

Akuna Capital Options 101 - Section 1 Notes

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05/31/2025

Welcome Video

Welcome!

Please watch the short introductory video below.

It will provide a bit more information about Akuna Capital and why we developed this options 101 Course.

The course is an introduction to options marketplaces and derivatives trading. Specifically, it will cover options from the perspective of an options market making firm. It touches on market basics, underlying contracts, option pricing, and option greeks. This course lays the foundation for further study into these areas. It utilizes some of the same material Akuna uses to educate our own in-house "junior traders" who are learning the business from the ground up.

We hope you find the world of options and market-making interesting, challenging and fun!

Note: Because this is an introductory course that focuses on option basics, we simplify some concepts in these lessons. To expand on the complexities of the topics at this introductory phase would confuse the reader and we leave the intricacies and more in-depth discussions for later lessons. For example, when introducing delta we ignore gamma effects.

Akuna Capital is an options market maker. That means we're experts in electronic options marketplaces. As we've grown over the past decade, we've faced the challenge of hiring and training new employees to become effective derivatives traders. To meet that need, we created an extensive curriculum of lectures, videos, and exercises, supported by a dedicated staff whose sole responsibility is to produce top-quality traders to add to our team. One of the fundamental differences between us and our competitors is that we invest significant resources into developing new hires into employees who love their careers and grow into leaders. Our trainers and senior traders spend thousands of hours in the first year or more educating and mentoring new trading hires. This is how we grow the company — by passing on our expertise to the next wave of traders. We developed an in-depth options trading curriculum and later adapted it into a 101 course available to all Akuna employees. Now, we've decided to open this course up to you. We know that there isn't a lot of accessible, well-structured options theory available; what exists is often poorly put together or not practical for real-world trading. That's why we're offering this course as an introduction to options, from the perspective of an options market maker. We have a few reasons for doing this. First, we want to educate those who are interested in options trading or considering market making as a career.

Second, we'd love to see how you do — and those who distinguish themselves might be contacted for final round interviews. If you've been given access to this course, take it as an opportunity to learn, to explore a possible career path, and to stand out from the thousands of applications we receive each year. Now, let me tell you a little about the course structure. This is a 101-level course that covers options fundamentals and lays the groundwork for more complex topics. It's organized chronologically into a series of topics and subtopics, each with an approximate time guide to help you manage your pacing. The materials are provided in various formats: written content, lectures, and videos explaining key concepts. We also include exercises and practical applications, similar to what our junior traders use internally. We hope you find this course interesting, challenging, and fun. Thanks for watching — and check us out at akuna.com.

Terminology and Trading Floors

SECTION 1: INTRODUCTION TO MARKET MAKING

There are many different participants in financial and commodity markets. Among them are brokers, proprietary traders, producers, end users, fund managers and market makers (MMs). **A market maker's purpose** is to provide liquidity, create markets, and facilitate price discovery by providing bids and offers to other market participants. Market makers exist in futures, options and other instrument markets. They serve a vital purpose in the financial ecosystem.

Official market makers have a special designation in most marketplaces with benefits that vary from one exchange to another. Registering as a MM can provide you more bandwidth to send orders, cheaper fee rates or other benefits. Often MMs will agree to provide markets for minimum amounts of the day and/or for a maximum width. This ensures a fair and orderly market on the exchange at all times, even during times of price uncertainty.

The next few sections will provide some of the basic framework and terminology for underlying markets and options-specific marketplaces.

Basic Terminology

Please watch the following videos. Use what you learned and any other resources (the internet) to define the following terms. Answers are provided on the following pages:

what does this mean? Often MMs will agree to provide markets for minimum amounts of the day and/or for a maximum width. This ensures a fair and orderly market on the exchange at all times, even during times of price uncertainty.

That sentence describes **obligations that market makers (MMs)** often agree to when operating on exchanges, especially in **options or less liquid assets**. Here's what it means in plain terms:

🔍 Explanation:

- **"Provide markets for minimum amounts of the day"**
→ Market makers agree to **quote prices** (i.e., show both a bid and an ask) for a certain **minimum amount of time each day**.
This means they can't just disappear when it's inconvenient — they have to be present and active, maintaining liquidity.
- **"For a maximum width"**
→ They also agree that the **spread between their bid and ask prices** won't exceed a certain amount.
This keeps the market **tight** and fair, so traders aren't hit with massive price gaps.
- **"Ensures a fair and orderly market"**
→ By being **consistently available** and keeping **tight spreads**, market makers help maintain confidence and smooth functioning — especially important during **volatile or uncertain times**.

⤓ Reworded version:

Market makers often commit to quoting prices for a minimum portion of the trading day and to keeping their bid-ask spreads within a defined limit. This helps maintain liquidity and ensures the market remains fair and orderly — even during periods of high uncertainty or rapid price movements.

Let me know if you want this translated into a LaTeX paragraph.



Hello and welcome to this video presented by Akuna Capital. In this video, we'll go over some basic terminology used by options market makers. The first set of terms will help us understand the fundamental building blocks of market making, followed by a discussion of different order types. First, the **bid** is the price someone is willing to pay to buy something—often we refer to the highest bid in the marketplace. For example, if you think tomorrow's expected temperature is 64 degrees, you might be willing to bet that it's above 60, giving you a 4-degree cushion. If multiple bids exist, we focus on the highest one. Next, the **offer** is the price at which someone is willing to sell. Again, we typically focus on the lowest offer. If you expect a 64-degree temperature and offer to sell at 68, you also have a 4-degree cushion. The **size** refers to how many contracts one is willing to trade at a given price. A bid of 60 with size 4 means you're willing to trade four contracts; perhaps you're more confident in your 68 offer and willing to trade ten. To **make a market** means to provide both a bid and offer along with their respective sizes, such as: "I'm 60 bid for 4, and 68 offer for 10," or simply "60 at 68, 4 by 10." The **spread** is the difference between bid and offer—here, 8 degrees wide. A **hedge** is a trade that reduces the risk of an existing position. For example, if you bet the Chicago Bulls will win, you could hedge by betting they'll score under 120 points, betting against them at halftime, or betting against their 3-point percentage—each reduces risk due to correlation with the original bet. **Paper** refers to outside market participants Akuna trades with, a term that originated when orders were physically written and delivered to the pit. A **broker** is an intermediary connecting one party (like a client) with another (usually a trader or market maker). The **tick size** is the smallest price increment. For example, if a stock goes from 100.00 to 100.01, the tick size is one cent. For a future that moves from 100 to 100.125, the tick size is 1/8. Different products have different tick sizes depending on the exchange. **Queue priority** determines whose order gets filled first on electronic exchanges. The common model is *price-time priority*, where higher prices (for bids) or lower prices (for offers) rank first, and among identical prices, earlier timestamps get priority. So if two \$81 bids are entered, the one timestamped first gets filled first. The exchange aggregates these, so traders only see "81 bid for 7" even if it's from multiple parties. Rules vary slightly across products and exchanges, but gaining queue priority is vital for market makers to improve execution. Moving to order types, an **Immediate or Cancel (IOC)** order executes all or part

immediately, canceling any unfilled portion. For instance, if there's a bid for 24 contracts at 100 and you submit an IOC sell for 50, it will sell 24 contracts and cancel the remaining 26. A **Good for Day** order remains active until the trading day ends or until fully/partially filled. A **Good Till Cancel** order remains on the books indefinitely until manually canceled. An **All or None (AON)** order must be fully filled or not at all—common when partial fills are undesirable (e.g., trading 1,000 options but avoiding fills of only 5). A **Fill or Kill (FOK)** order must be filled in full immediately or canceled—unlike AON, FOK does not wait on the book. Floor traders may use “FOK” or “IOC” more loosely to mean “fill what you can, quickly,” so exact definitions can depend on the trading venue. An **OCO (One Cancels the Other)** order is used when submitting two or more orders but wanting to limit exposure—if one fills, the other is automatically canceled. For instance, if you make markets on New York and Connecticut temperatures, and someone buys your New York 65 offer, you may want the correlated Connecticut 63 offer to cancel immediately to avoid double exposure. Since most traders would try to buy both correlated offers, the standard behavior is to cancel both sides of the second market, not just the one being hit. This protects your book from excessive risk. These are the key terms used by options market makers. Feel free to pause and review this list as needed.

Hello and welcome to this video sponsored by Akuna Capital. In this video, we're going to talk about how trading floors and electronic exchanges operate. We'll focus more on trading floors, saving electronic exchanges for another in-depth video. First, we'll talk about how trading floors are set up and introduce a few major participants. Then we'll cover how an order reaches the floor, how a trade is executed and confirmed, and finally, we'll compare trading floors with electronic venues. Most people have seen images of chaotic trading pits—people shouting and waving papers—but there's actually a structured method and language that lets everyone involved understand what's happening. On trading floors, groups of traders gather in designated areas known as pits, each assigned to a specific product. For example, all traders dealing in corn options would stand together in a circle in the corn pit. Historically, traders used paper quote sheets, but today they use tablets or laptops. In the past, most traders worked independently or in small groups with limited capital and were referred to as "locals." Nowadays, many pit traders are part of larger market making firms like Akuna. Due to increased competition, firms like Akuna have come to dominate the pits, causing many locals to either join bigger firms or exit the space. Akuna's pit traders are connected by headset to screen traders upstairs, working in real-time with identical data feeds across venues. Standing on the edges of the pit are brokers—middlemen relaying orders between the pit and off-floor participants. These off-floor parties include a wide range of market participants: for example, a hedge fund might use drone data to assess corn crop health and place trades accordingly; banks might execute trades based on client strategies; companies like Kellogg's might hedge rising corn prices to protect margins; producers such as farmers might hedge against falling prices; large funds, including pension or family offices, may deploy millions in trades; and retail investors, though less common on the floor, may also participate electronically via platforms like E*TRADE or Ameritrade. Market makers like Akuna may connect to brokers directly via phone or IM to ensure visibility across all order flow. Let's walk through an example. Suppose an off-floor trader wants to sell May 20 calls. Even though he already knows he wants to sell, he calls his broker and asks for a quote—“How are the May 20 calls?” The broker relays this to the pit. Market makers respond with two-sided quotes. In this example, two market makers bid \$1.00, and one—Akuna—offers \$1.20. So the market is \$1.00 bid, \$1.20 offer. These prices, along with sizes (quantities), are passed back to the client. The client then says, “Sell 100 at \$1.00.” The broker turns around and sells 100 contracts at \$1.00. The two market makers who were bidding each buy 50 contracts. Now comes trade reconciliation: the traders write tickets with their fill details, and the broker writes a ticket on behalf of the seller. These are collected by firm reps and matched. If all prices and quantities match, the trades are sent to the clearinghouse, which acts as the central recordkeeper and balances accounts. While effective, this manual system can lead to errors. In contrast, on electronic exchanges, all matching happens automatically on exchange servers. If the same off-floor trader wanted to sell 100 calls, he could submit the order electronically, and the trade would be instantly split among all \$1.00 bidders. Each party immediately receives trade confirmations, and clearinghouses receive the data in real-time. This minimizes errors and ensures transparency. Akuna participates in both floor and electronic trading. While most volume is electronic today, floor intelligence remains valuable, so we stay plugged into both environments. Hopefully this video has given you a strong overview of how trading floors work and how they differ from electronic exchanges. Thanks for watching, and feel free to get in touch at akunacapital.com.

General Terms: (Answers)

Bid: The (highest) price for which someone is willing to buy something.

Offer: The (lowest) price at which someone is willing to sell something.

Size: the number of contracts that one is willing to trade at a given price.

Make a market: to provide a bid and ask price and a quantity/size.

Spread: The difference between the bid and the ask price.

Hedge: a trade or investment to reduce the risks of another transaction. A second bet(s) that offsets risks associated with a first bet(s).

Index: an instrument that tracks the performance of a market. Generally, an index will track the performance of many stocks. Examples include the Nasdaq, S&P 500, and Dow Jones Industrial Average.

ETF: marketable security that tracks a stock index, commodity, or other basket of assets. Behaves and trades very much like a stock.

Commodity: a raw material (oil, gold) or agricultural product (soybeans, corn) that can be bought and sold, normally at one prevailing price

Market Participants:

Trader: can define any active market participant. Traders can work for trading firms like Akuna, as well as hedge funds, banks, etc.

Market Maker: a specific trader willing to buy or sell an asset at a specific price at all times. Market makers constantly buy and sell related securities, with their primary responsibilities being to collect edge and manage risk.

Local: General term for market makers. Term comes from pit trading days, as locals stood in the pit every day.

Broker: a person or company that acts as an intermediary between buyers and sellers

Paper: the interested parties trading against Akuna (or other market makers). Term comes from pit trading days as customer orders came via paper.

Hedge Fund/Institution/Bank: Financial institutions that, for a variety of reasons, are active market participants. These groups are generally the largest paper customers.

Retail Client: Smaller "paper" customers. For example, an individual trading at home.

Options Specific Terms:

Fill: Another term for the completion of a trade. If a market maker trades on their bid or offer, the market maker may claim he/she "got filled".

Tick size (tick increment): the increment between one price level and the next smallest price level. Different products have different tick sizes. For example, the tick increment in USD is 0.01, or 1 cent tick sizes.

Queue Priority: for markets that are determined "price-time", if multiple orders are entered for the same price, the participant who entered his/her order or quote first, will trade first. This person is said to have queue priority.

Settlement time: the specific time of days options expire, and futures "settle" for the day. These values are used to calculate daily P&L and mark to market.

All-or-None: an order type that must be executed in its entirety, or not executed at all.

Immediate or Cancel (IOC) : a type of order that requires all or part of the order to be executed immediately. Unfilled parts of order are cancelled– sometimes referred to as Fill and Kill (FAK) orders.

Good for Day (GFD) order: a type of order that will remain active until executed (in part or full) or until the end of the trading day. It is then cancelled.

Good-till-cancelled (GTC): a type of order that will remain active until completed or cancelled by the entering party.

Fill or Kill (FOK): an order type that must be executed immediately in its entirety, otherwise the order is cancelled; often with floor trading – market makers have a few seconds to decide to make a trade and can also do a partial order. Sometimes brokers will use this interchangeably with Fill and Kill and will fill partial FOK orders.

OCO (one cancels the other): when one order is executed, the other order is automatically cancelled. This is usually invoked to protect someone from gaining too much exposure in one direction.

Contract Size: The multiplier attached to an option or future. Options on stock generally have a multiplier of 100 shares. Options on futures have a multiplier of 1 future. The multiplier on options on a future and the multiplier on the future can vary.

Vol bid, catching a bid, ripping/exploding: Variety of terms for vol going up.

Vol offered, vol smashed/smoked: Variety of terms for vol going down.

Teenie: lowest priced options. Generally traded for movement risk purposes.

Theoretical Value (Theo): based on all inputs, the current value a market maker believes an option is worth.

Sheets (or fair value): same as above, but generally when referring to where something traded.

Liquidity: how easy/hard it is to trade close to fair value. Generally determined by the number on contracts on the bid/offer, along with the width of the market.

How Akuna Profits

How Akuna Profits

Akuna executes thousands of options trades each day in the process of making markets. This occurs as follows: We calculate a theoretical value for an option and **disseminate** (send out) a bid below that value and an offer above that value to the market (with appropriate sizes for each). When another market participant wants to trade that option, they'll execute a trade on our bid or offer price. The edge we collect, the difference between our theoretical value (theo) and the price we bought/sold adds up over time. Akuna doesn't have to be right about the final value of these trades. In fact, we lose on a large percentage of them. However, collecting this spread ("edge") thousands of times a day adds up to significant profits for the firm over the long run.

Example: We buy an option for \$1.00. We sell that option out later in the day at \$1.04. We do no other trades over the lifetime of that specific option. The option expires worth \$0. Therefore, of the 2 transactions, 1 was a winner (the sale at \$1.04), while the other was a loser. We lost on 50% of our trades! However, we made \$0.04 of profit (\$1.04 - \$1.00) by trading back and forth.

How can you sell something you don't own?

Selling something you do not own is a concept that often confuses new traders and those outside the financial world. It sounds as crazy as promising to sell someone a car when you don't own one. So, how can you sell an option you don't own? Well, because an options contract is created when two parties (buyer and seller) agree to transact. The option contract is a promise to deliver what's being optioned at a later date. Therefore, if you're the seller, you can worry about locating that item on the expiration date if the option is exercised by the buyer. If the buyer does exercise the option, and depending on the type of delivery, there are a few outcomes:

Stock Option: deliver (or buy) the underlying shares of stock. (Note: you'll need to "borrow" or locate these. We'll skip this topic for now.)

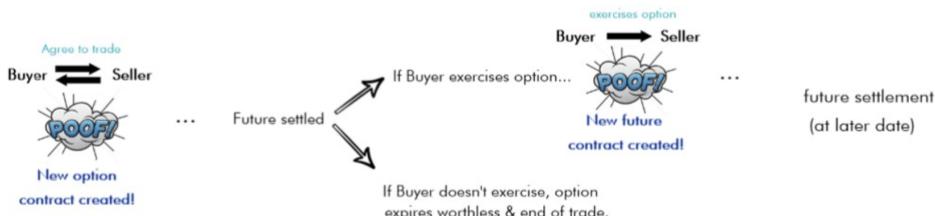
Cash Settled Option: debit the cash from your account to pay the buyer for the difference between the transaction price and the settlement price. Exchanges and clearing firms do most of this automatically.

For example, if you sold an option at \$1 but end up owing the buyer \$4 at expiry, you'd be debited the correct amount by expiry and they would be credited with their profit.

Future Settled Option: deliver a future, which is an underlying contract created when traded vs another party. Just as with options, the seller of a future and the buyer of a future transact at some specified price (the strike price if due to an option). There are various settlements for futures as well when they stop trading.

Example: Future settled option: Trader A buys a call option on a future from Trader B. At expiry that option is worth exercising (we'll get into why later) and Trader A exchanges that option for a future at a specified price. Trader B must deliver that future to Trader A. Trader A and B have offsetting positions in the future. At some point before the future expiration date both parties will either get back to a flat (zero) position or allow the future to settle into cash or a deliverable instrument (ie. Trader B must deliver 5000 bushels of corn to Trader A, or vice versa depending on who's bought and sold the future).

The mechanics of an option on a future



Marketplaces

Akuna primarily trades options on electronic exchanges ("on the screens") and on open outcry trading floors ("trading pits"). Both electronic and floor marketplaces provide a fair, central and transparent location to trade options.

We have traders in our Chicago and Sydney offices controlling our servers, which are located at various data centers run by an exchange. Having servers located at these centers is known as **co-location** and saves precious time (nanoseconds) when Akuna is sending and amending quotes and orders to the exchange's **matching-engine**. It is crucial that our computers have the lowest latency algorithms possible.

Why it matters:

In modern electronic trading, **speed = edge**. Faster access to the market means:

- Better prices
- Higher fill rates
- Lower risk of being picked off by faster traders

Co-location + low-latency algorithms = Akuna's competitive advantage.

We also have Akuna traders on trading floors and making markets verbally to traders and brokers in that pit. These floor traders have tablets with option prices and are communicating with the screen traders via headsets. Finally, we speak to brokers who stand on (or off) the floor and who represent our orders in pits where we don't have a dedicated Akuna trader. We use turrets (open lines), phones or chat services to communicate with brokers.

What it means:

- **"We speak to brokers"**:

Akuna communicates directly with third-party brokers.

- **"Who stand on (or off) the floor"**:

Some brokers are physically on the trading floor (in the pit), others might be nearby but still connected to it.

- **"Represent our orders"**:

These brokers act on Akuna's behalf — they take Akuna's orders and execute them in pits where Akuna doesn't have its own traders present.

- **"Pits where we don't have a dedicated Akuna trader"**:

Akuna doesn't cover every product pit with its own staff, so it relies on brokers in those locations.

- **"We use turrets (open lines), phones or chat services"**:

Akuna communicates with these brokers via:

- **Turrets**: specialized multi-line trading phones with open audio lines to multiple parties at once

- **Phones**: direct calls

- **Chat**: secure instant messaging systems (e.g., Bloomberg chat, Symphony)

Clear and concise communication between teams of traders working together on screens and trading floors is critical. Traders learn to be precise and accurate with their words as any confusion can cause unintended consequences.

Over the Counter (OTC) trades happen 'off-floor' and are transacted directly from one party to another. The first party will call the other and ask for a contract with non-standard specifications. The parties agree to the price and specifications (expiry date, strike, multiplier, etc.) and trade directly with one another. The big difference between these markets and exchange listed contracts is that OTC trades have significantly more **counterparty risk** because there is nothing ensuring that the firm you are trading against will honor their side of the contract or has the funds to back the deal if it goes bad.

To contrast OTC trades, let's highlight how little risk there is to trading contracts on an exchange: For the contract to default the entity you traded with (through the exchange) would have to default. Then their clearing company would *also* have to default. And finally, the exchange on which you traded would have to fail to do so. No US exchange has ever defaulted on a contract or agreement.

There are many electronic exchanges in the US that trade options. Some are the only place where specific option contracts trade, while other options are listed on multiple exchanges. A **singly listed option** example is Live Cattle options (and futures). The only place in the world where you can trade a Live Cattle option is on the Chicago Mercantile Exchange (CME). An example of an option class that is listed on multiple exchanges is Apple Co. (AAPL). You can route an AAPL options orders to over a dozen exchanges.

Options on futures are regulated and governed by the Commodity Futures Trading Commission (CFTC) while options on equities are regulated by the Securities and Exchange Commission (SEC).

Options on futures are traded on two main exchanges in the US:

CME Group: Comprised of a merged entity of four old exchanges listed below.

- **COMEX:** metals
- **NYMEX:** energy (oil, gas)
- **CBOT:** grains and treasuries
- **CME:** currencies, Eurodollars and SP500, livestock

ICE: Main products are Brent & WTI Oil, sugar, coffee, cocoa, OJ, Russell 2000 index, USD index.

Options on indices, individual stocks and ETF's all trade on multiple exchanges. Only the CBOE trades the SPX index and VIX options due to licensing agreements.

Settlement Types

There are several settlement types for options and futures. The most common option settlement types are stock, cash, or futures contracts. This is what the option "turns into" at expiration.

Futures contracts are either cash settled or physically delivered. Futures contracts that are physically delivered require the holder to produce the commodity or take delivery of the commodity. Futures contracts that are cash settled are simply debited or credited from the accounts of the buyers/sellers when the contract expires.

Cash settled example: If you buy an E-mini S&P 500 futures contract for a price of 2800 and that contract expires worth 2810 then you are up 10 points (times 50 multiplier) which is \$500. On your statement your account is credited +\$500 from this transaction (we've simplified the accounting and only noted it from purchase to final \$500 settlement).

Some other examples of cash settled contracts are Lean Hogs, Feeder Cattle & certain Natural Gas futures.

Physical delivery example: There are several warnings to those holding futures before physical settlement. These reminders are called the First Notice Day and Last Trading Day. If at a future expiry someone is long a corn future they are entitled to 5,000 bushels of corn. These bushels can be delivered to one of several warehouses that are specified by the contract. Someone short that contract must deliver the corn.

It is estimated that <1% of all physical futures contracts traded result in delivery. Akuna is always **flat** (zero position) futures well ahead of any physical delivery dates. We're not in the business of delivering or accepting large shipments of corn, soybeans or oil!

The following three videos from Khan Academy do a fantastic job explaining forwards and futures. We're not ones to reinvent the wheel so we're happy to include them as part of our education materials.

Every year, an apple farmer produces one million pounds of apples—but he faces a major problem: the price of apples fluctuates wildly. In some years, apples sell after harvest for over 30 cents per pound, allowing the farmer to make a substantial profit. Other years, the price drops to 10 cents per pound, leaving him unable

to cover costs. On the other side of the equation is a pie chain specializing in making apple pies. When apple prices soar, the pie chain runs losses because of high input costs; when prices fall, they benefit—but neither party enjoys the unpredictability of alternating between feast and famine. To reduce this uncertainty, the two can agree in advance to transact at a fixed price regardless of market conditions after the harvest. They can create a contract stipulating that the pie chain will purchase one million pounds of apples at a fixed price—say, 20 cents per pound—on a specified date, such as November 15th. This arrangement benefits both sides: the pie chain locks in a manageable cost that enables stable planning and profitability, while the farmer secures a price that covers expenses, pays wages, and reduces risk. This type of agreement is called a **forward contract**, which is a binding obligation for both parties to transact at a predetermined price and date. On November 15th, the farmer must deliver one million pounds of apples, and the pie chain must pay \$0.20 per pound, or \$200,000 in total. This allows both parties to hedge against price volatility and ensure financial stability.

You might be wondering why an exchange would be willing to take on the counterparty risk involved in standardized futures contracts. The first reason is profit: the exchange can earn money by setting different settlement prices for buyers and sellers. For example, it might allow buyers to enter into a futures contract at a settlement price of 22 cents per pound, while simultaneously offering sellers (such as farmers) a settlement price of 20 cents per pound. When settlement occurs, the exchange collects 22 cents per pound from buyers and only pays 20 cents per pound to sellers, yielding a 2-cent profit per pound. On a standard futures contract for 1,000 pounds of apples, that translates to a \$20 profit per contract. Since these trades occur continuously across many participants—including farmers, commercial buyers, and speculators—the exchange can generate steady revenue by maintaining this spread. To protect against losses if the futures price moves unfavorably, the exchange also requires each party to deposit funds called **margin**. This margin serves as a financial cushion, representing the maximum daily price movement the exchange expects. It acts as a form of insurance to ensure that both sides will fulfill their obligations at settlement. The mechanics of margin will be explained in greater detail in a subsequent discussion.

Before we get into options it's important to discuss what stocks and futures are and how they trade. Because stocks and futures are the **underlying instruments** on which options (derivatives) are based, knowing their price at any given time is essential to a market makers' ability to correctly price the option on that underlying security.

A stock is a share in a company that is issued to raise capital. Companies that are publicly traded allow their shares to trade openly on an exchange. We use the share price published as an input to our options' models.

Similarly, a future is a contract traded on an exchange and is an agreement between two parties to buy/sell a commodity or asset at a predetermined price at a specified time in the future. Stocks and futures contracts listed on an exchange are standardized so they can easily trade. The buyer of a future is taking on the obligation to buy the underlying asset when the futures contract expires. The seller of a future has the obligation to provide the underlying asset at that date. Standardization also allows someone to sell to one party then purchase from another without any 'leftover' position, as the exchange stands 'in between' each transaction.

This sentence is explaining one of the key benefits of **standardized** futures contracts and the role of the **exchange** as a **central counterparty**. Here's a breakdown:

◆ **What it means:**

- In a **standardized futures market**, every contract has the same terms (e.g., quantity, quality, settlement date, etc.).
- This **standardization** allows different parties to trade easily with one another, without having to negotiate unique terms each time.

◆ **Role of the Exchange:**

- The **exchange** acts as the **middleman** in all trades.
- So when **Trader A sells a contract**, they aren't selling *directly* to **Trader B**—they are selling **to the exchange**, which then **sells it to Trader B**.
- This setup means both traders are really transacting with the exchange, not with each other.

◆ **No 'Leftover' Position:**

- Because every trade is with the exchange, you can:
 - **Sell a contract** (open a short position),
 - Then **buy the same contract** back from *someone else* (close the short position),
 - And it **perfectly nets out**—no mismatch or residual exposure.
- Without standardization or a central counterparty, the seller might be stuck unless the original buyer agrees to reverse the trade.

✓ **Summary:**

Standardization + exchange intermediation means traders can freely enter and exit positions with multiple counterparties—**everything clears cleanly** through the exchange.



Futures contracts are often traded by someone who physically has (or will have) the asset as well as by a party that will need the asset at some point in the future. These interested parties are often referred to as **producers** and **consumers**. These parties can lock in the price they sell/buy the asset for to protect against future price movements. Similarly, these parties and others can use options to hedge, speculate, or lock in profits.

Example: A medium sized farmer in Iowa owns a farming operation that expects to produce about 20,000 bushels (544 metric tons) of wheat this year and wants to lock in the current price of wheat to help him sleep better at night. Currently, if the price goes up he will profit, but if the price goes down he could lose his entire business! He knows he will harvest and deliver the wheat around November so by selling the November wheat future today he's locked in that price. If the price goes up he'll make more on the wheat he sells at the market in November (and lose that amount on the futures he sold). If the price decreases he'll lose on the price he sells his crop for in November but make that amount on the futures he sold. He is now **hedged**. To hedge 20,000 bushels, he would sell 4 futures since each future represents 5,000 bushels of wheat.

We'll explore how a farmer can hedge his exposure to commodity price fluctuations with options in later chapters.

Just as Akuna specializes in making markets in options, there are firms that specialize in making markets in stocks and futures. As an options market maker it's very important to be able to correctly price the current fair price of stocks and futures. For now, we'll focus on a very simple example of how we look at futures prices.

The image shown below is a **trading ladder**. The BidQty column values show the quantities that are bid for that price and the AskQty column show the quantities that are offered at that price. This is the entire futures marketplace for this contract (LO F Q18 = WTI Crude Oil August 2018 Future) and it constantly moves as bids and offers are submitted to the market and as trades are matched. The current best bid is 383.75 for 507 contracts and the best offer is 384.00 on 515 contracts.

Day_Trades		Pass Δ			
1	2	3	5	10	C
Bid/BidQty	Price	AskQty	AskOr		
386.00	862				
385.75	382				
385.50	408				
385.25	440				
385.00	1559				
384.75	894				
384.50	1057				
384.25	1092				
384.00	515				
507	383.75				
1022	383.50				
561	383.25				
567	383.00				
539	382.75				
530	382.50				
523	382.25				
554	382.00				
487	381.75				
496	381.50				
	381.25				
	381.00				

For pricing purposes Akuna might say that the fair value in the future right now is 383.875 because it's the midpoint between the bid and the offer in the marketplace. This is a very simple average price calculation that we could use to price options that are derivatives of the future.

Forward Prices

1.2.1 Exercise: Forward prices (10:00)

You [may use a calculator or spreadsheet](#) to answer the following questions.

Options are based on the forward prices of the underlying assets. Below is a quick exercise that will show how to calculate a forward price for a stock. We've provided a basic equation to help you do the calculations. You may also refer to the materials in the previous sections as a guide.

$$F = S e^{rt}$$

F is the forward value of an instrument S, where t = time expressed in years (1 years = 1) and r = interest rate (1% = 0.01)

Information:

Stock = XYZ

Assume today is May 5th, 2020 = 253 days until Jan 15, 2021

current stock price = \$303.00

interest rate = 1%

(for this exercise we'll assume that this stock pays no dividends)

Note, this exercise requires some work on your own to figure out. We purposely didn't provide much info on this topic in the earlier sections. Let's see if you can piece this one together!

Also, the exercises in this course don't provide answers or allow you to review your answers. Once you've completed the course we can send you the answers to these exercises.

This exercise is asking you to calculate the **forward price** of a stock using the formula:

$$F = S e^{rt}$$

Where:

- F = forward price (what you're solving for)
- S = 303.00 = current stock price
- r = 0.01 = annual interest rate (1%)
- t = $\frac{253}{365} \approx 0.693$ years
- e = Euler's number ≈ 2.71828

Plug into the formula:

$$F = 303.00 \times e^{0.01 \times 0.693} = 303.00 \times e^{0.00693} \approx 303.00 \times 1.006954 \approx 305.11$$

Final Answer:

$$F \approx 305.11$$

Quiz

1 / 1

Given the information above, what would be the forward price for stock XYZ on Jan 15, 2021?

300.92
303.00
305.02
correct
305.10
305.16
306.20
604.34
3765.86

[Continue >](#)

Options on Listed Futures

Options on Listed Futures

Options are derivative instruments. They are based on the underlying contract and there are two main option types- **calls** and **puts**. We'll see in the following sections how these two are inextricably linked. The table below shows some markets (without quantities) for two strike prices. Calls are the right, but not the obligation to buy the underlying asset for a specified price, called the strike price, on or before a specified expiration date. Puts are the right, but not the obligation to sell the underlying asset at a specified strike price on or before the expiration date.

The 315 strike call has a theoretical value (theo) of 8.00. The current market is 7.75-8.25 (read as "7.75 at 8.25"). Someone who bought this option for 8.25 would have the right to buy the asset for 315. Therefore, the seller of the option would be obligated to sell the asset at this price. The theo of the 315 put is 6.00 and the buyer of this put is buying the right to sell the asset at the price of 315. You can see the 320 strike is listed directly below it. There are usually many strikes at various prices listed for each option expiration date.

Expiration date = June 20, 2022

	Calls			Puts			
	bid	theo	ask	strike	bid	theo	ask
7.75	7.00	8.00	8.25	315	5.75	6.00	6.25
5.25	5.50	5.75	5.75	320	8.25	8.50	8.75

Expanding on the table above, we can show a more complete options screen snapshot below. Now, we'll focus on the concept of bids and offers in each individual option. We circle the 55-strike call option. You can see the strikes running down the middle black column. It has a value (theo) of 1.85 and the market for it is 1.775 at 1.90. This means the highest bid price (highest price someone is willing to pay & highest price at which someone else can immediately sell) is 1.775 and the lowest offer (lowest price at which someone is willing to sell & lowest price at which someone else can immediately buy) is 1.90. The quantities for these are 85 and 63 respectively. We'll discuss the other columns in later sections of this course.

	S	C	O	B	Q	Bid	Offer	P	Theo	A	T	Pos	P/Bid	C/Fid	P/Theo	F/Ack	P/Pack	Q/Fifo	C
55	112.450	22.71	23.000	11	26	85	80.02	0.84	0.071	21									
56	112.475	20.73	21.000	11	28	-1	133.808	0.68	0.100	115									
57	115.825	18.79	19.075	12	30	-163	152.112	0.15	0.171	114									
58	126.625	16.90	17.775	12	32	-64	149.223	0.29	0.275	1									
59	126.575	15.70	16.150	12	33	-29	150.040	0.58	0.371	149									
60	126.575	14.06	15.150	12	34	-24	149.040	0.50	0.360	2									
61	123.900	14.17	14.425	13	35	-99	143.050	0.53	0.575	133	20								
62	123.925	13.30	13.550	13	36	-118	230.060	0.66	0.700	232	2								
63	132.150	12.45	12.700	13	37	38	178.178	0.81	0.850	208									
64	131.125	11.75	12.075	13	38	-1	112.952	0.59	1.000	124	2								
65	129.800	10.82	11.000	13	39	-56	140.040	1.16	1.151	165									
66	129.750	10.04	10.275	14	40	-50	133.125	1.16	1.400	47	22								
67	25	9.075	9.28	8.000	27	41	101	114.150	1.62	1.650	95	2							
68	26	8.325	8.55	8.775	28	42	94	27.1825	1.86	1.925	68	4							
69	26	7.650	7.85	8.050	19	43	89	35.2125	2.81	2.225	77	12							
70	3	27	7.10	7.48	24	44	24	24.025	2.68	2.000	273								
71	29	6.125	6.53	6.725	15	45	275	19.2775	2.88	2.800	61	4							
72	3	15	5.750	5.92	6.075	17	46	15	27.1150	3.29	3.275	54	20						
73	27	5.225	5.33	5.425	30	47	57	81.1550	3.64	3.675	51								
74	26	4.400	4.52	4.625	34	48	45	16.025	4.06	4.245	245								
75	29	4.000	4.150	4.315	49	49	449	14.490	4.55	4.600	45								
76	36	3.675	3.78	3.825	26	50	-88	39.4950	5.65	5.150	55	2							
77	11	40	3.225	3.32	3.400	59	51	-25	27.500	5.66	5.650	36	1						
78	46	8	4.3	2.800	2.90	2.90	32	52	-276	32.6775	6.17	6.275	64	17					
79	46	8	4.000	4.150	4.250	38	53	-98	18.6000	6.78	6.925	18							
80	85	1.775	1.85	1.900	69	55	-116	17.7825	8.18	8.300	33	2							
81	101	99.150	100	102.625	64	56	-129	16.8675	8.88	8.875	16	22							
82	1	110	1.750	1.33	1.775	94	57	35	15.9375	9.56	9.775	29							
83	6	101	1.000	1.000	1.000	62	64	81	15.0425	10.38	10.380	27							
84	137.750	0.92	0.975	0.98	0.98	59	60	28	15.0425	10.38	10.380	27							
85	20	0.775	0.77	0.825	241	60	238	14.11775	11.99	12.275	14								
86	185	0.600	0.64	0.675	106	61	-4	14.21650	12.89	13.150	14								
87	114	0.600	0.57	0.575	132	62	123	14.13525	13.76	14.050	13								
88	187	0.325	0.37	0.415	159	64	-141	13.13350	15.59	15.950	13								
89	6	151	0.225	0.27	0.200	127	66	-37	13.07225	17.48	17.775	14							

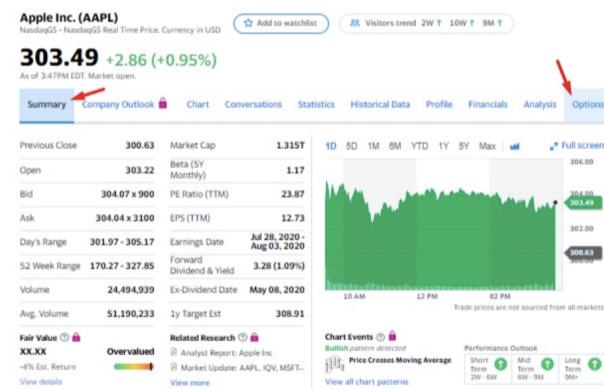
Looking up options on yahoo!

This section discusses the method of looking up options prices on Yahoo!

You can trade options using any brokerage (Fidelity, Vanguard, TD Ameritrade, etc) and looking up an options series is similar to the method for Yahoo! below:

1. First go to Yahoo Finance (or similar) and input the underlying stock you'd like to look up. Here we've picked Apple Inc (ticker: AAPL)

This will bring up the summary page. Click on the Options Tab shown by the red arrow.



This will bring up the Options section, which shows the series of options with calls listed at the top and puts at the bottom. You can pick the expiration date from the drop down box. Here we've selected January 15, 2021. The List view isn't as useful of a layout as the straddle layout which will show the strikes down the middle with the calls and puts on each side. Click the straddle view.

The screenshot shows the Yahoo Finance Options section for Apple Inc. (AAPL) for January 15, 2021. The 'Straddle' view is selected. At the top, there is a promotional banner for 'Don't Take Your RMD in 2020—Here's Why'. Below the banner, the 'Calls' section displays a table of option contracts. The table includes columns for Contract Name, Last Trade Date, Strike, Last Price, Bid, Ask, Change, % Change, Volume, Open Interest, and Implied Volatility. The table lists multiple contracts for different strike prices and expiration dates, such as 75.00, 80.00, 85.00, 90.00, 95.00, 100.00, 105.00, 110.00, 115.00, 120.00, 125.00, 130.00, and 135.00.

In straddle view you can view the puts and calls on the same line. If we display the 300 line (which is close to the 303.49 price) we can see that the call (Last price) is 33.99 while the put is 32.30. Take a minute and think about why these two values are close. Should the right to buy for 300 and the right to sell at 300 be worth about the same, given the current stock price of 303.49? We'll get into this in more detail in the upcoming sections as we describe the relationship between calls and puts.

55.11	+0.62	+1.14%	14	2.248	265.00	18.30	-1.42	-7.29%	4	4.110
52.45	+0.45	+0.87%	65	4.996	270.00	20.00	-0.85	-4.08%	30	8.071
49.20	+0.65	+1.34%	47	1.738	275.00	22.00	-1.30	-5.58%	4	3.448
45.55	+0.10	+0.22%	56	13.643	280.00	23.90	-0.90	-3.63%	77	11.761
42.45	+0.45	+1.07%	18	1.190	285.00	25.35	-1.13	-4.27%	19	5.260
39.55	+0.38	+0.97%	168	7.599	290.00	27.75	-1.60	-5.45%	44	10.112
36.65	+0.41	+1.13%	18	1.291	295.00	29.85	-1.45	-4.63%	35	8.71
33.99	+0.63	+1.89%	1164	17.550	300.00	32.30	-1.57	-4.64%	82	8.980
29.00	+0.40	+1.40%	263	9.489	310.00	37.01	-1.69	-4.37%	12	2.583
24.20	+0.10	+0.41%	426	14.999	320.00	42.45	-1.54	-3.50%	6	2.464
20.60	+0.30	+1.48%	666	10.833	330.00	48.33	-1.49	-2.99%	3	2.182
16.65	-0.15	-0.89%	281	6.361	340.00	54.98	-1.52	-2.69%	7	1.096
13.80	+0.12	+0.88%	914	11.849	350.00	61.62	-1.08	-4.76%	35	670
11.25	-0.10	-0.88%	39	6.537	360.00	69.61	-0.84	-1.19%	6	236
9.10	-0.16	-1.73%	130	3.973	370.00	76.48	-10.18	-11.75%	3	338
7.10	-0.25	-3.40%	41	5.192	380.00	84.62	-10.26	-10.81%	3	224

The video below will discuss some of the main parts of an outright screen and walks through the bids/offers and sizes of the call and put contracts. While the Yahoo! screens are delayed by a few minutes, Akuna's screens show up to the second live market info.

The screenshot shows the Akuna Capital Outright Trading Window for the 2022 March soybean options. The window title is "Outright Trading Window" and the subtitle is "2-22-19 Mar". The main area displays a grid of option contracts with columns for Bid Px, Ask Px, Theo, Ask Px, Ask Sp, Dist, A, T, Pos/PBid, P/Bid, Px/PTheo, Ask P/A, Ask P/Bid, C/Vega, Bid/CQ, and Delta. The contracts range from 2 to 84.62. The interface includes a toolbar at the top with icons for file, edit, search, and zoom, and a status bar at the bottom showing "0611" and "Exit full screen (F)".

Hello and welcome to this video presented by Akuna Capital. In this video, we'll describe an outright trading window, which is the type of window traders use to interact with outright trading contracts in the marketplace. We'll go over some of the main features of this window and some basics of the options market. This window displays all of the outright options for the Soybeans 2022 March expiry. One unique aspect of the grains market is that traders refer to this expiry as "March," even though the technical expiry occurs in February—hence the small note added by the trader. Calls and puts for this expiry are listed here, with calls on the left and puts on the right. This window is built from market data provided by the exchange, including

all bids and offers in the marketplace. Zooming into a specific strike to explain further: for the 740 put option (which gives the right to sell the future at \$740), we have a bid price of \$0.1225 (or 1/8), which is the highest price the market is willing to pay. Soybean tick sizes are in eighths, leading to these non-standard decimal prices. Akuna's theoretical value (Theo) for the option is \$0.15, and the offer is at \$0.25 (or a quarter). The bid and offer are color-coded to indicate whether Akuna is part of those prices. In this case, Akuna is not part of the bid but is participating in the offer, as \$0.25 has sufficient edge over our Theo. The cells adjacent to the bid and offer show size: the market is willing to buy 1,109 contracts at the bid and sell 6,287 contracts at the offer, with Akuna included in that size. Zooming back out, the full list of strikes shows where Akuna is quoting. The middle column shows strike prices, with calls to the left and puts to the right. For example, the 910 call shows a market of \$16.875 at \$17.25, while the 910 put shows a market of \$14.25 at \$14.50. The far-left column is call turnover, showing how many contracts have traded today (269 for the 910 call). The columns include theoretical values (in blue), bid and offer prices, and their respective sizes. The "spine delta" column shows delta values for each strike—an important Greek used by traders. Strikes closest to the nodes of our volatility curve are highlighted in orange, helping traders locate where strikes fall in delta space. To the right of the strike column is the position column, which shows Akuna's net position on each strike; for instance, we are long 448 contracts at the 910 strike (calls and puts combined). Calls and puts can also be viewed separately in hidden columns. The Vega column—another major Greek—is also shown. Finally, the "bid offset" column displays the edge required around our Theo to trade each option via our AT strategy. There's also a quote bid offset just off screen. Violet (the trading software) allows traders to display more columns than what's shown, but many are hidden to conserve screen space—especially with 10 to 20+ outright windows open. Hopefully this explains the main parts of an outright trading window. In the next video, we'll cover the combo window, the market trade ticker, the trade list, and the portfolio window. Thanks for watching, and feel free to reach out with any questions.

Contract Specifications

Details about option and future expiries vary by product and will always be listed by the exchange. Things like the expiration date, the underlying contract, and the type of settlement will always be carefully set by the exchange.

Many options Akuna trades are derivatives based on an underlying future.

The details for options that are based on a listed stock are more straightforward because there is only one stock traded, and all options expire into the underlying stock. Feel free to take some time and google "CME corn contract specifications" or something similar if you'd like to learn more about a contract.

Options, Edge, Multipliers & Cash

One of the contract specifications that is set by the exchange are the tick increments and multipliers of the options and underlying contracts. For new traders there is often confusion about options and futures prices, their tick increments, and their multipliers. We'll attempt to clarify some of these issues here. Again, with a stock it's pretty straightforward. We pay a price, in dollars, for the shares of stock and we calculate the profit/loss by subtracting the current price from transaction price.

Example: We buy 1 share of AAPL (Apple Inc) for \$175.05 and it goes up to \$175.80. We know we've made \$0.75.

This is because stocks have a **multiplier** of 1 on their shares. This multiplier (sometimes called contract size) allows us to calculate the total contract value. Therefore, we know that we require \$175.05 ($175.05 * 1$) to purchase shares at that price. Let's compare that to a corn future.

Multiples, Simplified

If I bought something for 3 and sold it at 4, how much money have I made? Well, that depends. Usually, we talk about 1-point (the difference between 3 and 4) equating to \$1.00. But that's simply because society has set a multiplier of 1 point = \$1 for most currencies. What if instead we set every 1-point increment as having a **multiplier** of \$10? 1 point = \$10. Now how much have we made? \$10. Many financial instruments have non-traditional multipliers. By using the contract multiplier and the quantity we can translate points into dollars.

So, Profit or Loss (P&L) = points x quantity x multiplier

Each corn future represents 5000 bushels of corn. Corn futures are displayed in pennies (shown below). The current price of one corn bushel is 384 pennies. This means that you'd need $(3.84 \times 5,000) = \$19,200$ to buy 1 corn future. Additionally, to calculate our P&L we understand that a 0.01 price increase in corn, say from \$3.84 to \$3.85, will translate to a \$50 profit (since 100 of these penny increments will be a \$1 move which will get us back to a \$5,000 profit).

BidOfferQty	Price	AvgQtyAvalOr
	386.00	862
	385.75	382
	385.50	408
	385.25	440
	385.00	1559
	384.75	894
	384.50	1057
	384.25	1092
	384.00	515
507	383.75	
	102383.50	
	561383.25	
	567383.00	
	539382.75	
	530382.50	
	523382.25	
	554382.00	
	487381.75	
	496381.50	
	381.25	
	381.00	

Finally, since corn ticks in 0.25 ticks (the smallest increment) we end up with a future ladder like the one pictured. Notice that 0.25 is one-quarter of a penny, 0.0025. Since each penny is worth \$50 and there are 4 ticks between each penny, each tick is worth \$12.50.

Example: If we buy 10 corn futures for 383.75 and sell 10 futures at 384.00 we make 1 tick 10 times, or $\frac{1}{4}$ of a penny times the multiplier times the qty ($0.25 \times 0.01 \times 5000 \times 10$), \$125.00 of profit.

Tick sizes vary by product. Some common ones are 0.01, 0.10, 0.125, 0.0625, 0.025.

To further complicate things, options also have a multiplier that allows us to translate how options relate to their underlying (stock/futures). For example, options on stocks have a multiplier of 100, which means that 1 option translates to 100 shares of stock. Normally options on futures have a multiplier of 1. So, 1 corn option will translate into 1 corn future (which then translates into 5000 bushels).

Edge vs Cash

Sometimes, traders don't need to calculate how many dollars were made (P&L) and instead want to discuss a trade in terms of edge in points (or ticks) against the current theoretical price. This is more applicable for options than futures. For example, if we had an option worth 1.00 and we sold it at 1.04 we could say we made "4 cents of edge". If the option ticks in pennies we could also say we made "4 ticks of edge". If it happens to tick in 2 cent increments, then we'd say we made "2 ticks of edge". Sometimes speaking in edge terms is enough information.

If we then want to translate that edge to cash terms, we'd multiply by the quantity traded and the multiplier. If, using the example above, we had a 1000 multiplier and we sold 20 contracts we'd have made $(0.04 * 1000 * 20) = \$800$ in theoretical profit (vs our current theoretical price).

Below are some common futures multipliers:

Oil = 1000 barrels of oil

Corn, Soybeans, Wheat = 5000 bushels

SPU future = \$250 per contract

E-mini future = \$50 per contract

Therefore, when calculating edge and cash for trades here are the rules of thumb:

Edge in points = edge in raw numbers/points. No multipliers or quantities needed.

Edge in cash = for cash P&L, we multiply edge x contracts traded x multiplier.

Example:

Q: If we sold 20 Corn 400 call options at 20.25 and we had them worth 20.00, what was our edge?

A: Since corn options tick in 0.125 increments we could say "we got 2 ticks of edge". We could also say "we got 25 cents of edge".

Note: most Agricultural option products trade in .125 increments. This is an exchange rule and is product specific

Q: What was our P&L (cash), using the multiplier for corn?

A: Again, since 0.25 is one quarter of a penny (0.0025) we get, $0.0025 \times 5000 \times 20 = \250 . (or $0.25 \times 0.01 \times 5000 \times 20$)

We'll also think of it as a "quarter" and do the math as follows, changing 5000 to 50: $0.25 \times 50 \times 20 = \250

Terminology and Basics

Important Terminology and Electronic Marketplaces

We've already touched on several key terms in previous sections. In this lecture we dive deeper into a handful of the more important ones and then describe how electronic marketplaces work.

We've also provided the slide deck below for you to review or reference.

Hello and welcome to this lecture, presented by Akuna Capital University. This is Lecture One, and we'll be reviewing terminology and basics. In this lecture, we're going to specifically go over some terminology together. You've already read about some of this terminology in the preceding section, so we'll just go over a couple of key terms—feel free to pause the video to look into any terms we don't cover in more detail. Next, we'll talk about the electronic marketplace. Again, you've already seen the "How Trading Floors Operate" video in the preceding section, so this will lay out the electronic marketplace in more detail. Then, we'll discuss standardized exchange contracts, and finally, we'll end with some futures contracts basics. These are general trading terms you should have seen in the previous lectures. We are going to go over "make a market" in one second, but first we'll explain the bottommost definition: "paper." Paper is generally referred to in the business as other market participants, usually non-market-makers or non-professionals. The term

originated when brokers would call down to the floor with customer orders, and the brokers on the floor would write these down on a piece of paper and run into the trading pits with the orders. That's where the term "paper" comes from. We then use this example to discuss what "making a market" is: it means providing both a bid and an offer for others to trade on. You'll also need to provide a bid quantity and an ask quantity. For example, if we have a theoretical value of 945 (such as the number of marbles in a jar), and I think there are about 945 marbles, then I'm going to make a market around that value. I'm willing to bid \$930 for a quantity of 145—meaning I hope to profit if the number of marbles is above 930. I'm also willing to sell at \$960 with a quantity of 240, hoping to profit if the actual number is below that. So the market would be quoted as 930 at 960, 145 by 240. Next, we'll talk about market participants, highlighting the "local," which usually refers to a market maker or participant that is a single person or small group localized to one trading pit. Corn locals would remain only in the corn pit, soybean locals in the soybean pit, and so on. Pause if you'd like to go over the other market participants, most of which should have been covered previously. Now let's discuss "queue priority," or Q-priority, which is the priority at which an order is filled in the marketplace. Suppose we have four bids—three at 125 and one at 124. The left-hand side shows the time each order was entered. Q-priority follows a time-price structure: highest price comes first, and ties are broken by time entered. So if three bids are at 125 but one was entered first, that order will be filled first. The market sees a total bid of 125 for 300 contracts, without distinguishing between individuals. If someone sells 20 contracts at 125, the earliest 125 bidder gets those and remains in line for the next 10. The next set of terms includes IOC (Immediate or Cancel), Good-for-Day (GFD), theoretical value (already discussed), and liquidity. Pause if needed to review these. Moving on, let's look at how electronic markets work. We already covered open outcry markets in a previous video, so here we'll look at how the architecture of electronic markets functions. The exchange has a "matching engine" for each product, which is just a computer/server that receives all quotes and orders and matches them. These are housed in colocation server farms, where market participants place their servers to ensure fast access. Akuna, for instance, has servers there—just like every other participant using that matching engine. Orders, quotes, and data are transmitted via standardized cable lengths to avoid latency advantages from being physically closer. Akuna performs any speed-sensitive computation on these colocated servers, including precomputing values and sending IOC orders. We also use FPGAs—custom chips designed for ultra-low-latency interaction. Our traders, located at 333 South Wabash in Chicago or even in Sydney, connect to these servers to adjust settings and parameters that aren't latency sensitive—changes that may tolerate a delay of 1–2 seconds. Meanwhile, all fast calculations are done right on the box near the matching engine. Akuna uses a clearing firm—in our case, ABN AMRO. The clearing firm acts as an accountant and intermediary between Akuna and the clearing house. When Akuna trades, the clearing firm gets a copy of the trade and helps with margining and accounting. The clearing firm is also plugged into the clearing house, which matches trades between clearing firms. This ensures trades between firms are reconciled—e.g., Akuna bought from Market Participant B at a set price and time. The clearing house ensures there are no discrepancies. More on clearing firms and clearing houses will be covered in future videos. The final topic is the life of a future, which will set up the next lecture on options. A future is a standardized contract—say, for corn—listed on an exchange and freely traded for months. Counterparties can use it for hedging, speculation, or liquidity provision. At the end of the period, there's a notice period. If you're a producer or consumer, you can deliver or take delivery of corn. Producers deliver to certified warehouses (e.g., in Illinois), and consumers pick it up from there. Akuna does not take or make delivery—so we make sure to have no position in the November future at the start of the notice period. We'll discuss this further when we get into futures in the context of options. That concludes Lecture One—thanks for watching, and feel free to reach out.

Basic Questions

What does the word "disseminate" mean to market makers?

to spread something far and wide

to create the tightest bid/ask spread possible

correct

to send bid/ask markets and sizes to an exchange 

to open a new trading product on a publically traded exchange

to double-check a trade with another market participant

none of the above

How does Akuna make most of it's profits?

incorrect

Akuna has better theoretical pricing models than the market and can make tighter bid/ask prices.



Akuna makes wider markets which lead to more profits for the firm

Akuna makes more winning trades compared to losing trades in every option contract it trades

Akuna makes lots of small amounts buying and selling options back and forth thousands of times a day while market making

Akuna is a registered market maker which gives it better fees and therefore can trade wider compared to other market participants.

The main risk to trading over-the-counter (OTC) is:

the exchange risk

the clearing house risk

the contract not being standardized

correct

the counterparty risk



the increased fees due to trading off-exchange

none of the above

The owner of a corn call option gets the following at expiration:

the right to buy corn at the specified strike price

correct

the right to buy the corn future at the specified strike price 

the right to take delivery of corn bushels

the right to deliver corn bushels

the cash difference between the strike price and the current future settlement price at expiration

none of the above

Which of the following is the best way for a farmer who grows soybeans to hedge the price of his crop?

to buy soybean futures at the current price

to mortgage his farm if his corn crop is worse than expected

correct

to sell soybean futures at the current price 

to sell soybean futures 6 months after his crop has been harvested

to buy call options on soybean futures

The term "local" refers to the following:

a market-maker who's located within 30 miles of the co-located server on the exchange.

a market participant that trades from their home office in a 401k, 403b or IRA account.

a broker/dealer that only trades with market makers that are located on-shore.

a market-maker that is located off-shore but has a local entity that allows him access to US exchanges.

correct

none of the above



There is a market that is currently 6 ticks wide as it stands, 1.060 - 1.075. What is the tick increment (tick size) of this product?

correct

the tick increment is 0.0025



the tick increment is 0.005

the tick increment is 0.010

the tick increment is 0.01

the tick increment is 0.015

the tick increment is 0.03

can't tell from the information given

If you sell 400 shares of IBM stock and the stock goes from \$123.85 to \$124.50, what is your P&L?

\$0.65

\$65

\$135

incorrect

\$260



\$2,600

none of the above

1.5.1 Exercise: Futures Ladders and Options Basics (10:00)

The items below represent 3 futures (ladders) and 7 option month expiries. They are arranged so that the futures and options months line up by expiry date. Use the images below to answer the questions. Feel free to use calculators if needed.

Jan F			
Bid Sz	Bid Px	Ask Px	Ask Sz
40	66.84		
20	66.83		
19	66.82		
11	66.81		
5	66.80		
1	66.79		

Mar F			
Bid Sz	Bid Px	Ask Px	Ask Sz
34	67.43		
54	67.42		
10	67.41		
7	67.40		
7	67.39		
4	67.38		

Jun F			
Bid Sz	Bid Px	Ask Px	Ask Sz
2	66.15		
7	66.14		
1	66.13		
4	66.13		
5	66.11		
1	66.1		

Nov Options

Dec Options

Jan Options

Feb Options

Mar Options

Apr Options

May Options

Which future month are November options based on?

November future

December future

January future

February future

incorrect

June future



[Continue >](#)

Mapping Futures to Option Expiry:

Options on futures typically expire **just before** their corresponding **underlying futures contract**. So the mapping is:

Option Month	Underlying Future
Nov	Jan Future
Dec	Jan Future
Jan	Jan Future
Feb	Mar Future
Mar	Mar Future
Apr	Jun Future
May	Jun Future

2. What is the current best bid in the Mar future?

66.84

66.85

correct

67.43



67.44

67.42

66.16

30

34

« Back

Continue »

3. Which of the futures ladders appears to have the most liquidity (measured by tightness of bid/ask spread and more size)?

correct

Jan future ✓

Feb future

March future

June future

none of the above

[« Back](#)

[Continue »](#)

4. If you needed to sell 50 futures in the Jan future, what would your average sale price be if you sold them based on the current markets (bids and sizes)?

66.83

66.832

66.838

66.84

incorrect

66.85



67.428

◀ Back

Continue ➞

What is the term for housing servers near exchange matching engines?

FPGAs

pre-calculations

clock cycling

correct

co-location



market-taking

market-making

◀ Back

Continue ▶

Gold is which of the following?

stock

ETF

correct

commodity



index fund

currency

◀ Back

Continue ›

Quiz 1

≡ 1.6 Quiz 1 (15:00)

Congrats on finishing the first section!

This is the first of three quizzes that you'll take as part of the course. It will help us assess how well we're teaching you the material.

Click the link below and use the same email address that you used to sign up for this course and it will take you right into Quiz 1.

It will take less than 15 minutes. No pencil, paper or calculators are needed or allowed. Akuna's Traders have to make quick decisions. To mimic this there are time limits on the quiz questions that will test whether you have the information on the tip of your tongue...so act fast!

Once you complete Quiz 1 you'll receive a link for Quiz 2 in your inbox. Save this link until you've reached that point in the course.

[Quiz 1 - Akuna 101 Options Course](#)

Good Luck!

[Complete and Continue ›](#)

Question 1

Question: The current market is 1.23 - 1.25, 10 contracts on each side. If you needed to sell 4 contracts against the current market, at what price would you trade them?

- A: You'd buy them for 1.25
- B: You'd buy them for 1.23
- C: You'd sell them at 1.23
- D: You'd sell them at 1.24
- E: You'd sell them at 1.25
- F: None of the above

* 1. Choose the answer from the choices below:

Select an Option



Question 2

Question: The term "ETF" stands for _____, and an example of an ETF is _____.

- A: exchange traded fund, AAPL
- B: exchange traded fund, Nasdaq
- C: exchange traded fund, SPY (S&P 500)
- D: exchange traded futures, Vanguard 500
- E: exchange traded futures, Nasdaq
- F: exchange traded futures, SPY (S&P 500)
- G: exchange transition future,

* 2. Choose the answer from the choices below:

Select an Option



Question 3

Question: **The practice of co-location refers to:**

- A: buying low latency server to speed up execution of orders.
- B: housing a server close to the exchange matching engine for better interaction with exchange.
- C: finding the fastest route to send or amend orders in nanoseconds.
- D: routing your order to the location (exchange) that will provide best execution.
- E: using the shortest cable from your computer to the exchange matching engine.

3. Choose the answer from the choices below:

Select an Option

Question 4

Question: **An OTC trade carries with it the following (additional) risks compared to exchange-listed contracts:**

- A: Execution risk
- B: Hedge Risk
- C: Counterparty Risk
- D: Delta Risk
- E: Single listed exchange (vs multiple exchange listed) Risk
- F: None of the above

4. Choose the answer from the choices below:

Select an Option

Question 5

Question: **The most commonly listed and traded option type is:**

- A: American
- B: Latin
- C: European
- D: Binary
- E: Digital

5. Choose an answer from the choices below:

Select an Option



Question 6

Question: **An Immediate or Cancel (IOC) order is defined as:**

- A: An order that is filled instantly at the highest price in the market.
- B: An order that gets filled for its entire quantity, or not at all.
- C: An order that is impacted by another order that must be executed first (the "originating order").
- D: An order that is fully or partially filled immediately at, or better than, its limit price. Any remaining qty is cancelled.
- E: An order that is filled immediately for its full quantity, or not at all.
- F: An order that is filled instantly at the lowest price in the market.

6. Choose an answer from the choices below:

Select an Option



Question 7

Question: Which of the following orders has 2nd queue priority if using a price/time priority method?

- A: 1.30 bid for 20 contracts, time entered 12:34:45pm
- B: 1.27 bid for 20 contracts, time entered 12:04:45pm
- C: 12.00 bid for 1 contract, time entered 12:35:45pm
- D: 1.00 bid for 8 contracts, time entered 12:45:45pm
- E: 1.30 bid for 11 contracts, time entered 12:34:00pm

7. Choose an answer from the choices below:

Select an Option

Question 8

Question: **Tick increment (size) is defined as:**

- A: The minimum increment between prices.
- B: The spread between the bid and the offer prices.
- C: The closest bid to the theoretical without going over.
- D: Whether the product trades in decimals or fractions.
- E: The difference between the bid and theoretical values (prices).

8. Choose an answer from the choices below:

Select an Option

Question 9

Question: **The highest price at which someone is willing to buy is called a:**

- A: Theoretical value
- B: Closing price
- C: Ask
- D: Offer
- E: Traded price
- F: None of the above

9. Choose an answer from the choices below:

Select an Option



Question 10

Question: **Using the current bids in the market, what is the most likely tick increment of the product below:**

- 2.000 current highest bid
- 1.500
- 1.250
- 1.250
- 0.875
- 0.750
- 0.500 current lowest bid

10. Choose an answer from the choices below:

Select an Option

Question 11

Question: If we buy 50 options for 0.30 under our theoretical price of 1.42, how much profit (cash edge) did we make? Multiplier = 10.

- A: \$0.30
- B: \$1.42
- C: \$1.50
- D: \$3.00
- E: \$14.20
- F: \$15.00
- G: \$30.00
- H: \$71.00
- I: \$710.00
- J: \$150.00
- K: \$1500.00
- L: None of the above

11. Choose an answer from the choices below:

Select an Option

Question 12

Question: There is a listed futures contract that has a multiplier of \$500 per 1 point. If we buy 2 futures for 50.50 and sell them both at 50.25 we've made a total cash profit of:

- A: \$0.25
- B: \$0.50
- C: \$125.00
- D: \$250.00
- E: \$500.00
- F: \$750.00
- G: None of the above

12. Choose an answer from the choices below:

Select an Option

Question 13

Question: A broker walks into a trading crowd and asks for a market in the July 300 calls. He receives the markets below from the 5 market makers in the crowd.

He wants to relay the best market back to his customer. What does he relay as the current market?

market maker 1: 10.00 - 10.20, 100x100

market maker 2: 10.00 - 10.20, 50x50

market maker 3: 10.00 - 10.30, 50x50

market maker 4: 9.90 - 10.40, 200x200

market maker 5: 9.90 - 10.20, 50x100

13. Choose an answer from the choices below:

Select an Option



Question 14

Question: We had an option with a theoretical value of 0.85. We sold this option at a price of 0.80. How much edge and cash edge did we make with this trade? Multiplier = 100.

A: 0.05 edge, \$5.00 cash edge

B: 0.05 edge, \$0.50 cash edge

C: 0.05 edge, \$0.05 cash edge

D: \$5 edge, \$5 cash edge

E: \$5 edge, \$0.5 cash edge

F: \$5 edge, \$0.05 cash edge

G: None of the above

14. Choose an answer from the choices below:

Select an Option

Question 15

Question: What does the buyer of a put option on a (physically settled) corn futures product get when it expires ITM?

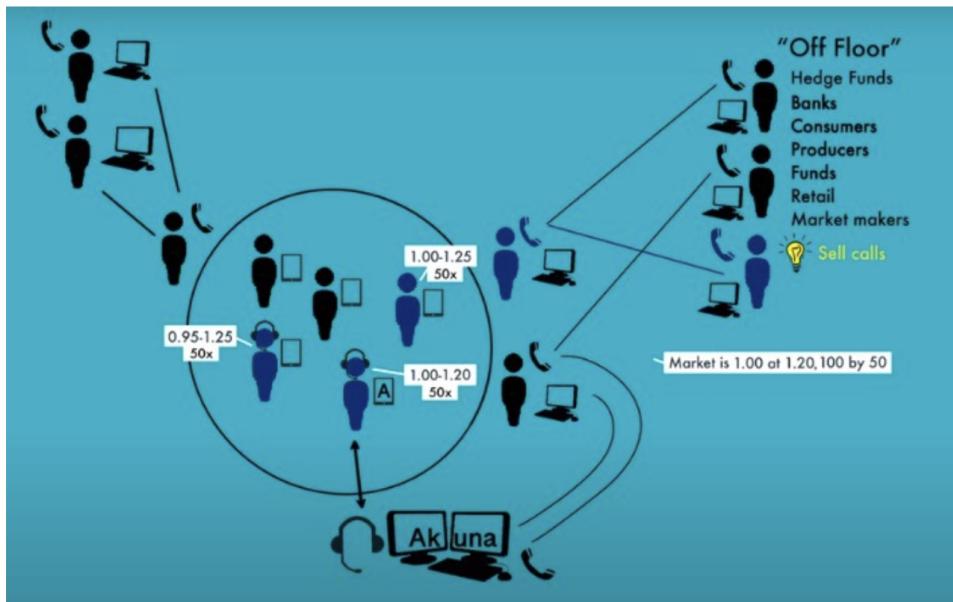
- A: nothing, since it expires worthless.
- B: to buy the physical commodity at the strike price.
- C: to sell the physical commodity at the strike price.
- D: to sell the future at the strike price.
- E: to buy the future at the strike price.
- F: to sell the future at the current market price.
- G: to buy the future at the current market price.

15. Choose an answer from the choices below:

Select an Option

Question 16

Question: A broker wants to sell 50 calls and receives the following market from the crowd, 1.00 at 1.20, 100 by 50. How would he respond?



- A: I'll buy 50 for 1.20
- B: I'm 1.10 bid for 50
- C: I'll sell 50 at 1.00
- D: My market is 1.10 at 1.30.
- E: I'll buy 100 for 1.20
- F: I'll sell 50 at 1.20

16. Choose an answer from the choices below:

Select an Option

Question 17

Question: What is the current bid quantity for the 70.5 call contract below?

Bid Q	Bid	Theo	Ask	Ask Q	Delta	Strike		Bid Q	Bid	Theo	Ask	Ask Q	Vega	Vol	
3	7.17	7.207	7.23	2	99	59.5		956	0.01	0.013	0.02	3016	0.003	36.51 0.006	
4	6.67	6.710	6.74	3	99	60.0		1960	0.01	0.017	0.02	22	0.003	35.39 0.006	
3	6.18	6.216	6.25	2	99	60.5		98	0.02	0.022	0.03	3035	0.004	34.26 0.006	
3	5.68	5.722	5.75	2	98	61.0	1	3	5	0.03	0.029	0.04	3127	0.005	33.13 0.006
3	5.19	5.231	5.27	3	98	61.5		1858	0.03	0.038	0.04	47	0.007	32.02 0.006	
3	4.70	4.744	4.78	3	97	62.0		1936	0.04	0.050	0.06	2613	0.008	30.94 0.006	
3	4.22	4.261	4.29	2	96	62.5		1163	0.06	0.067	0.08	2174	0.010	29.90 0.006	
3	3.75	3.785	3.82	3	94	63.0	-4	5	0.09	0.091	0.10	1136	0.013	28.94 0.006	
3	3.28	3.319	3.35	2	91	63.5		442	0.12	0.125	0.13	160	0.016	28.06 0.007	
3	2.83	2.867	2.90	2	88	64.0		25	0.17	0.172	0.18	326	0.020	27.28 0.007	
3	2.39	2.434	2.47	3	84	64.5	6	6	633	0.23	0.239	0.25	742	0.024	26.60 0.008
3	1.98	2.024	2.06	3	78	65.0	-7	208	0.32	0.329	0.34	375	0.028	25.96 0.008	
3	1.61	1.643	1.68	3	72	65.5	4	8	55	0.44	0.448	0.46	342	0.032	25.34 0.009
3	1.26	1.295	1.30	5	65	66.0	-2	-10	83	0.59	0.600	0.61	28	0.035	24.70 0.009
108	0.97	0.988	1.00	9	56	66.5	-6	3	213	0.78	0.793	0.81	108	0.037	24.11 0.010
13	0.72	0.729	0.74	13	45	67.0		4	35	1.00	1.034	1.07	10	0.037	23.63 0.010
268	0.51	0.522	0.53	13	35	67.5		3	12	1.29	1.326	1.36	2	0.035	23.32 0.010
411	0.35	0.363	0.37	83	26	68.0	-3	-6	3	1.63	1.667	1.71	2	0.031	23.18 0.010
329	0.24	0.248	0.26	450	18	68.5	-2	2	2	2.02	2.052	2.09	3	0.026	23.22 0.010
153	0.16	0.169	0.17	188	12	69.0	-4	2	2.44	2.472	2.51	3	0.022	23.46 0.010	
1365	0.10	0.116	0.12	880	8	69.5	6	14	3	2.88	2.919	2.95	3	0.017	23.93 0.010
1316	0.07	0.082	0.08	161	5	70.0	1	-14	2	3.35	3.385	3.42	3	0.014	24.57 0.010
638	0.05	0.058	0.06	895	4	70.5	1	4	2	3.83	3.861	3.90	3	0.011	25.30 0.010
8	0.04	0.042	0.05	2189	3	71.0	3	-14	3	4.31	4.345	4.38	3	0.008	26.04 0.010
9	0.03	0.030	0.04	2465	2	71.5			2	4.80	4.833	4.87	3	0.007	26.79 0.010
746	0.02	0.022	0.03	2463	1	72.0	6		3	5.29	5.325	5.37	3	0.005	27.58 0.010
2975	0.01	0.017	0.02	267	1	72.5	-1		2	5.79	5.820	5.86	3	0.004	28.46 0.010
1312	0.01	0.013	0.02	2109	1	73.0	25		3	6.28	6.316	6.36	3	0.003	29.42 0.010

A: 8

B: 1316

C: 0.05

D: 0.058

E: 0.06

F: 895

G: 2

H: 638

I: 836

J: 3

17. Choose an answer from the choices below:

Select an Option