##### [00:00:00.790] - Speaker 1

Welcome to this Community viz Video Tutorial this tutorial is about using the Formula Editor. It's the first of three parts. It covers Formula basics. Part two uses an example to illustrate setting up an indicator formula.

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And part three three goes into attribute formulas with an emphasis on spatial analysis. Community Viz of 360 provides a number of ways to make formulas. Those include Decision Tool Wizards, the Formula Wizard, and the Formula Editor, which is what we're covering here. As a reminder, indicators are measurements of characteristics of an overall scenario. They're typically the values that you see in a chart.

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This chart, for example, is showing the value of an indicator. You can also see indicators here in the Indicators list. This is all the indicators in my analysis and this is their values for each alternative. One characteristic of indicator formulas is you only have to write them once. They automatically apply to all scenarios.

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Now, if I want to create a new indicator, I go to the 360 Setup tab, I click Indicators and this is the set up Indicators list. It's the same indicators, but now I can see their formulas, their properties, I can edit them and in this case I can create a new one. I give it a name, I can give it a description if I want, I can give it a category. And for convenience I'm going to check this box which is to display this indicator in a new chart. I don't have to use this method to create a new chart.

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There are others, but this is an easy one. Now. I need a formula. And again, there's two choices here, formula wizard and Edit Formula which opens the Formula Editor. Here it is.

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This is the control. It's fairly complex because it does a lot of things, but for now, let's just focus on this area here, which is where the actual formula appears. Now the way these formulas work here's, the name of it example is going to equal something. But I don't have to write the equal sign, I can just type the expression.

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When I'm finished, I click this button, check Formula and if it says no errors Find, I'm good to go. If I want, I can use the preview button to give myself a temporary look at the values. And sure enough, it's telling me that two plus two is indeed four in both scenarios. So I'm good to go. I click OK here and I'm back to this Properties and Formula tab.

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If I'm still satisfied with all my settings, I click okay again and the indicator gets created. I can find it now in this list of indicators, usually at the bottom when it's first created and there's a formula right there. If I want to see the values of the indicators, I can find those in my analysis. One is again here in the Indicators list. My new indicator appears at the bottom with its present values and another is in this chart that just got created.

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Down at the bottom of the list I can see the charted value. So that's an introduction to the mechanics of indicator formulas. Now let's make some that are more interactive. For this demo I have created a couple of variable assumptions. Remember, it's these slider bar controls and I'm going to use these as variable inputs to my formula.

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So I want to return and change that example formula. I go to 360, set up again indicators. I find my indicator in the list and I simply double click to return to its properties. I can go to the formula tab and edit formula to get back to the formula editor controls. So now instead of two plus two, I'd like to clear that and make a different formula.

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And what I'm going to do is add the values of those two assumptions together. Now, the way I can do that is click on this important button. It's called insert analysis component. When I click it and choose assumptions, it gives me a list of all the assumptions in my analysis. I want to choose one and I want to add it to another to make a new formula.

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Now this is a good time to talk about notation. Notice how the assumption is referred to in the formula. There's a square bracket. There's the word assumption written out. There's a colon and then the name of the assumption.

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That same notation is used for indicators. The word indicator written out in the name of the indicator. And as you'll see later, the notation for dynamic attributes is similar. So let's just go with this one for now. I'm going to check the formula, no errors found, so I can go okay twice.

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So now let's look at that formula in action here. I've set my assumptions to 50 each and the indicator is showing 100. If I adjust those two values to something new and apply the update button, then the indicator updates and gives me a new value. Now, if I want to make more complicated formulas, I can use parentheses.

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I can use other arithmetic operators like divide. I can add additional components like perhaps an indicator and in that way build up a more complex expression. Formulas start to get a lot more powerful when we introduce the concept of functions. A function is just a mathematical calculation that's been given a name. They can be very simple, like this one sum, which just adds numbers together.

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Or they can be much more sophisticated and complex as we'll get into the way you write functions in a formula is the name of the function and then two parentheses inside the parentheses is where the inputs to the function go. So for instance, if I wanted to do two plus two, I'd never do it this way. But I could do two comma, two comma separate multiple inputs to a function. Now functions get really powerful when their inputs are attributes. And that's what we cover in the next video with a short example.

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