Introduction Black Scholes

I probably the most famous formula in all of finance.That's Black - Scholes Formula sometimes called the Black Scholes-Merton Formula. and it's named after these gentlemen. This right over here is fischer Black. this is myron Scholes. They really laid the foundation for what led to the BS model and BS formula. that's why it has their name. This is Bob Merton, who really took what BS did and took it to another level, to really get to our modern interpretations of the BS model and BS formula. All three of these gentlemen would have won the Nobel Prize in economics. except for the unfortunate fact that Fischer Black passed away before the award was given, but myron scholes and bob merton dif get the nobel prize for their work. the reason why this is such a big deal, why it is nobel prize worthy, and, actually, there's many reasons. I could do a whole series of videos on that is people have been trading stock options, or they've been trading options for a very, very long time. they have been trading them, they had been buying them, they had been selling them, it was a major part of financial markets already. but there was no really good way of putting our mathematical minds around how to value an option. pp had a sense of the things that they cared about, and I would assume especially options traders, had a sense of the things that they cared about when they were trading options, but we really didn't have an analytical framework for it, and that's what the BS formula gave us. Let's just, before we dive into this seemingly hairy formula, but the more we talk about it, hopefully it'll start to seem a lot friendlier than it looks right now. let's start to get an intuition for the things that we would care about the price of a stock option. So, you would care about the stock price, you would care about the exercise price, you would especially care about how much higher or lower the stock price is relative to the exercise price. you would care about the risk-free interest rate. the risk-free interest rate keeps showing up when we think about taking a present value of something if we want to discount the value of something back to today. you would, of course, think about how long do I have to actually exercise this option. finally, this might look a little bit bizarre at first. but we'll talk about it in a second. you would care about how volatile that stock is, and we measure volatility as a standard deviation of log returns for that security. that seems very fancy. and we'll talk about that in more depth in futre videos.but at just an intuition level.

- The variable delta S is the change in the stock price S in a small time interval delta t