This tutorial covers expected value. Expected value, we're typically going to be looking at discrete distributions. With continuous distributions, you need to know a little bit more about calculus in order to calculate this. So here, with a discrete distribution, you're multiplying the value of each event by the probability. And then once you have those multiplied probability event numbers, you're going to add all of those up.

So look at an example here. If you're playing some sort of game where you're flipping a coin twice, and if you get zero heads you win $4. If you get one head, you lose $2. If you get two heads, you win $4. So let's see what the expected value of this game is.

So first, I'm going to take the value of each event, and I'm going to multiply it by the probability. So this chart here is giving me the probabilities. So zero heads has a probability of 0.25, and I'm going to multiply that by 4. One head has a probability of 0.5. We're going to multiply by negative 2. And 2 heads has a probability of 0.25. We're going to multiply that by 4.

So here, when we're multiplying for the one heads, and it's negative 2, and you're losing $2, you want to make sure you keep that negative, or else you're going to end up with the wrong answer. So we have our values right here. And we're going to add those all together. And when we add those all together, we get 1. So our expected value for this game is 1.

We'll look at another example. If we're trying to calculate the expected value of rolling a die, the outcomes or events are the numbers 1, 2, 3, 4, 5, and 6, and our probability for each of those events is one sixth. Now this time they don't give us a value straight out, but we're going to take each of these numbers, how many dots there are on the face the die, as our value.

So we're going to multiply those by the probability, one sixth. Now I'm not going to write out all the answers to 1 times one sixth. It's going to be a lot of decimals. You can just type that all in your calculator. And when we add all of those values up, we get 3.5. So when you're rolling a die, your expected value is going to be 3.5.

Now you notice that that's not something you can actually get. You can't actually roll a 3.5. So you can't always get your expected value exactly, but you know that you're going to roll somewhere, some 3s, some 4s, some 1s, some 2s, some 5s and 6s, as well, but on average, you're going to end up somewhere in between the 3 and the 4, around 3.5. This has been your tutorial on expected value. You can use in a variety of other cases, anytime you're trying to find out what your expected value or

earnings are based on a set of events and their probabilities.