Title: The actual math of a winning call option
Author: No-Fox-1400
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This is the actual math of an options trade (call purchase by an ape) that is successful (price goes higher than sneeze), sold or exercised, and 100% DRS.l for GME.

Boring reference section:
CBOE Rule Book.[CBOE Rulebook](https://cdn.cboe.com/resources/regulation/rule_book/C1_Exchange_Rule_Book.pdf)

Look for :
Rule 6.22
Rule 10.3(c)5
Rule 10.4

OCC Rule Book
[OCC rulebook](https://www.theocc.com/getmedia/9d3854cd-b782-450f-bcf7-33169b0576ce/occ_rules.pdf)

Look for:
Rule 901

Citadel Leverage
NY Post article [leverage source](https://nypost.com/2014/04/09/griffins-citadel-a-leader-in-leverage/)

Options & Greek pricing -grabbed from Barchart.com [barchart data](https://www.barchart.com/stocks/quotes/GME/options?expiration=2022-06-17-m&moneyness=allRows)

Law for beneficial ownership [law for beneficial ownership](https://www.law.cornell.edu/cfr/text/17/240.13d-3) note that we saw Susquehana use this in their last report. It is not some obscure never used law.

This is to show the real math, all the math and nothing but the math.

There is a popular near term play out there right now based on OI. June 17 $190 @ 3350 OI. The math is similar for a leap too. I can make a follow up post for that if necessary. Or someone else can since I show the math and method for calculation.

Here are the steps to an options trade when shares are 100% exercised:

A SHF or Market Maker writes a call contract for sale and sells it to the OCC and gets paid the premium for that contract and pays the initial margin based on CBOE 10.3(c)5. The SHF or Market Maker most likely hedges this sold contract. This example assumes a Delta neutral hedging strategy. The OCC sells that contract on the CBOE to you for the premium cost. This is where the OCC makes money on arbitrage.

When you exercise that contract you pay the strike price times 100 to the OCC and you get 100 shares in T+1, where T is Monday since options expire on Saturday. This is equivalent to buying a stock and getting settlement.in T+2, because it literally went through the same process. You get shares, but fuckery could be afoot. They are not guaranteed real shares. Please don’t spam about DRS because I said this. I’m just trying to make a point. Delivery of exercised shares is equivalent to buying through non special routing

market buy. So overall, you paid a premium, paid an exercise cost, and got 100 shares. You 100% DRS them so DTC is -100 shares as you flip them the bird.

The OCC now has your money and made sure you got shares from the NSCC. They then assign that debt to a contract being sold on the same day at the same strike that they have purchased from a SHF or Market Maker. Assigning a contract really just means that the OCC is exercising the contract that they bought from the SHF or Market Maker at the beginning of a trade as part of the novation process.

When that contract is assigned (or really exercised by the OCC) the SHF or Market Maker owes margin based on CBOE 6.22. The margin due is based on CBOE rule 10.3(c)5. Additionally, Rule 10.4 allows them to group trades in a portfolio account so that total positions long and total positions short each get netted. Remember, just like the NYSE, the CBOE does clear trades. They pass that responsibility over to the OCC in CBOE rule 6.22. The OCC uses Rule 901 to pass that buck straight over to the NSCC where options share delivery gets netted with regular share delivery in CNS. Every time. So the OCC takes your money, pays it the SHF or Market Maker, and gets a margin payment from them based on CBOE 6.22 and 10.3(c)5.

Now let's also be realistic. They aren't paying full margin or delta. They use leverage. According to this link, Citadel uses 8.8 times estimated leverage. I think that's fair and reasonably sourced. https://nypost.com/2014/04/09/griffins-citadel-a-leader-in-leverage/ the way margin works is they only pay 1/8.8 times what you and I pay for the same security or derivative. So their margin cost is only 1/8.8 of the calculated margin. Their delta cost is only 1/8.8 of the calculated delta.

So overall the SHF or Market Maker got paid a premium, paid a leveraged delta neutral hedge, paid a leveraged margin deposit, and got paid the cost to exercise. Notice how there wasn't a mention of shares going out from the SHF or Market Maker. This isn't a coincidence. It's the point of CNS. They play musical chairs with the beneficially owned shares they have to kick the can on failures to deliver.

So let's get to the actual fucking math, am I right?!?!

Yes. I am.

Let's say GME hits $400 at some point before expirey. Everyone would be nuts thinking moass is about to happen because we finally got over $350 again. Holy fuck. Now I need new pants thinking about it.

July 17 $190 bought at lowest price possible

Date bought: 1/28/22 for $10 per share ($1000 per contract)
Delta: I don't know how to look at historical delta, so I calculated an estimation. Here's the math.

Heres at time of purchase
So when you bought the contract you were out the premium, -$1000, and the SHF or Market Maker is up $1000 -leveraged delta hedge- initial margin. This delta hedge would be 56.95 shares, so the leveraged delta hedge initially is

*Leveraged delta hedge = 56.95/8.8=6.47 shares.

*Cost of 6.47 shares = 6.47*$93.52 =$605

*Initial margin is 100% of options contract + 20% of exercise price=$1000+$3800=$4800
*Leveraged initial margin is $4800/8.8=$545

Initially you are -$1000 and the SHF or Market Maker is -$240. Big yawn. No real pressure up or down. Overall we are talking a net of -2.5 shares of GME on that day per contract.

Here's when GME at $400 and you exercise:
You are -$1000-$19000=-$20000 and you get 100 drs shares

DTCC -100 shares

SHF or Market Maker gets $1000 + $19000 – leveraged delta hedge – leveraged margin.

Now the delta hedge and margin have changed since the price of the underlying has changed. Now delta is 1 is the contract is well ITM. The margin due is now maintenance margin instead of initial margin. So if delta is 1 and their hedge strategy is to not pre buy when delta hits 1 but only go to market when option contract is exercised. This is called a worst case scenario for hedging. They naked sold a call contract, meaning no shares backing it, and didn't hedge with actual shares when the strike was met. This is what we believe happened on 3/25 $150 gamma ramps. Unhedged bets be MM. the point is, if they hedge, then their costs would be lower and their profits higher. Cause a hedge by definition should lesson your downside risk, which is the type of play we are discussing. One with a lot of MM downside risk. That means any other hedging should decrease their loss and be an better situation than what I describe. Spoiler alert, they still win

*Leveraged delta hedge = 100/8.8=11.36 shares

*Cost of delta hedge @$400= $400 x 11.36 shares=$4544

*Maintenance margin is 100% cost of contract + 10% of exercise

When GME is $400, the cost of the contract will be $210. 10% of exercise remains the same. So total margin due is $210*100+10%*$400*100=$25000
Leveraged margin will be $25,000/8.8=$2,841

So back to the total: SHF or Market Maker overall: +$1000 +$19000-$4544-2841 for a grand total of $12,615.

Conclusion: When you execute this winning options play

You are out $20,000 and you get 100 shares

DTC is -100 shares

SHF or Market Maker is up $12,615

Looks great right, you got shares, DTCC is down 100 shares, and the market maker made a little more than 50% selling you this shares. Duck the hedgies, Amiright?

No. You are not right.

Since it only costs a SHF or Market Maker $205 dollars to initiate selling a call contract, this is enough to start another 61 contracts totaling 6100 shares. Here's why that's important.

Law 240.13d-3d(1)(i) states that you are a beneficial owner of shares if you own an open options contract that expire within 60 days. And we all know what happens to beneficially owned shares. They get lent. And when they get lent, they add to netted long positions. So it is possible that this one contract for a July call could clear 6100 FTD's on the day it is exercised.

So a possible outcome is:::
*You are out $20,000 and you get 100 shares
*DTC is +6000 shares
*SHF or Market Maker is neutral

If there is something wrong with margin or hedging or leverage, please let me know which rule I misread or didn't include. I have chosen to cite specific rules and guidelines, not general rule books. Please show the same courtesy when replying with criticism.