.17 to start making a profit from the purchase of this put spread. Now, that's a good reminder for me to mention that all of these payoff diagrams assume that we buy the option or options and hold them until expiration. We don't do anything else with them. We don't hedge them with the underlying. We don't trade other spreads or other options—again, until expiration. Clearly, as a market maker, Akuna doesn't think much of payoff diagrams, as our traders are constantly doing trades and hedging with the underlying. These exercises are meant to teach the mechanics of the options and option spreads, but in practical terms, they aren't used much on the trading floor. That's all for this video. Thanks for watching, and get in touch at akunacapital.com.


What is a call fly and what does the payoff diagram look like?
A strategy composed +1 strike - 2 strikes + 3rd strike
Example: The 310/330/350 call fly : buyer for $7.00
+ - - +
P&L
$0
310
330
350
Strikes
calls
Strike
puts
300
+ 310
320
- - 330
340
+ 350
360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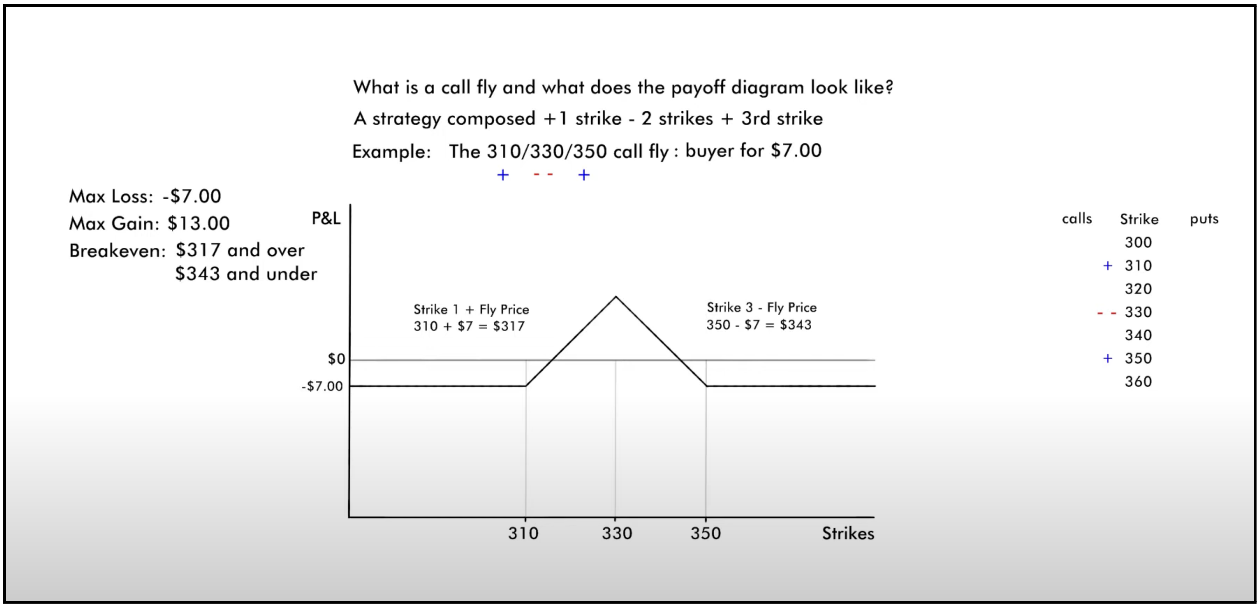
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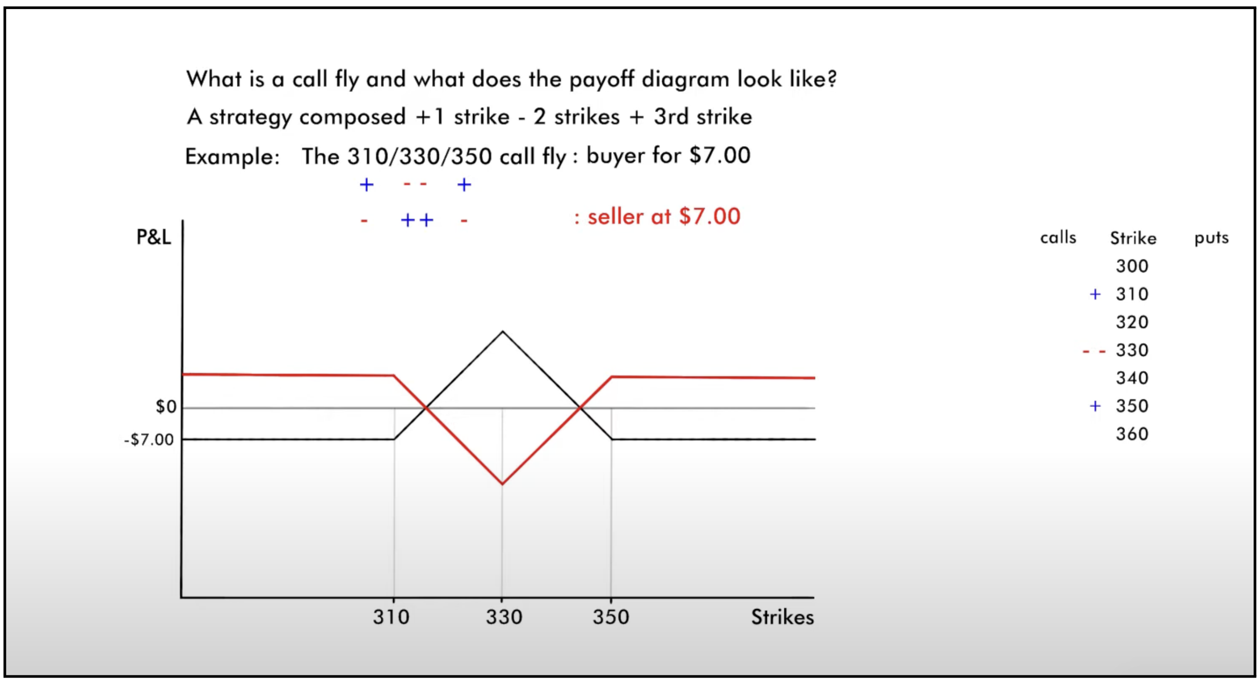
Example: The 310/330/350 call fly : buyer for $7.00
+ - - +
Max Loss: -$7.00
Max Gain: $13.00
Breakeven: $317 and over
$343 and under
P&L
Strike 1 + Fly Price
310 + $7 = $317
Strike 3 - Fly Price
350 - $7 = $343
$0
-$7.00
310
330
350
Strikes
calls Strike puts
300
+ 310
320
- - 330
340
+ 350
360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- ++ -
: seller at $7.00
P&L
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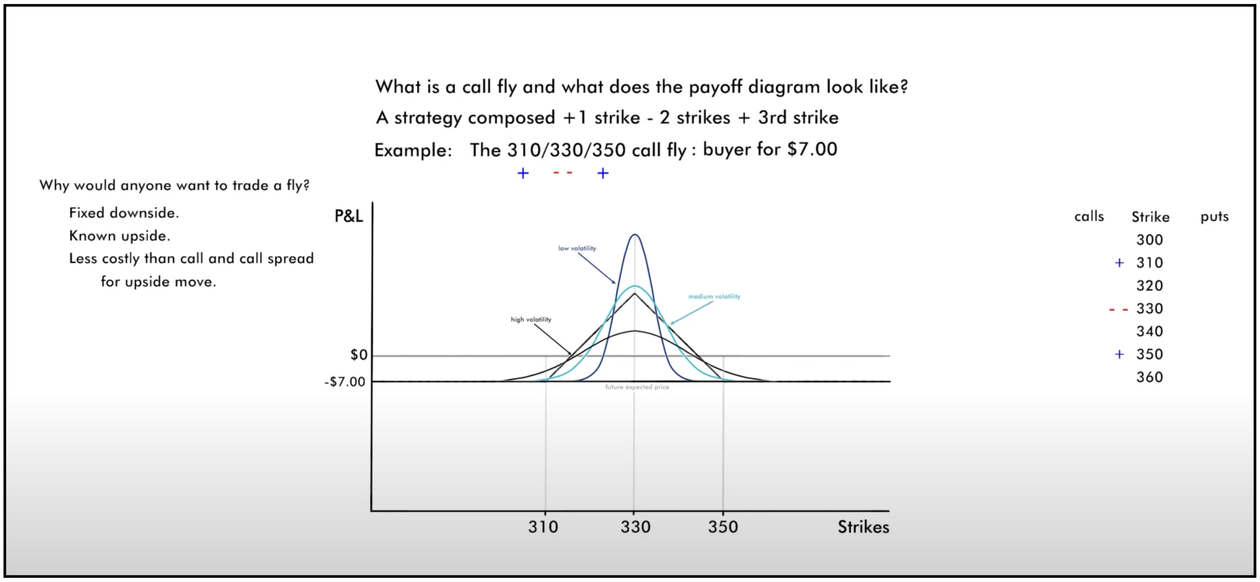
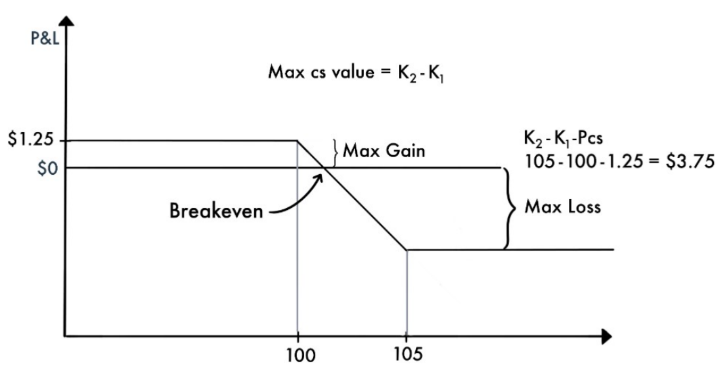
350
Strikes
calls Strike puts
300
+ 310
320
- - 330
340
+ 350
360



Hello and welcome to this video presented by Akuna Capital. This is the third video in a series on payoff diagrams. You should have already watched the call and call spread as well as the put and put spread videos before diving into this one. In this video, we'll discuss what a call fly strategy is, go through a step-by-step payoff example, explore why someone might want to trade a call fly, and then compare it to a put fly. So let's start by answering the age-old question of what a call fly is and what its payoff diagram might look like. A call fly is a strategy made up of four options: you buy one contract of the first strike, sell two contracts of the middle strike, and buy one contract of the third strike. Most of the time, these strikes are equidistant, meaning that the wings are an equal distance from the middle strike. If that is not the case, traders will specify that it is a non-symmetrical fly. In this case, this is a 40-point wide fly, since it starts at the 310 strike and ends at the 350 strike. So let's go through the payoff by adding the four option legs together from left to right, using what we learned in our call spread video. I'll start with our axes, which are again P&L on the Y-axis and strike-based pricing on the X-axis. I've drawn our zero line horizontally, which will help us distinguish between ending up positive or negative in P&L for each point on our plot. I'll add the three strikes that make up the fly along the bottom. For our example, we'll plot the payoff diagram from the perspective of someone who has paid $7 for this call fly. I won't break down the individual option prices when adding the legs and will instead use this $7 total strategy price to calculate our max gain, max loss, and break-even points. First, we'll plot the payoff diagram for our first leg—buying the 310 call. We'd use the price of this call as our intersection on the Y-axis if we wanted to, as we learned in our call video. Next, we'll plot the portion of the payoff diagram representing selling two of the 330 calls. Notice I start above the zero point by the price of the two calls, and the slope of the line, once we cross 330, is 2-to-1. For every dollar the underlying increases, we'd lose $2 from the sale of the 330-strike calls since we sold two of them. Now let's take these two payoffs and add them together first. The dotted line becomes our resulting vector. We'll now clean up the pieces from the first three option legs and plot our result. Now we simply plot our last leg—the purchase of the 350 call—on top of this. Again, we'd use the price of this option as our horizontal line, and we'd start making money once the underlying moved above the 350 strike. Once again, we add these vectors together to get our final shape of the payoff diagram. This symmetrical pyramid, with its peak right at the middle strike, is our final payoff diagram for a call fly. Now let's start filling in our numbers. We'll begin with our max loss, which in this case is the cost of the fly. This occurs anywhere outside the furthest strikes of the fly, and in this example, our max loss is $7. So it's clear that the buyer of the fly wants the underlying to finish somewhere within the strikes of the fly. Now, let's calculate our maximum gain for the buyer of this fly. It's pretty clear that this happens right at 330, and we can use the fact that we know a symmetrical fly can never be worth more than the difference between the middle strike and the first strike—in this case, 20. If we know the price we paid for the fly and the maximum amount it can be worth, we can subtract these two numbers to arrive at our maximum gain. In this case, $13. Finally, let's look at our break-even points, of which there are two in this example. The first is found by adding the price of the fly to the first strike. This makes it clear that the underlying must finish at least above 317 to recoup our $7 cost. Anything above that amount, up to our second break-even point, makes the buyer a profit. The second break-even point is found by subtracting the price of the fly from the third strike to arrive at 343. So any closing price between 317 and 343 at expiration is where the buyer of this fly would make a profit. Anything outside of that would result in a loss. Now, remember, as we stated in earlier videos, these are payoffs at expiration and assume that the buyer simply bought the fly for the price of $7 and did not hedge with the underlying at any point and just waited to see where the underlying finished at expiration. In our final video of the payoff series, we'll discuss why market makers don't usually think this way. Since they trade thousands of options and option strategies per day, they don't focus on one payoff diagram. Now let's quickly look at how the payoff diagram for the seller of this fly at a price of $7 might look. We can think about and construct the payoff strike by strike, or we can just reason that the payoff will be flipped around the zero point since this is a zero-sum payoff between the two participants. Therefore, the maximum payoff occurs if the underlying has higher volatility and moves away from the 330 strike, while the maximum loss of $13 occurs if the future pins the 330 strike. "Pinning" is a term meaning that the future finishes right at the 330 strike at expiration. Now let's step back and think about a few questions commonly asked at this point when learning about payoffs for call flies. The first is usually: Why would anyone want to trade this fly? The first reason is that it has a fixed downside and a known upside payoff. This makes it easy to think about in cost-benefit terms compared to some other, more complex strategies. It also costs less than buying the 310–330 call spread, which gives you a similar risk profile if you think the future will finish in this area. But the most common reason is that if you look at a payoff of this strategy—and if I overlay a few probability distributions above it—it becomes clear that this is a great way for someone to bet on a price distribution when they have a view on how volatility is priced relative to their own belief about the distribution of the underlying at expiration. So the buyer of this call fly, in this case, might think that the volatility distribution is tighter and therefore the fly has a higher probability of finishing near the max payoff. If there's higher volatility, then the distribution is flatter and the fly may be overpriced at $7, and the seller might benefit from selling it at this price. Therefore, in either case, a fly is a great way to bet on the distribution of an underlying's price if you disagree with the market's option pricing of this strategy. Now let's look at what happens if instead of call strikes, we trade the put strikes and buy the put fly instead. Well, it turns out that for payoff purposes, nothing changes. The price of the put fly is identical to the price of the call fly. So are the Greeks: the Vega, the Gamma, and the Theta—these are all the same barring any special situations. Therefore, we can think of a put fly and a call fly as the same for payoff diagram purposes. So with this, you've worked through your first call fly payoff diagram. In the next video, we'll discuss straddles and strangles.

Payoff Diagrams

Payoff diagrams are graphs showing the profit of an option or multiple option combinations at expiry for various underlying prices. Putting two or more options together is a very common practice and these are often called **spreads** or option combinations or **combos**.



Example of a payoff diagram from the perspective of the seller of a call spread (selling the 100 call and buying the 105 call).

After viewing the videos below, work through drawing the following payoff diagrams.

Remember, the financial industry uses the term **long** to mean something you've bought and **short** to mean something you've sold.

- Long/short underlying at price $50:
- Long Call for price $1.00:
- Long Put for price $2.00:
- Long Call spread for $4.00 (strikes 10 apart):
- Long Put spread for $3.00 (strikes 20 apart):
- Long Call Butterfly for price $2.00 (strikes 10 apart):
- Long Straddle (+c, + p on the same line) for price $1.00:

You can also spend some time thinking about the spreads from the seller's (someone who's **short** the combo's) perspective. These will be mirror images of the buyer's P&L along the $0 horizontal line.

Options market makers rarely think of a trade as a payoff diagram because we are not trading one option or an option spread and holding it to expiry. Instead, we are trading many options back and forth and managing a book of hundreds or thousands of options.

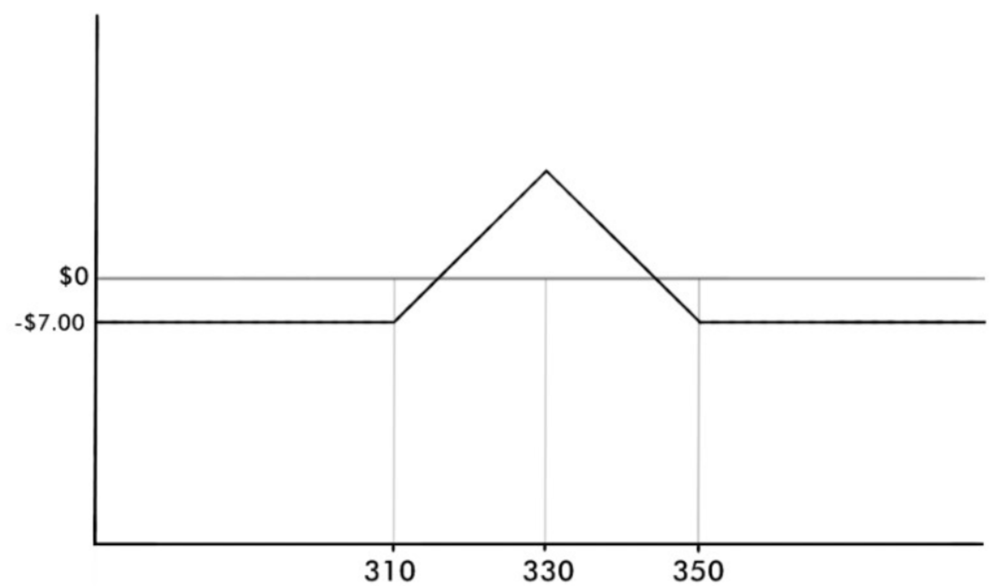
In addition, we hedge our exposure to directional moves in the underlying with the underlying contract. If we buy a call, we don't simply hope the underlying goes up so that we can profit. We sell some amount of the underlying as a hedge, creating a more balanced position.

We'll get into these advanced topics in later sections. However, using these graphs to visualize payoffs is still a useful stepping stone and tool that should be mastered by everyone who's interested in learning about options.

Watch the following videos on payoff diagrams:

Payoff Diagrams Exercise

Use the image below to answer the questions:



What is shown on the x and y axis in the payoff diagram?

- x: the change in option prices, y: profit or loss (P&L)
- x: P&L, y: change in option prices
- x: payoff, y: P&L
- x: underlying price, y: change in option price

correct

- x: underlying price, y: P&L ✔
- x: change in option price, y: underlying
- x: P&L, y: underlying price
- none of the above

This payoff diagram is from the perspective of someone who did the following trade:

incorrect

- bought the 310/330 call spread and bought the 330/350 call spread. ✖
- bought the 310/350 call spread and sold 2 of the 330 put
- bought the 310/330 call spread and bought the 310/350 call spread
- bought the 310/330/350 put spread
- sold the 310/330/350 put fly
- sold the 310/330 call spread and sold 2 of the 330 puts
- none of the above

The maximum profit from this payoff diagram is:

- $7.00

correct

- **$13.00**
- $20.00
- $23.00
- $27.00
- $33.00
- $40.00
- $0
- ($7.00)
- can't tell from the information given

.

Which of the following prices in the underlying would lead to $0 P&L (breakeven) for this option combo?

- $310
- $310
- $315
- $330
- $337

correct

- **$343** ✔
- $350
- $357
- none of the above

✅ **Correct Answer: $317 and $343**

From the given options, **only**:

- **$317** (from $310 + $7 cost)
- **$343** (from $350 – $7 cost)

are valid **breakeven points** for this **310/330/350 long call fly** purchased at a **$7 premium**.

However, **only one** of them is listed:

$$\$343$$

So the correct choice is:
✅ **$343**

This payoff diagram from the perspective of the buyer of a put fly. What is the most the SELLER of the fly can make?

- $0
- $5
- $7
- $10
- $15
- $20
- $27
- $30
- $37

incorrect

- none of the above ✖

‹ Back

Continue ›

Basic Options Strategies

Basics for Non-101 Participants

The options trading information found online is NOT abundant and is usually presented in an ad-hoc way that leads to individuals dabbling in options without fully understanding the complex instruments they're trading. There are a handful of simple strategies that these investors ("paper") use. Picking which options to trade is often a back-of-the-envelope estimation with no regard for risk, returns, or other important variables that should go into these decisions. We'll define them from the simplified perspective of a novice trader:

- Covered Calls
- Puts as protection
- Call spreads and put spreads
- Straddles

At the end of the course, we'll return to some of these to note how your extensive knowledge of option greeks will better allow you to formulate these simple strategies if you choose to dabble in options yourself.

Hello and welcome to this lecture presented by Akuna Capital. Today, we're going to discuss some very basic option strategies. Specifically, we're going to talk about some common option strategies that someone who's maybe just dabbling in options or starting with options usually begins with. So we're going to go over two main sections. We're going to talk about people who use options or trade options when they are long the market, and we'll talk about what that is. Then we'll talk about some common option strategies for people who don't have a long market or a short market exposure at all. In a previous lecture, we described how most people are long the market. Usually, when cash is sitting idle, the convention is to put that cash to work somehow. Individuals get paid, and if they have excess cash or capital, they go out and buy stocks—they invest in the marketplace, usually by buying those underlyings. Additionally, they might put their money into a 401(k) or IRA, which just goes out and buys stocks or bonds or some other commodity. Finally, we have large pensions and university endowments. Everybody's kind of doing the same thing, and so the bottom line is that when we describe the world, we say that most people are long the market. "Long" is just another way of saying that they've bought the market or are positively correlated to an upward move in the market in some way, shape, or form. So let's talk about what we can do with options if we are long the market. If you look at the right diagram, I've shown what someone who is buying a certain instrument—future, stock, index, ETF—for price P would see. They have exposure to the market where, if the market goes up, they make money; if the market goes down, they lose money. So what can we do with options on top of this long exposure to the market? First, we'll briefly go over what a call is, which we've talked about in earlier sections. A call, if you remember, is the right but not the obligation to buy an underlying instrument at a specified price on or before a specified date in the future. In this example, we have the payoff diagram from the perspective of someone who's bought a call option. They have some gain if the underlying goes up in price, and they lose the premium if the underlying goes down in price. Comparing this to the long payoff diagram for an underlying at price P, it doesn't do much: you're winning if the future goes up either way. So that doesn't help much. But if instead of looking at the call buyer, we look at the call seller, we get something different. If we sell a call, we're winning if the future or underlying doesn't go up in price, and we're losing if the underlying does go up. This can be seen as a hedge to the rightmost diagram. By selling the call at strike K, we receive a \$1 call premium—the price of the call we sold. That lifts the payoff diagram of the initial underlying by one dollar, because we've received that dollar in our pocket. Selling the call caps our upside: if the underlying goes up between P and K, we still make money, but past K we've capped any incremental gains, as they're offset by losses on the short call. So we're less happy if the underlying goes far above K. Early investors dabbling in options may see this as a great way to collect a dollar if the underlying goes up a little, doesn't move, or even goes down—extra income with limited tradeoffs. The call offsets the gain if the underlying rises past K, so you're only giving up some upside to gain this dollar. You'll notice that the breakeven shifts from P to $P - 1$—you effectively acquired the underlying at a \$1 discount. You can repeat this over and over—selling a call that expires in a month, collecting a dollar, then selling another for the next month, and so on. This is called a **covered call**, because you've covered your short call exposure with the underlying you own. If you sell a naked call without owning the underlying, you face unlimited loss if the market rises. Now let's talk about another option strategy for someone long the market who wants protection from downside risk. Again, we start with a long position—if the underlying goes up, you win; if it goes down, you lose. Now consider a **put option**.

A put is the right but not the obligation to sell the underlying at a specified strike on or before a specified expiration date. If the underlying goes down, the put increases in value because you have the right to sell at a higher price. Comparing this to the long position, the put offsets losses from the underlying when it drops. By buying a put at strike K, and adding it to the underlying, we shift the net payoff diagram. You pay \$1 for the put, so your breakeven shifts right by one dollar. But now your downside is limited—once the underlying drops below K, your losses are capped. This is a great hedge against catastrophic drops. It's like insurance for your stock. This is the second most common hedge: either sell a call to limit upside or buy a put to limit downside. Some investors do both—selling a call to finance the purchase of a put—thus hedging both ends. Now let's talk about option strategies when you don't have an underlying position. There are a couple of reasons someone would still trade options: (1) to speculate on direction, and (2) to bet on movement, regardless of direction. Let's start with direction. If you believe the stock will rise, you can buy a call without buying the underlying. Instead of paying \$100 to buy a share, you pay \$1 for a call option. That's your maximum loss and gives you the upside exposure. Alternatively, you could buy a **call spread**, which is cheaper (e.g., \$0.50 instead of \$1) but caps your upside. Or you can sell a put, which wins if the stock goes up. However, selling a put carries more downside risk than buying a call. There are many bullish strategies. Conversely, if you think the stock is going down, you can buy a **put**. It gives you exposure to downside gains. Or you can buy a **put spread**, which is cheaper but limits your gains. Now let's consider trades based on movement. If you think the stock will move significantly but don't know the direction, you can buy a **straddle**—a call and a put at the same strike (e.g., 50). This gives you gains if the stock finishes far from 50 in either direction. If instead you think the stock won't move much, you can sell a call for \$1 and a put for \$0.80, collecting \$1.80. This is a short straddle. The maximum profit is \$1.80, and it occurs if the stock stays near the strike. However, you have unlimited risk if the market moves sharply in either direction. These are the most basic strategies new investors explore. As this course continues and we introduce the Greeks, you'll gain a more nuanced understanding of calls, puts, and combinations of the two, helping you choose the best strategies for your market views.

Time Premium and Put-Call-Parity

Option prices are derived using one of many well known models. The most popular is some derivation of the Black-scholes option pricing model. These are well known throughout the industry and we'll get into those at a later time. First, we'll describe some of the general pricing characteristics of put and call options as well as the relationships between call and put options on the same strike.

Time Premium

First, let's describe two terms that we'll need when discussing option prices.

In-the-Money (ITM) - an option that has some inherent (intrinsic) value based on the current location of the underlying compared to the strike of the option. For example, the 40 strike call option has some value if the forward value of the underlying is currently above \$40. If someone handed us this option for free we'd have the right to buy for \$40 and sell for something higher than \$40. Therefore, we say this option currently is "in-the-money".

Out-of-the-Money (OTM) - an option that has no intrinsic value. Any option that is not ITM is, therefore, OTM.

An American or European style option price can be broken down into two parts.

For In-The-Money (ITM) options, the **Intrinsic Value** of an option is the amount of the option price based on the difference between the current underlying price and the strike. This value only occurs for ITM options. For example, the 40-strike call above, which gives the right to buy the underlying for \$40 will have \$60 of intrinsic value when the underlying is trading \$100. You could exercise the call right now (though you normally wouldn't) and capture \$60 of value.

Intrinsic Value (call) = Max (0, U – K) where U - K = Underlying Price – Strike Price

Intrinsic Value (put) = Max (0, K – U) where K - U = Strike Price – Underlying Price

The second part of an option price is the **Extrinsic Value** (or Time Premium). This portion of the option price is attributed to the optionality of the option contract itself, since the contract gives you the *option* to buy/sell at the strike price. There is a chance the future moves and the OTM option becomes ITM, which is the optionality premium of the option. **Out-of-The-Money (OTM) options only have extrinsic value while ITM options have both intrinsic and extrinsic value.**

What factors influence the extrinsic value of an option?

First, we must establish a **Forward Price**, which is the price of the underlying at a future time (the option expiry). This price accounts for the 1) current price of the underlying or "spot price" 2) interest rates 3) dividends (if applicable) and 4) carrying costs (if applicable). Once a forward price is established the factors that contribute to extrinsic value are:

- **Distance to ATM:** How far the strike is from the forward. For example, if underlying is 100, the 130 call is closer than the 135 call, and therefore worth more.
- **Time:** the time to expiry. For example, a 1-year option will cost more than a 6-month option – all else being equal.
- **Volatility:** Higher implied volatility will lead to higher option prices. We'll get into volatility in a later section.

🔷 **Step 1: Establish the Forward Price**

The **forward price** is what we expect the asset to be worth at the **time of option expiration**. It's not a guess — it's a theoretical value based on financial principles.

The formula (for non-dividend-paying assets) is:

$$F = S \cdot e^{rT}$$

Where:

- F = forward price
- S = spot price (current price of the asset)
- r = risk-free interest rate
- T = time to expiration (in years)

For assets with dividends or carrying costs, the formula adjusts:

$$F = S \cdot e^{(r-d+c)T}$$

Where:

- d = dividend yield
- c = carrying cost (e.g., for commodities)

🔷 Let's start with compounding intuition

🧠 Discrete Compounding:

Say you invest $1 at a 10% rate.

- **Annually:** After 1 year, you get 1.10
- **Semi-annually:** $1 \cdot (1 + 0.05)^2 = 1.1025$
- **Quarterly:** $1 \cdot (1 + 0.025)^4 = 1.1038$
- **Monthly:** $1 \cdot (1 + 0.10/12)^{12} \approx 1.1047$

You're getting slightly more the more frequently you compound.

📈 What if you compounded infinitely often?

That's **continuous compounding**:

$$FV = 1 \cdot e^{0.10} \approx 1.1052$$

It's just the **limit** of compounding frequency going to infinity:

$$\lim_{n \to \infty} \left(1 + \frac{r}{n}\right)^{nT} = e^{rT}$$

🔷 What goes into the forward price:

1. **Spot Price** — the price of the asset right now.
2. **Interest Rates** — higher interest rates generally push the forward price up, since money today is worth more than money later.
3. **Dividends** — expected dividends lower the forward price because the buyer of the forward doesn't receive those dividends.
4. **Carrying Costs** — storage, insurance, or other costs of holding the asset (relevant for commodities).

🔷 How does it affect forward price?

The forward price represents what someone should pay **today** to receive the asset **later**. If it's **costly to hold** the asset until that future date, then the forward price should be **higher** to compensate the seller.

Put Call Parity (PCP)

Put call parity is the mathematical link between puts and calls on the same strike. There are a few ways to discuss and prove PCP. There are mathematical methods, shown below, that prove the **value of an ITM option is equal to its intrinsic value plus the value of the corresponding OTM option**, which represents its extrinsic value. Also, you can use the payoff diagrams and simple vector algebra to see how calls and puts are linked and can be synthetically created/transformed by trading the underlying instrument.

Simplified Put-Call-Parity formula: Call price - Put price = Underlying price - Strike or C - P =U - K

The above formula will always hold, otherwise arbitrage opportunities exist in the marketplace.

Put-call-parity also explains the observation that being long a call and short a put with the same strike is essentially the same as being long the underlying instrument (in terms of payoff at expiration). As an example, say we have the following portfolio:

- Long an oil 106 call
- Short an oil 106 put

What happens on expiration? No matter where the future ends, we will be buying an oil future for 106. If oil ends above 106, we will exercise the call. And if it ends below 106, the put will be exercised against us. Hence, we have effectively entered a forward contract to buy oil futures for 106. Knowing that we will be buying the underlying in the future for 106, we can sell the future contract now.

In other words, a long call, short put position (which is effectively long forward) can be balanced (to provide zero payoff at the execution time) by being short the forward. The combined portfolio must have zero value (credit = debits).

Assuming for a moment zero interest rates, we can write at time T:

- **credits**: Put Price (from selling put) + Underlying Price (from selling borrowed oil)
- **debits**: Call Price (from buying call) + Strike Price (buying oil back at the strike price either by executing your call or having the put you sold be exercised)

Thus, it must be that:

Put Price + Underlying Price = Call Price + Strike Price

or:

Underlying Price = Call Price - Put Price + Strike Price

🔷 Step-by-step breakdown:

> "No matter where the future ends, we will be buying an oil future for 106."

You hold:

- **Long Call @ 106** (you can buy oil at 106 if you want)
- **Short Put @ 106** (someone else can force you to buy oil at 106)

Together, these two positions force the same outcome:

- Whether oil ends **above** or **below** 106, **you will end up buying oil at 106**.

Why?

- If **oil > 106**: You exercise the **call** and buy oil at 106.
- If **oil < 106**: The **put** buyer exercises their right, forcing you to buy oil at 106.

> 🔁 In either case, you're buying oil at 106. That's exactly what a **forward contract** does.

🔷 So what's the insight?

You've synthetically created a **long forward contract** using options:

- **Long Call + Short Put** at the same strike (and same expiration) $\Longleftrightarrow$ **Long Forward**

$$\text{Long Call} + \text{Short Put} = \text{Long Forward}$$

🔷 **Now, the next idea:**

> "Knowing that we will be buying the underlying in the future for 106, we can sell the future contract now."

If you **don't actually want to take on forward exposure**, you can hedge it.

- You already synthetically **long the forward** (via options).
- So, to neutralize that, you go **short the actual forward**.

🔷 **Final point: "The combined portfolio must have zero value."**

This is a **no-arbitrage** condition. When you add:

- **Long Call**
- **Short Put**
- **Short Forward**

you've essentially combined:

- a synthetic long forward
- and a real short forward

Which cancels out — no future gain or loss, just **zero payoff** at expiry. So the net value today must also be **zero**, otherwise you'd have arbitrage.

In fact, if we look at the theoretical prices for a sample oil option screen we can extract:

Call	Strike	Put	=C-P+K
$14.873	85.5	$ 0.097	100.276
$ 6.054	95	$ 0.773	100.281
$ 2.602	100	$ 2.317	100.285
$ 1.320	103	$ 4.032	100.288
$ 1.029	104	$ 4.741	100.288
$ 0.800	105	$ 5.510	100.290
$ 0.097	116	$15.801	100.296

which looks quite promising. But why is the implied underlying price not the same for each strike? Interest rates...

We receive cash for selling the underlying and put right now, and this cash earns interest over time. At the same time, I had to pay for buying the call, so I pay interest. The credit/debit balance is now:

- **credits**: Put Exp(rt) + Underlying Exp (rt)
- **debits**: Call Exp(rt) + Strike
- (Strike is not discounted because it is paid at the expiration date).

Having in mind that "Underlying Exp (rt)" is the forward price of the underlying, we have,

Forward = (Call - Put) Exp(rt) + Strike

And, indeed, we find consistent (forward) prices of the underlying

Call	Strike	Put	=(C-P)*EXP(r*t)+K
$14.873	85.5	$ 0.097	100.285
$ 6.054	95	$ 0.773	100.284
$ 2.602	100	$ 2.317	100.285
$ 1.320	103	$ 4.032	100.286
$ 1.029	104	$ 4.741	100.286
$ 0.800	105	$ 5.510	100.287
$ 0.097	116	$15.801	100.287

Example: Given the following option prices, can you use the PCP equation to solve for the missing term? How much intrinsic value is in this call? Extrinsic? We'll assume interest rates of 0% for this example.

Call value = 15.34 Put value = ?? Underlying = 85 Strike = 75

Answer: Using PCP the answer is U – K = C – P; therefore 85 – 75 = 15.34 – P and P would be 5.34 The call is made up of 85 – 75 = $10 of intrinsic value and $5.34 of extrinsic value (the put value is all extrinsic).

🔷 **Strategy Breakdown**

💰 **Credits (Cash Inflows):**

You **receive money** from two sources:

1. **Put Price** – You sell a put, so you receive the put premium.
2. **Underlying Price** – You short (sell) the underlying asset, so you receive the full value of the stock/future/oil/etc.

💸 **Debits (Cash Outflows):**

You **spend money** on:

1. **Call Price** – You buy a call, so you pay the premium.
2. **Strike Price** – At expiration, you are obligated to buy back the underlying asset at the strike price (either because your call gets exercised or the put gets assigned).

Welcome. In this video, we’re going to break down time premium and discuss the put-call parity equation. We’ll start by discussing the concept of an option’s time premium and by breaking down an option price into intrinsic and extrinsic values. We’ll then define the terms ”in the money” and ”out of the money,” and point to some examples on an options board. Finally, we’ll discuss put-call parity by referencing a payoff diagram and examining the put-call parity equation. An option price is made up of, and can be broken into, two distinct parts: an intrinsic value and an extrinsic value. Let’s start by defining each one, and we’ll walk through a few examples on the board to clarify these terms. The intrinsic value of an option is found by looking at an in-the-money option and taking the difference between the strike and the current underlying. In previous videos, we’ve defined the terms ”in the money” and ”out of the money.” Remember, an in-the-money option is one where the option already has some value based on the current relationship between the strike price and the current futures price. For example, let’s look at the 330 call option. This option gives the buyer the right to buy the underlying at a price of $330. Since the current futures price is $370, the call has some value already because the buyer of the call can exercise it, meaning he buys the future for $330. Therefore, we say that the option is in the money because it has some value now, and the immediate $40 profit you can make is the intrinsic value of that option. It has to be worth at least $40 just from the fact that the strike is $40 lower than the futures price. Even though the option is worth at least $40, you can see that it’s worth $42.92 right now, and we’ll come back to the difference between those two numbers in a bit. Now, let’s look at the 330 put, since it shares the same strike as the call, and break down that option. Remember, the put gives the owner the right to sell the underlying at a price of $330. Since you can sell the underlying in the market for a price of $370, the option to sell it at a lower price isn’t worth much. Therefore, the put is not in the money but instead is described as out of the money. It has zero intrinsic value at this moment. Now let’s look at another example strike. Let’s focus on the 430 strike put. This gives the owner the right to sell at a price of $430. Since the future is trading at $370 now, the ability to sell at $430 is worth something, because you can go out to the market and buy it back immediately for the lower price of $370. Therefore, this put is in the money to the tune of $60. It’s worth at least $60 because the underlying is trading at $370, and you have the right to sell at $430 if you own this option. The corresponding call, however, is not worth nearly as much. Since this gives the owner the right to buy the future for $430, this isn’t very appealing, as no one would pay $430 for something they can buy in the market for $370. Since there’s no value in doing this at the moment, the call is currently out of the money. So let’s take what we saw in these examples and expand them to other strikes to come up with a general rule for intrinsic value. Calls that have strikes lower than the current underlying price have intrinsic value equal to the underlying price minus the strike. Puts whose strikes are greater than the current underlying price have intrinsic value equal to the strike minus the underlying price. Calls where the strike is higher than the current underlying price have no intrinsic value, and similarly, puts whose strikes are lower than the current underlying price also have no intrinsic value. There is no inherent value to these options based on where they are relative to the futures price. However, they still have value because there’s some probability that the underlying moves and that they become in the money before expiration. If we look at these four sections again, we can see that the two in-the-money sections have both intrinsic and extrinsic value, while the two out-of-the-money sections only have extrinsic value. Let's look more closely again at the in-the-money 330 strike call to break down the numbers. The call value is \$42.92. We calculate the intrinsic part as the difference between the futures price and the strike: \$370 minus \$330 equals \$40. This allows us to solve for the extrinsic value, which gives us a value of \$2.92. If we look at the corresponding put price, which consists entirely of extrinsic value, we see it is also worth \$2.92. So the extrinsic values match between the put and the call. If you think back to when we discussed in our payoff diagram videos that we can turn a call into a put and a put into a call by trading the underlying asset, it makes sense that their prices would have some relationship, and we see that here, mirrored by the \$2.92 extrinsic value in both. We can go through the same process for the 430 put. Doing the math again, we find the extrinsic value on the in-the-money put is \$1.98, which again matches the call value. This leads us into the second part of the video: the concept of put-call parity, which we'll get into in a minute. But first, let's quickly note the middle strike of 370. The future is sitting right on this strike, which means these options have no intrinsic value. In our example, both are worth \$15.50, entirely extrinsic value. These prices reflect the fact that the future can move in either direction before expiration, and one of them will finish in the money. Finally, let's list the factors that influence the extrinsic value of options. We'll go into each of these in future videos as we discuss how interest rates, dividends, carrying costs, strikes, time, and volatility all feed into an options pricing model to determine the extrinsic value, while the futures price and strike determine the intrinsic value. Now let's transition to put-call parity. First, we'll look at payoff diagrams and construct a portfolio made up of a long call option at strike 100 and a short put option at the same strike. If we look at the payoffs at expiry, they are exactly the same as buying the underlying. No matter where the underlying finishes at expiry, we will be buying the future at price 100. For example, if the future finishes at 105, our long call is worth \$5, since it is \$5 in the money. We exercise the right to buy the future at \$100, equivalent to buying the future and realizing a \$5 profit. Since we can construct a position from a call and a put that behaves like the underlying asset, there must be a mathematical link between the call and put prices such that when combined to create the synthetic asset, their net price equals the cost of the underlying. Otherwise, someone could take advantage of discrepancies among the three instruments—call, put, and underlying—and lock in a risk-free profit. This is known as arbitrage. We can also construct the opposite synthetic position using a short call, long put, and long underlying. I've left out numbers here to focus on the concept; we can plug in values later. The equation relating these components is: Underlying Price = Strike + Call - Put, which is often rearranged as Call - Put = Underlying - Strike. So given any three components, we can solve for the fourth. For example, if we can buy the call for \$5 and the underlying is \$25 with a strike of \$27.5, then the put should be worth \$7.5 for put-call parity to hold. If it's priced higher, that's an arbitrage opportunity. Going back to our earlier discussion, it stands to reason that since in-the-money options are composed of intrinsic value and the value of the out-of-the-money option, their pricing relationship is governed by this embedded structure—and that's why put-call parity holds. Now let's look at a series of strikes with theoretical call and put prices. When we rearrange the parity equation to solve for the implied underlying price, we may find inconsistent values. This doesn't mean the model is broken; it means we haven't yet accounted for interest rates. When trading calls and puts, we receive or pay cash today. We must discount these values using current interest rates to account for time value. When we do, the parity values become much more consistent across strikes. Note: early exercise rights (which we won't cover here) explain any remaining small differences. Also, we don't discount the strike price because it's exchanged only at expiration. To wrap up: an option's price consists of intrinsic and extrinsic value. Out-of-the-money options have zero intrinsic value. We defined the terms "in the money" and "out of the money," and their link to intrinsic and extrinsic value. We reviewed the put-call parity equation and explained how it links call and put prices with the underlying to prevent arbitrage. We also touched on how interest rates and other inputs refine the equation. I hope this video was informative and that you now have a basic understanding of these new terms and the concept of put-call parity. That's all for this video.

Time Premium & PCP Exercise

1. What are the 3 factors that influence the extrinsic value of an option?

- time to expiry, option type, volatility
- volatility, intrinsic value, future price
- correct: time to expiry, volatility, strike price ✔
- strike price, interest rates, intrinsic value

Continue ›

2. A February soybean future is currently trading for a price of 1005.25. Would the January 950 strike call be described as ITM or OTM? How much intrinsic value would the call have?

- ITM, 55.05
- OTM, 50.05

correct

- **ITM, 55.25** ✔
- OTM, 50.25
- OTM, 0
- ITM, 0

‹ Back

Continue ›

4. If we raise the price of the 950 strike put in the previous question by 0.50 (by increasing the implied volatility in our model), what is the new price of the call?

- 54.75
- 50.25
- 50.55

incorrect

- 50.75 ✖
- 50.95
- 55.55
- 55.75
- 55.95
- I don't remember values from last question

‹ Back

Continue ›

13. Use the PCP equation to solve for the missing variable: K = 10, U = 12.40, C = 3.55, P = ?

0

1.10

correct

1.15 ✔

1.25

1.30

3.55

5.95

‹ Back

Continue ›

If we have a call with strike K=50 that is worth 6.00 and the forward price of the underlying is currently worth 53.20, what is the value of the 50 strike put option?

- 0
- -3.00
- 3.20
- 6.00

correct

- 2.80 ✓
- 9.00
- 9.20
- 53.00

‹ Back   Continue ›

If we have a call with strike K=100 that is worth 4.00 and the underlying is currently worth 98.20, what is the value of the 100 strike straddle?

- 1.80
- 2.20
- 5.80
- 8.80

correct

- **9.80** ✓
- 12.00
- 15.20
- 53.20

‹ Back

Continue ›

We are given:

- **Call strike** $K = 100$
- **Call price** $C = 4.00$
- **Underlying price** $S = 98.20$

We are asked to find the value of a **100 strike straddle**, which is:

$$\text{Straddle} = \text{Call Price} + \text{Put Price}$$

📘 Use Put-Call Parity to find the put price:

$$C - P = S - K \Rightarrow P = C - (S - K)$$

$$P = 4.00 - (98.20 - 100) = 4.00 + 1.80 = 5.80$$

📌 Now calculate straddle value:

$$\text{Straddle} = C + P = 4.00 + 5.80 = \ 9.80$$

✅ Final Answer: 9.80

If a stock is currently trading $130 and the 120 strike call is worth $12.01, which of the following best describes the option value?

- 12.01 intrinsic, 0 extrinsic
- 12.01 intrinsic, 10 extrinsic
- 10.01 intrinsic, 12.01 extrinsic
- 10.00 intrinsic, 12.01 extrinsic

correct

- 10.00 intrinsic, 2.01 extrinsic ✔
- 2.01 intrinsic, 10 extrinsic
- none of the above

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Continue ›

Theos & Combination Spreads

The video below focuses on 2 important points.

Theoretical values and edge

The first few minutes of the video are spent reviewing how theoretical values (theos) are used by market makers to keep track of the edge and profits and losses due to trading. Keeping track of and adjusting theoretical values allows market participants to move their bids and offers and is an extremely important factor in market-making options. The video describes some of the major concepts.

Combination spreads

The video describes some of the more common combination spreads that exist in options markets. As we've described in previous sections these are often referred to as "spreads" or "combos". They're made up of several outright calls and puts that packaged together.

For example the 300/320 call spread is made up of 1 300 call and -1 320 call. The buyer of the spread would buy the 300 and sell the 320 while the seller of the spread would sell the 300 and buy the 320.

Hello, and welcome to this lecture, presented by Kununa Capital University. In this lecture, we'll be talking about combination spreads. First, we'll review a few topics about theo calculations and edge that we talked about in a previous lecture. We'll then spend the majority of our time going through the most popular combination spreads. Combinations, or combos, are exactly what they sound like: they're different outright options that are joined together or arranged in different combinations. First, let's discuss again how we think about theoretical values of options. On the right, we have an options outright grid with different call options on the left and put options on the right. The theoretical values of each are in blue, with the bids and offers on either side. Options are interesting because you have several inputs that go into a model that can be used to control the theos. This means that we, as market makers, control the theoretical values. The main driver of these theoretical values is a change in implied volatility, and we'll get into that in depth later. On the left, we have a graph of option price against underlying value. This might look familiar since we discussed this in payoff diagrams. The red line is the value at expiry for an options contract depending on where the underlying value lands. The other various lines are option prices depending on time to expiry, changes in implied volatility, and all the other inputs into the pricing equation. So if we can control the theoretical value of an option by changing the inputs, we can make it worth, for example, 5.50, 4.78, or $2.91, just by changing some inputs or the time to expiry. And while we can change these values back and forth as much as we want, eventually, at the end of the option's life, at expiry, they're either going to be worth zero or some intrinsic value, depending on the underlying value of the future. So in this example, if the future finishes at 102.5, they'll be worth 2.05. Otherwise, if the future finishes anywhere below 100, these calls will be worth zero. With all these constantly moving theoretical values, it's important to keep track of the edge and trades that we're doing. So it's important to be able to keep track of and calculate our edge and PNL. Let's work through some examples together to reinforce some of the things that we talked about in the previous lecture. If we bought the 69 strike call for the current bid price, how much edge would we have made? As with all of these examples, feel free to pause the video and work through this on your own. To work this through, we can look at the theoretical value of the call now, which is 0.169, the bid price of 0.16 (which is where we would have bought the option), and subtract the two to find 0.009, or just under one cent of edge. If instead we know that this product has one-cent tick increments, and we want to discuss the edge in terms of tick increments, we could also do that. We'd simply divide the 0.009 of edge by the $0.01 tick to figure out that we had picked up 0.9 of a tick of edge, just under one full tick. Finally, if we know the quantity of contracts that we traded—let's pretend that we did 50—and the multiplier of the product is $1,000, we can find how much cash edge we made. Take a few seconds and work this out alone before looking ahead in the video. So, as we learned in our previous video, we can find our cash edge, which is sometimes referred to as PNL or profit, as quantity times the edge times the multiplier. In this case, $50 \times 0.009 \times 1000$, giving us $450 of cash edge. Now, we can't take this $450 to the bank, and we certainly can't spend it. Remember, this PNL is theoretical for a reason. It's simply the difference between our current theoretical price and the price at which we transacted. Here's where it gets interesting and tricky. With options, since we can adjust our theoretical value, there's nothing keeping us from adjusting them at any point in time. Additionally, we usually, as market makers, adjust our theoretical value after we've done a trade. The easiest way to think about it is: if someone's willing to sell me something at a price of 16 cents, I have new information and I shouldn't have it worth 16.9. Therefore, if I've just bought something, I should lower my theoretical value. We could change one of our inputs in Black-Scholes, which is implied volatility, to lower our theoretical value. So if we lower our theoretical value from 16.9 to 16.3, how much cash edge have we made now? We simply do the same calculation, except we use 0.003 instead of 0.009 to give us \$150 of cash edge. Now, remember, this \$150 isn't real either. We can certainly move our theoretical value down below 16. So how do we actually bank cash edge into real PNL? Well, there are two ways that you can lock in cash or cash edge into real PNL. As we discussed, the first is when an option expires—when it realizes its final value of either zero or some intrinsic value, depending on where the underlying finishes—that is real PNL. The second is closing out a position. So we can sell an option at a price and then buy it back. If we've sold something at 40 and bought it back at 20, we've locked in an actual \$20 because we now have no position, and we've sold and bought at different prices. In a similar fashion, that option that we paid 16 for can be sold back out at some price to lock in edge that way. So if we sell it out at 17 in a similar scenario, we lock in \$10 of PNL. There are a couple notes worth mentioning at this point. First, with options, you can sell something first, then buy it back to close. You don't actually have to own something to sell it. Second, you can lock in a negative price by buying and selling. If we bought something for 16 and then, due to a drop in implied volatility, sold it out at 14, we've locked in a loss. These are usually topics that are difficult at first, which is why we've devoted the first half of our lecture to reviewing them. There are plenty of exercises that we've included that help reinforce this information, and I'm sure that with practice, they'll become second nature. Now let's transition to some of the most popular and used combo types in the marketplace. These combo types listed probably account for about 95% of all option spread combinations. As we saw when we discussed payoff diagrams, call spreads and put spreads are some of the more popular combos. Each of the combos can be traded in several ways. An individual can certainly buy the 68 strike call and sell the 70 strike call if he wants to buy a call spread. Or he can go the other way and sell the 68 strike call and buy the 70 strike call if he wants to trade the call spread that way. Additionally, electronically, you can create the 68/70 call spread as a package. Market makers will make a market on this as an actual package, and you can trade it without having to go out and trade the two individual legs. Put spreads are very similar to call spreads, except they involve put options. A put spread is simply the difference between two put options. Once again, if someone wanted to buy this put spread, they would buy the higher strike put for 18 and sell the lower strike put for 6, and therefore buy the put spread for a price of 12. Or they could go the other way and sell the put spread at a price of 9. Again, a market maker might make his market 9–12 in this put spread, and in fact, usually, if it's quoted as an electronic put spread as one package, the market maker would make their markets a little bit tighter. We'll get into why market makers can make tighter spread markets later. A box is a four-legged combination. You can think of it as a call spread plus a put spread. We won't go into why different market participants trade boxes at this point, but the important thing to take away is that since the deltas cancel, there's very little net Greeks to a box. The delta is zero, as are other Greeks that we'll talk about in later lectures. Next, we'll talk about a call fly, which is a strategy that involves three strikes. To get the theo of the call fly, you would add the first theoretical, subtract two of the second theoretical, and then add the third theoretical. As we saw in previous lectures, this gives you a payoff diagram that looks like a triangle if you buy the fly. Note, the payoff diagram would be inverted if you sold the fly. Similar to all other combos, you can buy the fly or sell the fly by trading the individual components that make up the combo, or you can request that market participants quote it up as a package. Now, put fly is similar to call fly. Just like a call spread and a put spread mirror each other structurally, a call fly and a put fly are the same structure—just using puts. As we move down our list of combos, I'll remind you now to feel free to take notes. There's a lot of info coming at you, and this is all pretty new. I'll also post these lecture slides in the next module. The next combo type is a straddle. A buyer of a straddle will buy both options, and the payoff diagram would look like a "V" shape. Straddle buyers want the underlying price to move as far away from the strike as possible, or they want the volatility to increase. Sellers of a straddle want the opposite—they want the underlying to sit quietly and not move, so they can maximize their PNL from this strategy. Showing the markets currently displayed, we can see that the buyer of the straddle would have to lift both offers (1 and 81) to buy the straddle, or they would have to hit both bids (97 and 7) to sell the straddle. They could, of course, quote it up as a combo spread instead. Here's a question to work through: If you pay 1.81 for the straddle, what's your maximum loss? Take a second and think about it. Your maximum loss is the full 1.81 premium paid, which would occur if the underlying finishes exactly on the 66.5 strike. Now let's talk about a strangle. Strangles are similar to straddles, except that the options aren't on the same strike. A strangle is always made up of the lower strike put option and the higher strike call option. So in this case, the 66 strike is the put, and 67.5 is the call. You could buy both options to buy the strangle or sell both to sell the strangle. In this lecture, we won't compare the strangle and the straddle—we'll get into those details later. At a high level, strangles are a cheaper vol bet than straddles with slightly wider risk profiles. Next are ratio spreads. The most common is a 1-by-2—either a 1-by-2 call spread or a 1-by-2 put spread. In the example shown, the ratio call spread is one leg of the 68 call versus two legs of the 70 call. Take a few minutes to compare this to a normal call spread. Finally, let's discuss the last two combos: the risk reversal and the reversal/conversion. A risk reversal is buying the lower strike put and selling the higher strike call—or vice versa. This is often used to hedge a directional position. A reversal is buying a call and selling a put (same strike), while simultaneously selling the underlying. A conversion is the reverse: selling the call, buying the put, and buying the underlying. Whether you're reversing or converting depends on which side you're on. We'll cover the risk reversal and reversal/conversion more deeply in the trader's course. That wraps up this lecture. Remember: any combination of options can be packaged into a spread. Market makers will trade it—as long as there's edge.

Option Limits & Boundaries

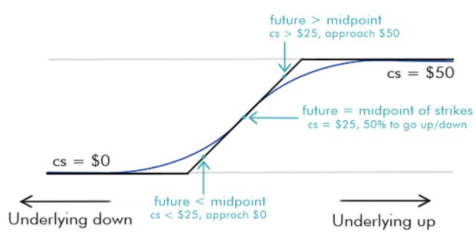
Option Limits/Boundaries

There are certain options relationships that always hold. These limits or boundaries allow traders to sanity check their systems as well as spot opportunities in the marketplace. Some examples are:

1. An ITM call or put should never be worth less than its intrinsic value (Strike – Underlying for puts, Underlying – Strike for calls).
2. An option can never be worth less than zero.
3. A call spread can never be worth more than the difference between the strikes.
4. A symmetrical fly should never be worth less than zero.
5. A same-strike calendar (expiring into the same underlying) can never be worth less than 0. The further month offers more optionality than the same strike of the closer month.*
6. The put call parity equation should always hold, otherwise it presents an arbitrage opportunity.

Take some time and think about these relationships and draw payoff diagrams or reason out why they hold.

Options spreads have certain limits that allow us to approximate option values or link one strike to another using a spread. Below we illustrate how the price of a call spread with strikes 50 points apart can be constructed, and how the value of the call spread changes with various underlying price changes. We can use the current future price to approximate the value of the call spread.



Representation for a call spread (cs) value equaling 1/2 the difference of strikes when the current future price sits at the midpoint and for points above and below this point. Plotted on a payoff diagram with $50 wide strikes at expiry and with some time until expiration. Skew, interest rates and dividends are all set to 0 in this example.

This diagram is explaining **how the value of a call spread changes as the underlying asset price moves**, particularly **before expiration**, assuming:

- The call spread has two strikes **50 points apart** (e.g., 100 and 150).
- The payoff is being visualized **over time** (not just at expiry).
- Volatility, interest rates, dividends, and skew are **all zero**, simplifying the math.

🔍 **Breakdown:**

- **Call Spread (cs)** = Buy lower strike call + Sell higher strike call
- The maximum value of this spread at expiry = difference in strikes = **$50**

The maximum value of a call spread at expiry equals the difference between the strikes because:

> You're long one call at a **lower strike** and short another call at a **higher strike**, and they both have the **same expiration**.

⚙️ **Let's break this down with an example:**

Suppose you enter a **bull call spread**:

- **Buy 1 call with strike 100**
- **Sell 1 call with strike 150**
- Both expire at the same time.

🚨 **Now what happens at expiration?**

Let's say the underlying finishes at **$200**:

- The **100 call** you bought is worth:
$\text{Intrinsic value} = 200 - 100 = 100$
- The **150 call** you sold is worth:
$\text{Intrinsic value} = 200 - 150 = 50$
- Your **net profit** is:
$100 - 50 = 50$

Even if the stock finishes at $1,000, that doesn't matter. You're long one call and short another that **caps your gains**. So the maximum profit you can make is:
$\text{Higher Strike} - \text{Lower Strike} = 150 - 100 = 50$

📈 Chart Zones:

1. **Left side: Underlying way below lower strike (future < midpoint)**
   - The spread is worth **near $0**
   - There's little chance the lower call becomes ITM.
   - So the value **approaches $0**
2. **Middle point: Future price = midpoint of strikes**
   - At midpoint between the two strikes, e.g., 125 if strikes are 100 & 150
   - Spread is worth **about $25** → that's **half the width of the spread**
3. **Right side: Underlying way above upper strike (future > midpoint)**
   - Both calls are in the money, but since you're short the upper call, the max payoff is capped
   - Spread value **approaches the full $50** as probability of expiring at max increases

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🧠 **Key Insight:**

> If you know the **future (forward) price** of the underlying, you can **approximate the call spread's value**:

- If future is **below the midpoint** → value < 25
- If future is **at the midpoint** → value ≈ 25
- If future is **above the midpoint** → value > 25
- It caps at **$50** as future price increases beyond both strikes

We can also visualize this by displaying an options board as it is usually shown (increasing strikes from top to bottom) and noting what occurs to the theoretical values of individual options that make up the cs or ps as the futures move up or down relative to the strike prices.

*assumes the same underlying forward or future price.

Spread and Fly Basics Exercise

This exercise will step through some spread (call & put spread) and fly (call & put fly) basic concepts. Use the outright options board image below to answer the questions presented.

Delta	Bid Qty	BidPx	Theo	Ask Px	Ask Qty	Strike	T Pos	Bid Qty	BidPx	Theo	Ask Px	Ask Qt	Vega
1.00			110.66			260	0	0	0.000	0.02	0.125	50	0.009
1.00			100.72			270	0	0	0.000	0.05	0.125	48	0.021
0.99			90.83			280	0	25	0.125	0.14	0.250	46	0.044
0.98			81.04			290	0	44	0.250	0.32	0.375	44	0.084
0.97			71.33			300	0	42	0.500	0.59	0.625	42	0.135
0.95			61.76			310	0	40	0.875	0.99	1.000	40	0.199
0.92			52.49			320	0	38	1.625	1.70	1.750	38	0.287
0.87			43.60			330	0	36	2.75	2.79	2.875	36	0.391
0.81			35.35			340	0	34	4.5	4.51	4.625	34	0.506
0.73			27.85			350	0	32	6.875	6.98	7.000	32	0.613
0.63	26	21.375	21.39	21.500	26	360	0	30	10.5	10.50	10.625	30	0.694
0.53	26	15.875	15.94	16.000	26	370	0	28	15	15.03	15.125	28	0.732
0.43	28	11.625	11.67	11.750	28	380	0	26	20.625	20.73	20.750	26	0.723
0.34	30	8.250	8.37	8.375	30	390	0			27.40			0.673
0.26	32	5.875	5.92	6.000	32	400	0			34.93			0.596
0.20	34	4.125	4.16	4.250	34	410	0			43.14			0.507
0.14	36	2.875	2.91	3.000	36	420	0			51.87			0.419
0.11	38	2.000	2.03	2.125	38	430	0			60.97			0.337
0.08	40	1.375	1.40	1.500	40	440	0			70.32			0.265
0.06	42	0.875	1.00	1.000	42	450	0			79.88			0.209
0.04	44	0.625	0.70	0.750	44	460	0			89.57			0.162

What is the current theoretical value of the 380/400 call spread?

- 1.75
- 14.20
- 5.60
- 3.75
- 4.75

correct

- **5.75** ✔
- 12.00
- 13.20
- none of the above

Continue ›

What is the current theoretical value of the 400/420/440 call fly?

0.50

1.00

1.25

1.65

1.75

2.00

2.25

2.50

2.65

correct

none of the above

‹ Back

Continue ›

Thank you — using your corrected theoretical values:

- **Call 400**: 5.92
- **Call 420**: 2.91
- **Call 440**: 1.40

Now compute the butterfly spread:

$$\text{Call Fly Value} = 5.92 - 2 \cdot 2.91 + 1.40 = 5.92 - 5.82 + 1.40 = 1.50$$

✅ Final Answer: 1.50

But since **1.50 is not listed**, the correct choice is:

✅ none of the above

What is the final value at expiration of the 370/380/390 call fly if the future finishes at 372.00?

- 370
- 0
- 12.00
- -2.00

correct

- **2.00** ✔
- 4.00
- none of the above

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Continue ›

We're evaluating a **call butterfly spread**:

Long 370 call, **Short 2× 380 calls**, **Long 390 call**

with the **underlying finishing at 372.00** at expiration.

Step-by-step:

At expiration, option value = max(Final Price – Strike, 0)

- **370 call payoff** = max(372 – 370, 0) = **2.00**
- **380 call payoff** = max(372 – 380, 0) = **0** (×2 short = 0 total)
- **390 call payoff** = max(372 – 390, 0) = **0**

Now compute the **net value of the fly**:

$$\text{Fly Payoff} = 2.00 - 0 - 0 = \ 2.00$$

✅ Final Answer: 2.00

If you buy the 370/380/390 call fly for $1.00, what is the most profit you can make at expiry? (profit = final value - price paid).

- -1.00
- 0
- 0.50
- 1.00
- correct
  9.00
- 10.00
- 20.00
- 30.00
- none of the above

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Continue ›

We are analyzing the **maximum profit** of the **370/380/390 call fly**, purchased for **$1.00**.

This is a **long call butterfly**:

- Long 370 call
- Short 2 × 380 calls
- Long 390 call

The **maximum payoff** of a call fly occurs when the stock finishes **at the middle strike (380)**. At that point:

- 370 call = 10
- 2 × 380 calls = 2 × 0 = 0
- 390 call = 0

$$\text{Max value} = 10 - 0 + 0 = 10$$

If the **fly was bought for $1.00**, then:

$$\text{Max profit} = 10 - 1 = 9.00$$

✅ **Final Answer: 9.00**

What is the most a fly with strikes K, K+20, K+40 can be worth?

0

K

K+20

K+40

correct

20

40

80

none of the above

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A call fly with strikes **K, K+20, K+40** consists of:

- Long 1 call at **K**
- Short 2 calls at **K+20**
- Long 1 call at **K+40**

This has **width = 40** and **symmetric structure**, so:

🔷 **Maximum payoff occurs when the underlying finishes exactly at K+20.**

At that point:

- Call at K: worth 20
- 2 × Call at K+20: worth 0 (ATM)
- Call at K+40: worth 0

$$\text{Max Fly Value} = 20 - 0 + 0 = 20$$

✅ **Final Answer: 20**

Someone offers to sell you a fly with strikes K, K+1, K+2 for $0.00. Which statement below best represents the characteristics and payoffs of this fly? (assume no fees to transact)

- Can't make a profit since you buy it for $0.00. No thanks.
- Can make a maximum of $K, so buy it.
- Can make a minimum of $1.00, and can't win, so buy it.
- Can make a maximum of $1.00, and can't lose, so sell it.
- Can lose a maximum of $K, so it depends on the theoretical value of the fly at the time.
- Not sure, so can't trade unelss you know the theoretical value of the fly at the time.

correct

- Can make a maximum of $1.00, and can't lose, so buy it. ✔

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You're being offered a **call fly with strikes K, K+1, K+2** for **$0.00**.

That means:

- Max width = 2 (so max value at expiry = 1)
- You pay nothing
- So **you cannot lose money**, and **you might make up to $1**

✅ Final Answer:

"Can make a maximum of $1.00, and can't lose, so buy it."

What are the upper and lower bounds on the theoretical price of a put spread with strikes K, and K+3?

- Min bound: \$0, Max bound: \$K
- Min bound: \$K, Max bound: \$K+3
- Min bound: \$1, Max bound: \$3
- Min bound: \$K, Max bound: \$(K+3)
- Min bound: \$0, Max bound: \$2

correct

- **Min bound: \$0, Max bound: \$3** ✔
- Min bound: \$0, Max bound: (\$3)
- none of the above

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A **put spread** with strikes **K** and **K+3** involves:

- **Long put at K**
- **Short put at K+3**

This is a **bear put spread** and its **maximum value** occurs when the underlying finishes **below K**, and both options are in the money:

$$\text{Max value} = (K+3) - K = 3$$

The spread value cannot go negative (you can't lose more than what you paid for it), so:

$$\text{Theoretical bounds} = \text{Min bound}: \ \$0, \ \text{Max bound}: \ \$3$$

✅ **Final Answer: Min bound: \$0, Max bound: \$3**

What is the best estimate of the current forward price of the underlying contract?

- ~340
- ~345
- ~352
- ~353
- ~369

incorrect

- ~370 ✖
- ~371
- ~374
- ~381

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To estimate the **current forward price** of the underlying, we use the strike where **call price ≈ put price** — this is where the options are **at-the-money**, implying the forward price is near that strike.

Let's look at the **theoretical prices (Theo)**:

Theo and P&L Calculations Exercise

Exercise – Theo & P&L Calculations

Below is an outright options screen for July Corn options. The underlying is a September Corn future (current market in future is shown in top part of window as 649.00 at 651.00). Our theoretical option prices (theos) are based on the future mid-price of 650.00 from this bid/ask market.

Corn has a multiplier of 5,000 and is quoted in pennies. So 1 option displayed as 0.01 = 0.0001 pennies, which is 0.01 * 50 = 0.0001 * 5000 = $0.50 notional value.

Corn options trade in 1/8th tick increments (.125).

Calculate the theo, edge and/or cash edge (P&L) for each of the questions given, assuming we trade each option or spread 100 times?

Example: Buy the 610 call for 53.00, 100x.

Theo = **53.12.** Edge = 53.12-53.00 = **0.12** Cash edge (P&L) = 0.12*100*50 = **$600**

b#	Bid	Theor.	Ask	a#		ew de	Val.bid	Net	.O. volum	Pos	Net(%)	Settl.
8	649.000	650.00	651.000	5	Sep fut	1.00	650.000	0.500		-5	0.07	674.000

ew de	Act.Vol	b#	Bid	Theor.	Ask	a#		mb	mb	S.Pos	b#	Bid	Theor.	Ask	a#	ew de	Vega
0.99	49.06			150.51			G 500 S				9	0.125	0.54	2.000	5	-0.01	0.072
0.99	48.53			145.60			G 505 S						0.62			-0.01	0.081
0.98	48.04			140.70			G 510 S						0.72			-0.02	0.091
0.98	47.58			135.82			G 515 S						0.84			-0.02	0.103
0.98	47.15			130.95			G 520 S				37	0.500	0.98			-0.02	0.116
0.97	46.75			126.12			G 525 S						1.14			-0.03	0.130
0.97	46.39			121.31			G 530 S				1	0.250	1.33	37.500	1	-0.03	0.146
0.96	46.05			116.54			G 535 S						1.56			-0.04	0.164
0.96	45.74			111.80			G 540 S				5	0.875	1.82	3.875	1	-0.04	0.183
0.95	45.46			107.10			G 545 S						2.12			-0.05	0.204
0.94	45.21			102.46			G 550 S			-5	1	1.125	2.48	10.750	1	-0.06	0.227
0.93	44.98			97.87			G 555 S						2.89			-0.07	0.251
0.92	44.78	1	60.750	93.34			G 560 S				1	1.875	3.36			-0.08	0.277
0.91	44.60			88.88			G 565 S				30	1.500	3.90	8.000	1	-0.09	0.304
0.89	44.45	2	14.000	84.50			G 570 S			-10	1	2.000	4.52			-0.11	0.332
0.88	44.32	3	2.000	80.20			G 575 S				20	2.000	5.22	8.000	2	-0.12	0.361
0.86	44.22			76.00			G 580 S			2	2	3.000	6.01	13.250	10	-0.14	0.391
0.84	44.14	1	2.000	71.89			G 585 S			-10			6.91			-0.16	0.421
0.82	44.08			67.90			G 590 S			1	1	1.750	7.91			-0.18	0.450
0.80	44.04			64.01			G 595 S						9.03			-0.20	0.480
0.78	44.02			60.25			G 600 S			5	2	2.000	10.26	12.000	1	-0.22	0.508
0.75	44.03			56.62			G 605 S			7			11.63			-0.25	0.535
0.73	44.05	3	1.000	53.12			G 610 S				1	0.500	13.13			-0.27	0.561
0.70	44.09	1	0.250	49.76			G 615 S						14.77			-0.30	0.584
0.67	44.15			46.54			G 620 S				1	2.125	16.55	28.000	5	-0.33	0.605
0.64	44.23			43.47			G 625 S						18.47			-0.36	0.624
0.62	44.33	2	1.500	40.54	75.000	1	G 630 S				2	1.500	20.55			-0.38	0.640
0.59	44.45			37.76			G 635 S			-7	7	3.000	22.77			-0.41	0.653
0.56	44.58	2	2.000	35.13			G 640 S						25.14	22.000	1	-0.44	0.663
0.53	44.73			32.65			G 645 S						27.65			-0.47	0.670
0.50	44.90	1	1.250	30.32	48.000	2	G 650 S			10			30.32			-0.50	0.674
0.47	45.07			28.12			G 655 S						33.11			-0.53	0.676
0.45	45.25			26.04			G 660 S			1			36.04			-0.55	0.674
0.42	45.42			24.10			G 665 S						39.09	45.000	5	-0.58	0.670
0.40	45.59			22.27			G 670 S			-1			42.27			-0.60	0.663
0.38	45.77			20.56			G 675 S						45.55			-0.62	0.654
0.35	45.94	1	0.500	18.96	52.000	20	G 680 S						48.95			-0.65	0.642
0.33	46.11			17.47	28.750	1	G 685 S						52.46			-0.67	0.629
0.31	46.28			16.08			G 690 S			1			56.07			-0.69	0.615
0.29	46.45			14.78			G 695 S						59.77			-0.71	0.598
0.27	46.62	1	6.000	13.58	31.500	10	G 700 S				20	15.500	63.57			-0.73	0.581
0.25	46.79	1	6.000	12.47			G 705 S						67.46			-0.75	0.563
0.23	46.96			11.44	30.000	1	G 710 S						71.42			-0.77	0.543
0.22	47.13			10.48			G 715 S						75.47			-0.78	0.523
0.20	47.30	1	3.500	9.60			G 720 S						79.59			-0.80	0.503
0.19	47.47			8.79			G 725 S						83.77			-0.81	0.482

Buy 620/570 put spread for 11.75, 1x. What is the theoretical value and cash edge of the spread?

- 12.03, $1400
- 0.28, $1400
- 21.07, $46,600
- 11.75, $46,600
- 12.03, $0
- 11.75, $1400
- 12.03, $140,000

incorrect

- 12.03, $14 ✖
- 0.28, $46,600
- none of the above

Continue ›

✅ **Full Explanation:**

You are given prices in **cents**.

- **620 put theoretical value = 16.55 cents**
- **570 put theoretical value = 4.52 cents**
- **You paid = 11.75 cents**

So the **theoretical value of the spread** is:

$$16.55 - 4.52 = 12.03 \text{ cents}$$

Your **edge** is:

$$12.03 - 11.75 = 0.28 \text{ cents}$$

Corn options have a multiplier of **5000**, and prices are in **cents**, so to get cash edge:

$$0.28 \text{ cents} \times 5000 = \$1,400$$

✅ **Final Answer:**

- **Theoretical value** = 12.03 cents
- **Cash edge** = 0.28 × 5000 = **$1,400**

No dividing. No conversion. Just straight multiplication — as it should be.

Buy the 710 put for 63.00. What is the edge and cash edge of the trade?

incorrect

- 71.42, $42,100 ✖
- 71.42, $8.42
- $842, $42,100
- 63.00, ($42,100)
- 8.42, $42,100
- 8.42, ($42,100)
- 7.42, $42,100
- 6.30, ($8.42)
- none of the above

‹ Back

Continue ›

🧠 **Problem:**

You're buying the **710 put** for **63.00 cents**.

From the option board:

- Theoretical value of the 710 put = **71.42 cents**

We are given prices in **cents**, and corn options have a **5,000 bushel multiplier**.

🔷 **Step 1: Compute Edge (in cents)**

$$\text{Edge} = \text{Theo} - \text{Paid} = 71.42 - 63.00 = \ 8.42 \text{ cents}$$

🔷 **Step 2: Compute Cash Edge**

$$\text{Cash Edge} = 8.42 \text{ cents} \times 5000 = \ \$42,100$$

✅ **Final Answer:**

8.42, $42,100

This matches:

> ✅ **8.42, $42,100**

Sell 500 call at 151.00. What is the theoretical value of the call, and the edge of the trade?

- 151.00, $2,450
- incorrect
- 150.51, $2,450 ✖
- 0.54, $752,300
- 150.51, 0.49
- 150.51, $75,230
- none of the above

‹ Back

Continue ›

🔷 Step 1: Get Theo value of the 500 call

From the option board:

- **Theo of the 500 call = 150.51**

🔷 Step 2: You sold it at 151.00

So you received **151.00 cents**

🔷 Step 3: Compute the Edge

Since you're **selling**, the edge is:

$$\text{Edge} = \text{Price Received} - \text{Theo} = 151.00 - 150.51 = 0.49 \text{ cents}$$

Buy 500/670 strangle for 23.25. What is the edge and the cash edge of the strangle?

- 0.44, $2,200
- 23.25, $0
- 0.44, $22,000
- 0.54, $2,200
- 0.44, ($2,200)
- (0.44), ($2,200)

incorrect

- none of the above ✖

‹ Back

Continue ›

📌 What a strangle actually is:

> A **long 500/670 strangle** means:
>
> - **Buy 500 put**
> - **Buy 670 call**

🧾 From the options board:

🔷 **500 put (G 500 S):**

- **Theo = 0.54**

🔷 **670 call (G 670):**

- **Theo = 22.27**

So total theoretical value:

$$\text{Theo} = 0.54 + 22.27 = 22.81 \text{ cents}$$

💰 Step 1: Compute Edge

$$\text{Edge} = 22.81 - 23.25 = -0.44 \text{ cents}$$

💵 **Step 2: Convert to Cash Edge**

$$\text{Cash Edge} = -0.44 \times \cancel{50} = (\$2,200)$$

5000

✅ Final Answer:

- **Edge = −0.44 cents**
- **Cash Edge = −$2,200**
- Correct choice: **(0.44), ($2,200)**

🔨 **Correction Recap:**

You were **absolutely right** — the **500 put** theo is **0.54**, **not 150.51**. That earlier number was a misread from a different option line.

Thanks for forcing the correction.

What were the strikes of the strangle from the previous question?

500, 620

600, 670

500, 620

correct

500, 670 ✔

600, 670

500, 520

‹ Back

Continue ›

Buy the 670 put for 22.17. What is the edge and cash edge of the trade?

0.10, $850

0.10, ($850)

0.20, $1700

21.10, $105,500

21.10, $1,055

correct

none of the above

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Continue ›

> **Buy the 670 put for 22.17**
> **Theo = 42.27 cents**
> Multiplier = **5000**
> (Prices are given in **cents**, not dollars)

🔷 Step 1: Compute Edge in cents

$$\text{Edge} = 42.27 - 22.17 = 20.10 \text{ cents}$$

🔷 Step 2: Cash Edge

Since prices are in **cents**, and multiplier is **5000**, the cash edge is:

$$20.10 \times 5000 = \$100,500$$

✅ Final Answer:

- **Edge = 20.10 cents**
- **Cash Edge = $100,500**
- Correct choice: **none of the above** ✅

Thanks for staying on this — this is the accurate and fully compliant answer.

Quiz 2

Question 1

Question: A put option on a future is a contract that:

A: gives the option owner the right to buy the future at the strike price.
B: pays out the difference between the strike and the current futures price.
C: gives the option owner the right to buy the physical asset that the future is based on.
D: settles into cash and gets automatically credited/debited from each persons account.
E: gives the option owner the right to sell the future at the strike price.
F: none of the above

1. Choose the answer from the choices below:

Select an Option

Question 2

Question: **The most profit the buyer of a call can make is _____, while the most they can lose is _____.**

A: the price they paid for the call: the price of the put.
B: the price they paid for the call: the price of the underlying.
C: the price they paid for the option: an infinite amount.
D: the price they paid for the option: the difference between the 0 and the future.
E: an infinite amount: the price of the option.
F: the difference between the strike and underlying: the price of the call

2. Choose the answer from the choices below:

Select an Option

Question 3

Question: **A straddle is made up of:**

A: a call minus a future
B: a call minus a call on a higher strike
C: a call on a strike plus a put on the same strike
D: a call on a strike minus a put on that same strike
E: a call on one strike minus 2 calls on the next strike plus a call on the 3rd strike
F: a lower strike call plus a higher strike put
G: a lower strike put plus a higher strike call

3. Choose the answer from the choices below:

Select an Option

Question 4

Question: **The extrinsic value of an option is usually also known as ________. _____ option prices are comprised entirely of extrinsic value.**

A: intrinsic value; In-the-money (ITM)
B: intrinsic value; Out-of-the-money (OTM)
C: time premium; In-the-money (ITM)
D: time premium; Out-of-the-money (OTM)
E: the value of option if exercised now; In-the-money (ITM)

4. Choose the answer from the choices below:

Select an Option

Question 5

Question: **If we bought the 60 strike call for $2.00 and sold the 70 strike call at $1.00, what is the most profit we can make from this transaction? (assume no other trades)**

A: $1.00
B: $2.00
C: $3.00
D: $8.00
E: $9.00
F: $10.00

5. Choose an answer from the choices below:

Select an Option

Question 6

Question: **The simple form of the Put-Call-Parity Equation is defined as:**

A: C+P=U+K
B: C-P=U-K
C: C-P=U+K
D: U+K+C+P=0
E: none of the above
F: I have no clue, I already forgot

6. Choose an answer from the choices below:

Select an Option

Question 7

Question: **The reason you can sell an option you don't own is because:**

A: the buyer probably won't exercise it because it's OTM
B: you can borrow that option from another person when you sell it
C: the clearing houses normally handle the back end mechanics
D: an options contract is created when a buyer and seller transact (trade)
E: you can "sell it short" and buy it back if needed at a later date

7. Choose an answer from the choices below:

Select an Option

Question 8

Question: **The general term for the contract on which an option is based (and expires into) is called the:**

A: basis contract
B: forward contract
C: underlying contract
D: derivative contract
E: futures contract
F: none of the above

8. Choose an answer from the choices below:

Select an Option

Question 9

Question: **A producer (farmer) of corn would profit if the price of corn goes _____ in value. This could be caused by an _______.**

A: up: increase in demand
B: down: increase in demand
C: up: increase in supply
D: down: increase in supply
E: down: shortage of corn

9. Choose an answer from the choices below:

Select an Option

Question 10

Question: **Using the Put-call-parity equation, and assuming zero interest rates, find the put value below based on the characteristics shown below:**

Future Price = 100.80

Strike = 100

Call value = 6.90

Put value = ??

A: 0.80
B: 0.90
C: 6.10
D: 6.90
E: 7.70
F: 106.90
G: 107.70

10. Choose an answer from the choices below:

Select an Option

Question 11

Question: **Break the call option below into it's intrinsic, extrinsic and total price based on the following (0 interest, no dividends):**

future price = 20.43
strike = 19
put price = 1.20
call price = ??

A: Intrinsic: 1.43, Extrinsic: 1.20, Total: 1.63
B: Intrinsic: 1.43, Extrinsic: 1.20, Total: 2.63
C: Intrinsic: 1.20, Extrinsic: 1.43, Total: 2.63
D: Intrinsic: 0.43, Extrinsic: 0, Total: 1.23
E: Intrinsic: 0, Extrinsic: 1.43, Total: 2.63
F: Intrinsic: 0, Extrinsic: 2.63, Total: 2.63
G: Intrinsic: 2.63, Extrinsic: 0, Total: 2.63

11. Choose an answer from the choices below:

Select an Option

Question 12

Question: **We bought a put on the 50 strike for $1.34 and executed no other trades. At expiration the future finished at $46.50. How much profit did we make?**

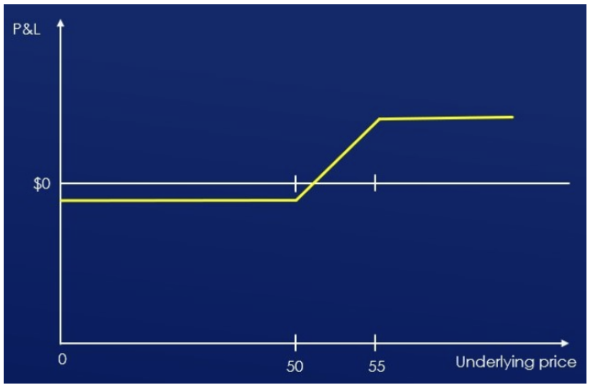
A: $0
B: $1.34
C: $2.16
D: $2.50
E: $2.66
F: $3.50
G: $4.50
H: $4.84
I: ($1.34) loss

12. Choose an answer from the choices below:

Select an Option

Question 13

Question: **The following payoff diagram can be constructed using which of the following 2 trades?**



A: buying the 50 strike call & buying the 55 strike call
B: buying the 50 strike put & buying the 55 strike call
C: buying the 50 strike call & selling the 50 strike put
D: buying the 55 strike put & buying the 55 strike call
E: buying the 55 strike put & buying the 50 strike put
F: selling the 55 strike put & buying the 50 strike put
G: selling the 50 strike call & buying the 55 strike put
H: selling the 55 strike call & selling the 50 strike call

13. Choose an answer from the choices below:

Select an Option

Question 14

Question: **The seller of a call option that expires into a future must do the following if the option expires in-the-money:**

A: nothing, since it expires worthless.
B: buy the future at the current market price.
C: sell the future at the current market price.
D: sell the future at the strike price.
E: buy the future at the strike price.
F: receive the difference in cash between the strike and the current future price.
G: pay the difference in cash between the strike and the current future price.
H: decide if they want to exercise the option.

14. Choose an answer from the choices below:

Select an Option

Question 15

Question: **Refer to options board image shown (without column labels). Which of the following choices best describes this image?**

15.51	-2.99	-16.16%	4	893	274.00	8.41	-1.67	-16.57%	136	2,854
17.70	+1.40	+8.59%	393	1,532	275.00	8.68	-1.57	-15.32%	5,405	27,612
14.97	-6.90	-31.55%	68	740	276.00	9.08	-2.09	-18.71%	113	1,897
16.11	+1.34	+9.07%	84	1,368	277.00	9.37	-1.97	-17.37%	326	2,638
13.14	-0.99	-7.01%	26	971	278.00	9.97	-1.69	-14.49%	535	1,273
14.80	+1.32	+9.79%	15	2,170	279.00	9.98	-1.92	-16.13%	163	1,971
13.96	+1.06	+8.22%	450	3,102	280.00	10.10	-2.11	-17.28%	1,686	7,203
13.67	+1.22	+9.80%	208	835	281.00	10.60	-2.03	-16.07%	440	2,702
12.70	+1.17	+10.15%	151	2,559	282.00	11.71	-1.46	-11.09%	77	2,374
11.80	+0.60	+5.36%	360	1,410	283.00	11.10	-2.43	-17.96%	277	1,091
11.19	+0.59	+5.57%	398	1,453	284.00	12.05	-1.98	-14.11%	39	1,110
11.35	+1.31	+13.05%	388	4,700	285.00	11.79	-2.62	-18.18%	240	2,813
10.17	+0.84	+9.00%	29	1,061	286.00	14.13	-0.67	-4.53%	41	1,874
9.90	+1.58	+18.99%	50	1,623	287.00	13.88	-1.49	-9.69%	22	1,635
9.52	+1.67	+21.27%	1,019	2,753	288.00	13.50	-2.06	-13.24%	43	1,822
8.06	+0.77	+10.56%	10	2,433	289.00	16.56	-0.38	-2.24%	12	1,611
8.31	+1.00	+13.68%	140	6,293	290.00	14.29	-2.26	-13.66%	402	9,498
6.84	+0.29	+4.43%	225	2,064	291.00	14.34	-3.07	-17.63%	22	1,526
6.50	+0.70	+12.07%	27	3,071	292.00	14.77	-3.08	-17.25%	25	1,284
5.76	+0.22	+3.97%	140	2,323	293.00	18.42	+0.27	+1.49%	14	886

A: blue shading = ITM, future has increased on the day
B: blue shading = ITM, future has decreased on the day
C: white shading = ITM, future has increased on the day
D: white shading = ITM, future has decreased on the day
E: can't tell, need column headers

15. Choose an answer from the choices below:

Select an Option