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# On-Demand Training: Date Calculations Transcript

Welcome to the Date Calculations Training Video. As we're going through our examples today, please follow along using the companion workbook, as it contains both the instructions for creating the visualizations, as well as the data sets needed to create them.

Today, before we dive into the specific calculations I want to discuss, I want to go over briefly the power of dates in Tableau just as they stand currently. So I'm going to bring out my Sales and my Order Date here, and you'll notice right away that we've built out this hierarchy. You'll also notice in the data set here, there's nothing special about Date. In fact, if we right-click this and choose Describe, we can see that these are just simply a month-day-year field that's stored in the data set as such. Tableau's then going to recognize that as a date, and build out this nice hierarchy for us to use. We can go all the way down to seconds as the discrete part. I can rearrange these. I can have these on multiple parts of the visualization. I can do whatever I want with these dates. They're incredibly flexible and I didn't have to do any work to get them to be that flexible.

Additionally, what we've been using so far is the discrete date part, and you can tell that here because I have quarter one, two, three, and four summarized. I do not have any year-level information here. That's because I'm using these discrete parts. If I use these continuous date parts in the bottom here, you see that every date part is associated with a respective year. So, for example, now I'm looking at quarters over my year, and now I'm looking at months over my year. You'll see these dates are incredibly flexible and very powerful. And because of that we can do some really neat calculations with them that really increase the power of your end visualizations here.

In this example, we want to create a chart that allows users to see their sales over time, at the granularity specified. We don't want them to have to click on the visualization, we don't want them to have to do anything other than use the parameter control. So, first we need to start with our Sales and put this out into the visualization. And we'll see Order Date, just like before, and we can build that hierarchy out. But this isn't really what we want here. We want to be able to have a continuous date up here that the user can control.

So let's create a calculation using Order Date. Just right-click that and choose Create Calculated Field and let's just get rid of this right now. The function types we are going to be using today are mainly these date functions, and you see we've got a number of them. Some are Boolean, some are standard, like what's today's date. But the one specifically we want to use right now is DATETRUNC. Now what this allows us to do is control the granularity of the date that's being shown. But in order to do this we have to have some sort of input here. And right now there's no input and we could do this statically and we could always say quarter, but since our goal is to have this dynamic, we need to create a parameter here. We'll just call this our "Date Granularity". And we want this to be the String option. And now we just need to type in the different parts we want. We want year, quarter, month, and week.

It's important to note here that the values here have to be lower case. You can change the display as to be upper case, so that year shows with a capital Y, quarter with a capital Q, but these must be all lower case for this to work. So I'll go ahead and add that in here, and then I'm going to add to Order Date in, since that's the date we want to effect change on. So you'll see we have our granularity level and our date, so we're done. We'll just call this our "Dynamic Order Date".

Now you'll see that showed up here, just to the date. Now I can bring this out here and it's going to start in the year, but really what I want here is to right-click this and choose Exact Date. Because now this is going to allow us to show the visualization in its entirety when we change this parameter from year to quarter to month and subsequently to

week. This allows a lot of control around the visualization, as well as control of other types of calculations that you could then run off of this Dynamic Order Date.

The next common question that often comes up when you're using date level information is "How much time did something take?" Whether it's shipping or creation or production it doesn't matter. All the calculations are going to be very similar. So how do we do this? Really it's as simple as most cases are. We can do it exactly as you did in Excel, or you can use a Tableau function. It doesn't matter. So, in this case, I'm just going to bring out my country here. I want to map all my countries and I want to see what is the average time to ship it, for each of these countries. So again, I'm going to find my order date here and I'm going to create a calculated field.

This time instead of using DATETRUNC I want to do DATEDIFF. And I'm just going to double-click that and bring it in here. And I want to do this at the day level. And by that I mean, I want to see how many days occurred between my order date and my ship date. For those of you familiar with Excel, this is exactly the same thing as ship date minus order date, it's just that in this case, if I wanted to do this at the month level, quarter level, or the year level, I could control that as well. So in this case, this type of syntax can be much more dynamic. So let's call this our "Time to Ship", and since this is just going to be a numerical result, this is going to show up in our measures list here. And we can drag this out. And I'll just put it on Color, and we going to get a filled map.

The problem here is that we're just summing up our time to ship and I know that most of my shipments occur from the United States. I know that's where the bulk majority of my orders are, so that doesn't really make any sense for me to sum them. So I'm going to change the aggregation to Average by clicking that drop-down. Additionally, I really want to see which have the highest concentration of slow orders, to see if there's something I can do to change my shipping channels around. So I can just double-click my legend, and I'm going to use a red-green palette here. You can use our color-blind palette if needed. And I'm going to reverse this. Because the slower the country, the more attention I need to pay to it. We've got fast shippers over on this end. I don't really care about those, I really want to focus on this high end. So now, when we filter it out, you see that South Africa is far and away the worst in terms of shipping time, closely follow by Morocco, and Thailand. So, I wonder if there's just some infrastructure changes I can make there to help that out. So, this is just another instance in which dates are powerful. You notice I didn't actually use a date field overtly in the view, even though it's dependent on one in this calculation.

Our final example here is addressing a very common problem that people have with dates. Oftentimes your dates are stored in a structure in which Tableau doesn't recognize, because they're stored as integers or strings. In this case, we're going to handle a case in which a date is stored as an integer that we don't recognize. If you go to the string calculations video there's information there about how to convert a string date into a Tableau date, and like I said, in this case we're going to worry about an integer example. We're going to start by building out the parts, and I'm just going to go to that integer dates data connection and drag Date out onto Rows. And you'll notice here we've got a pretty obvious date structure, we've got our year, and then our month and our day. And you can tell the final two numbers are a day, because we have things like twenty-six in the last two, so we know that can't possibly be a month. So we know our first four are our years, second two after that are our months, and then finally, our days.

So how do we split this out? The easiest way to approach problems like this, are to create calculations step by step. And by that I mean we're going to create first a calculation for year, and then month, and then day and combine

them all into one final date calculation. So in order to get our first date, here, you need to do the integer of the dates, divided by ten thousand. So what this is doing here is saying divide by ten, hundred, thousand, ten thousand, and taking the integer so we remove that decimal and are left with twenty twelve. So let's go ahead and create this, and we'll see what it does. And because that's a number, it showed up in Measures. So with our flexibility in Tableau, I can just make that a dimension, and bring that out, so we've got 2012. Let's go ahead and duplicate this field, then edit this, and we'll call this our "Month", and now we need to approach this in a different way. Because rather than just getting the remainder here, so we're getting the 2012, we want this bit. So instead of doing divided by ten thousand, we want to do modulo ten thousand. So that we fully understand what's going on here, let's just go ahead and end this here. This isn't going to be our final calculation, but we can get an idea of what it's accomplishing. So that modulo ten thousand is dividing this number by ten thousand and giving us that remainder. So, in other words, this is giving us this bit right here. Our 1201, our 1202, so now we just have to extract this twelve from this number. And that's achievable pretty simply by coming in here and editing this information. So we get our remainder, and so, in this case, 1201. But we want to divide this by one hundred, so that we get 12.01, and this integer function is going to resolve that decimal into nothing, so that we just get a twelve. Now, when I hit OK here, we going to get our month accurately for all these different months in the data set. Now our final one is pretty easy, since we're just on the end here. Just going to duplicate this again, and we'll call this our "Date". And since we know what modulo does now, we know that it's doing a modulo of a hundred. It's just going to give us this remainder here. So our one, two, three and so on. And that's going to give us our dimension for our day.

I can just drag that out, and now we have all of our different parts of the date. So how to we combine them? Our final example here, is going to be combining this into a single calculation. So we've got all of that information. We've got those years, months and days. We need to create one more calculated field. We can go ahead and call our calculation here our "Tableau Dates". Now let's go ahead and build this. So I'm going to build this out part by part. And I'm going to explain it as we go. And I'm going to organize this in a specific way so it's easy to see. So first we're going to use a new function we haven't used yet, and that's DATEADD. And it effectively allows us to add numbers to a specific date and increment it. So you can see here in our example, you're adding three months to April, so we get July. We going to do this with all of our date parts here, while adjusting the date part simultaneously.

So I'm just going to tab in here to make this easier to read, and I'm going to double-click my year, and subtract 1900, and I'm going to add a new DATEADD, after I add a comma here. And we're going to add our months. And we're going to do the same tab in at months and subtract 1, add our comma and our final DATEADD for our day. And we're going to add our days, minus 1, and comma, and then we're going to add our final date here. And then we're going to go through exactly what this is doing. So we're going to wrap this in dates, and these pound signs effectively allow us to call something as a date within Tableau here, and now I just need to close out my three parentheses. We get a "calculation is valid".

So, what exactly is going on here? Now, let's think about this from a reverse perspective. So, DATEADD is simply incrementing dates by the numbers you've given it. So I'm incrementing 1900, 1, 1, by day, so that would be, in this case, our Tableau calculation minus 1, because we have a 1 here, incrementing it by a month minus 1, again because

we have a 1 here. And then incrementing it by our years minus 1900, since we're starting at 1900. Now, what we can do, we're going to get this date field, and I can bring this out, so we're going to get that nice hierarchy. Now we can look at the number of new customers we've had over time. And at some point, when I connected to things like Excel, or CSVs, we may get an error like this, saying "Hey, this query is too complex". That's fully expected. So in that case, you run into something like that, take an extract of that file your using. Put it into our extracts, and then you're going to be able to go down to whatever granularity you want there.

Thanks for watching. I hope this discussion has been helpful. Happy analyzing.