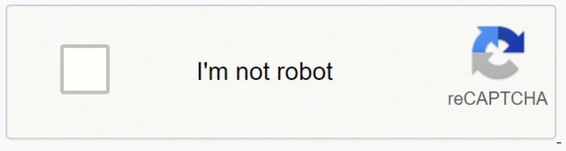
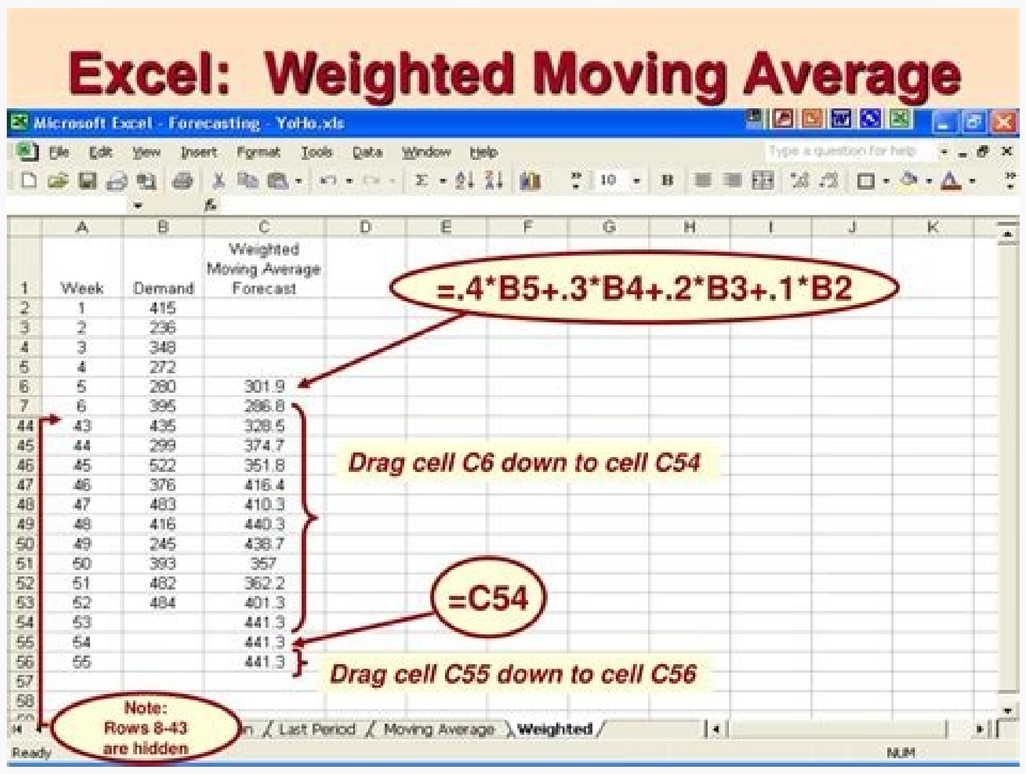
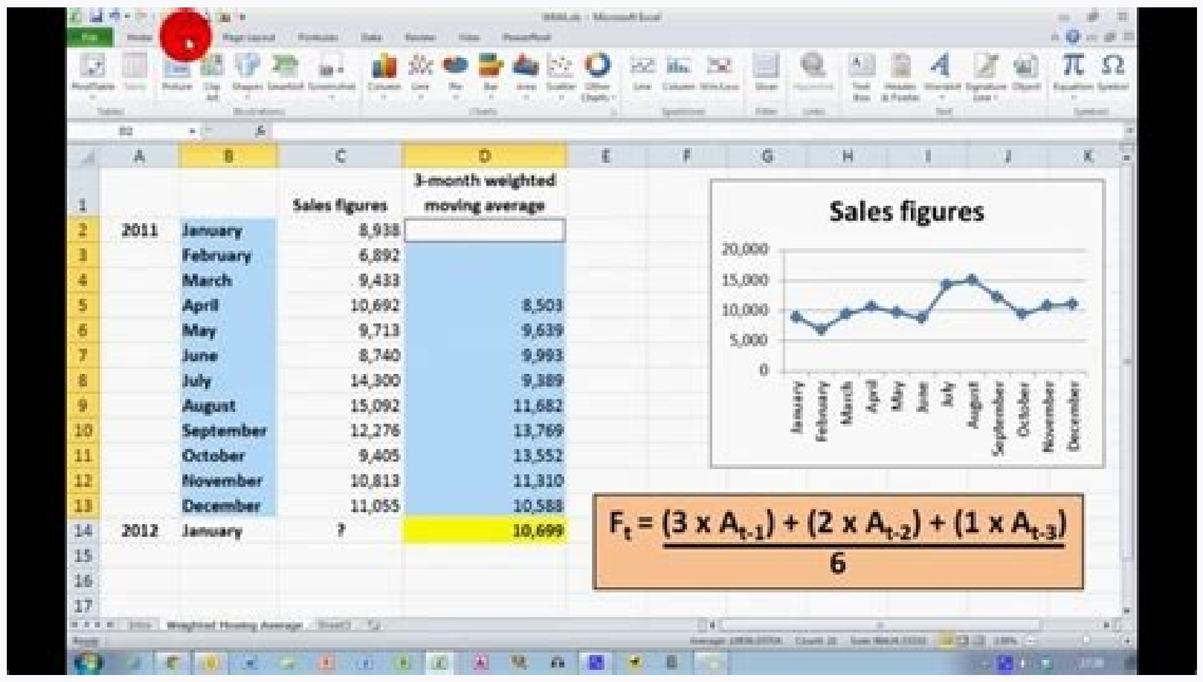



Next

# Weighted moving average excel template




| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | Period | Sales | WMA | Formula | | |
| 2 | 1 | 50 | | | | |
| 3 | 2 | 55 | | | | |
| 4 | 3 | 36 | 44.5 | =0.5*B4+0.3*B3+0.2*B2 | | |
| 5 | 4 | 49 | | | | |
| 6 | 5 | 84 | | | | |
| 7 | 6 | 75 | | | | |
| 8 | 7 | 101 | | | | |
| 9 | 8 | 86 | | | | |
| 10 | 9 | 80 | | | | |
| 11 | 10 | 104 | | | | |
| 12 | | | | | | |
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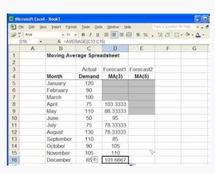

A few things you can format in the trendline include: Color of the line. If you don’t see it, follow the below steps to make it available in the ribbon. Calculating Simple Moving Average (SMA) using Data Analysis Toolpak in Excel Microsoft Excel already has an in-built tool to calculate the simple moving averages. Example 2: Use Solver to calculate the weights which produce the lowest mean squared error MSE. You can use the same steps to insert a moving average trend line to a line chart as well. Like many of my Excel tutorials, this one is also inspired by one of the queries I got from a friend. Here we assign m weights w1, …, wm, where w1 + …. Formatting the Moving Average Trend Line Unlike a regular line chart, a moving average trend line doesn’t allow a lot of formatting. For example, suppose you need to calculate the 3 point WMA for the below dataset, where 60% weight is given to the latest value, 30% to the one before it and 10% of the one before it. Click on the Data tab and check whether you see the Data Analysis option or not. Figure 2 – Solver dialog box Note that we need to constrain the sum of the weights to be 1, which we do by clicking on the Add button. If I have three days of daily temperature data, you can easily tell me the average of the last three days (hint: you can use the AVERAGE function in Excel to do this). Enough of statistics lecture. So if you want to do this manually without the Data Analysis toolpack, you can certainly do that. + wm = 1, and define the forecasted values as follows In the simple moving average method all the weights are equal to 1/m. But then, I decided to write one myself (the fact that I was somewhat of a statistics nerd in college also played a minor role). For example, in case there is a really hot day, the three-day moving average of the temperature would still make sure that the average value has been smoothened (instead of showing you a really high value that could be an outlier – a one-off instance). So, we are better off if we rely more on the value of Day 10. Below is the formula to calculate the EMA for a three-point moving average: EMA = [Latest Value  - Previous EMA Value] * (2 / N+1) + Previous EMA …where N would be 3 in this example (as we are calculating a three-point EMA) Note: For the first EMA value (when you don’t have any previous value to calculate EMA), simply take the value as is and consider it the EMA value. This brings up the Add Constraint dialog box, which we fill in as shown in Figure 3 and then click on the OK button. Calculating Exponential Moving Average using Formulas Exponential Moving Average (EMA) gives higher weight to the latest value and the weights keep on getting lower exponentially for earlier values. In cell C3, enter the below formula and copy for all cells: =(B3-C2)*(2/4)+C2 In this example, I have kept it simple and used the latest value and previous EMA value to calculate the current EMA. It is also called the Exponential Weighted Moving Average (EWMA) The difference between WMA and EMA is that with WMA, you can assign weights based on any criteria. Types of Moving Averages There are three types of moving averages: Simple moving average (SMA) Weighted moving average (WMA) Exponential moving average (EMA) Simple Moving Average (SMA) This is the simple average of the data points in the given duration. To do this, enter the following formula in cell C4 and copy for all cells. To use this tool for Example 1, press Ctr-m, choose the Time Series option from the main menu and then the Basic forecasting methods option from the dialog box that appears. Real Statistics Data Analysis Tool: Excel doesn’t provide a weighted moving averages data analysis tool. Day-10 temperature is more likely to be a better indicator of the trend as compared to Day-1 (since the temperature is dropping with every passing day). Figure 3 – Add Constraint dialog box We next click on the Solve button (on Figure 2), which modifies the data in Figure 1 as shown in Figure 4. Suppose you have the dataset as shown below and you want to calculate the moving average of the last three intervals. As new data is added, you keep the time period (3 days) the same but use the latest data to calculate the moving average. For example, if you want to get the standard error value as well as the chart of the moving average, all you need to do is check a box and it will be a part of the output. Also, Data analysis Toolpak only gives the Simple Moving Average (SMA), but if you want to calculate WMA or EMA, you need to rely on formulas only. Using the formulas in Figure 1, select Data > Analysis|Solver and fill in the dialog box as shown in Figure 2. The above steps would enable the Data Analysis Toolpack and you will see this option in the Data tab now. Calculating Weighted Moving Average using Formulas For WMA, you need to know the weights that would be assigned to the values. If you want, you can use the first two values as is, and use the SMA value from the third one onwards. Before you can use the Data Analysis toolpak, you first need to check whether you have it in the Excel ribbon or not. Moving average is heavily used for technical analysis and a lot of banks and stock-market analysts use it on a daily basis (below is an example I got from the Market Realist site). Another popular way of doing this is by first calculating the Simple Moving Average and then using it instead of the actual latest value. Figure 4 – Solver Optimization As can be seen from Figure 4, Solver changes the weights to 0, .223757 and .776243 in order to minimize the value of MSE. Example 1: Redo Example 1 of Simple Moving Average Forecast where we assume that more recent observations are weighted more than older observations, using the weights w1 = .6, w2 = .3 and w3 = .1 (as shown in range G4:G6 of Figure 1). You may also like the following Excel tutorials: Adding Moving Average Trend Line to a Column Chart If you have a dataset and you’re creating a bar chart using it, you can also add the moving average trend line with a few clicks. In case you want to insert more than one moving average trendline (for example one for 2 periods and one for 3 periods), repeat the steps from 5 to 8). This is called the weighted moving average. For example, on Day 3, if I ask you the 3-day moving average temperature, you will give me the average temperature value of Day 1, 2  and 3. The output will look just like the output in Figure 2 of Simple Moving Average Forecast, except that the weights will be used in calculating the forecast values. She wanted to calculate the moving average in Excel, and I asked her to search for it online (or watch a YouTube video about it). This will open the Format Trendline pane on the right. This means that the formula can be =AVERAGE(B2:B4) or =AVERAGE($B2:$B4), but it can not be =AVERAGE($B$2:$B$4) or =AVERAGE(B$2:B$4). In case you want to jump to the part where I show how to calculate moving average in Excel, click here. This is because there is no previous value to calculate EMA. This type of forecasting is called weighted moving average. =0.6*B4+0.3*B3+0.1*B2 Since we are calculating a 3-point Weighted Moving Average (WMA), the first two cells (for the first two days) are empty and we start using the formula from the third day onwards. If you want, you can use the first two values as is, and use the WMA value from the third one onwards. Exponential Moving Average (EMA) The exponential moving average is a type of weighted moving average where more weight is given to the latest data and it decreases exponentially for the older data points. Now let’s dive in and see how to calculate moving averages in Excel. The row number part of the reference needs to be without the dollar sign. In our daily temperature example, when you simply take an average of the past 10 days, it gives the 10-day simple moving average. There is a good chance you need to take a few steps to first enable it. Note that the first two cells in column C have the result as #N/A error. So the actual moving average values start after the third data point onwards. It’s called the Data Analysis Toolpak. This pane as all the formatting options (in different sections – Fill & Line, Effects, and Trendline Options). You can use this to highlight one of the trendlines by making everything in the chart light in color and making the trendline pop-out with a bright color The thickness of the line  The transparency of the line To format the moving average trendline, right-click on it and then select the Format Trendline option. Now, before I tell you how to calculate moving average in Excel, let me quickly give you an overview of what moving average mean and what types of moving averages are there. This can be achieved by averaging the data points in the given duration. What is a Moving Average? Click on the Clustered Column chart option. E.g. the formula in cell C7 is now =SUMPRODUCT(B4:B6,G$4:G$6). Figure 1 – Weighted Moving Averages The formulas in Figure 1 are the same as those in Figure 1 of Simple Moving Average Forecast, except for the forecasted y values in column C. Suppose you have the below data set and you want to calculate the three-period EMA: In cell C2, enter the same value as in B2. A Moving Average (also called as the rolling average or running average) is when you keep the time period of the average the same, but keeps moving as new data is added. Instead, you can use the Real Statistics Weighted Moving Averages data analysis tool. None of Parameter values are used (essentially # of Lags will be the number of rows in the weights range and # of Seasons and # of Forecasts will default to 1). In Example 1 of Simple Moving Average Forecast, the weights given to the previous three values were all equal. You can then use this value going forward. The forecast for the next value in the time series is now 81.3 (cell C19), by using the formula =SUMPRODUCT(B16:B18,G$4:G$6). For example, in a 3-point moving average, you may assign a 60% weight age to the latest data point, 30% to the middle data point and 10% to the oldest data point. Fill in the dialog box that appears as shown in Figure 5 of Simple Moving Average Forecast, but this time choose the Weighted Moving Averages option and fill in the Weights Range with G4:G6 (note that no column headings are included in the weights range). Calculating Simple Moving Average using Formulas Suppose you have the dataset as shown below and you want to calculate the 3-point SMA: In the cell C4, enter the following formula: =AVERAGE(B2:B4) Copy this formula for all the cells and it will give you the SMA for each day. In Excel, you can do this easily using the AVERAGE function (this is covered later in this tutorial). This way, you still get the trend, but with more influence of the latest data. For example, if you want to highlight a specific data point on the trend line, you won’t be able to do that. Below are the steps to use Data Analysis to calculate a simple moving average: Click the Data tab Click on Data Analysis option In the Data Analysis dialog box, click on the Moving Average option (you may have to scroll a bit to reach it). In fact, if all you need is the moving average value (and not the standard error or chart), using a formula can be a better (and faster) option than using the Data Analysis Toolpak. I am sure you know what’s an average value. I only aim to show you how to calculate moving averages in Excel (with a brief introduction of what moving averages mean). To lock in these weights you need to click on the OK button of the Solver Results dialog box shown in Figure 4. Calculating Moving Averages (SMA, WMA, EMA) using Formulas in Excel You can also calculate the moving averages using the AVERAGE formula. You will also notice that all this Data Analysis toolpak has done is applied an AVERAGE formula to the cells. This will open the ‘Moving Average’ dialog box. That’s it! The above steps would add a moving trendline to your column chart. You can read more about absolute and relative references here. One of the benefits of using the moving averages is that gives you the trend as well as smooths out fluctuations to an extent. In the Input Range, select the data for which you want to calculate the moving average (B2:B11 in this example) In the Interval option, enter 3 (as we are calculating a three-point moving average) In the Output range, enter the cell where you want the results. Hover the cursor on the ‘Trendline’ option and then click on ‘More Trendline Options’ In the Format Trendline pane, select the ‘Moving Average’ option and set the number of periods. In EMA, a higher weight is given to the latest value and the weight keeps getting exponentially lower for earlier values. This is because it’s a three-point moving average and needs at least three data points to give the first result. As you can see, the minimized value of 184.688 (cell E22 of Figure 4) is at least less than the MSE value of 191.366 in cell E22 of Figure 2). And if on Day 4 I ask you the 3-day moving average temperature, you will give me the average of Day 2, 3, and 4. Click the File tab Click on Options In the Excel Options dialog box, click on Add-ins At the bottom of the dialog box, select Excel Add-ins in the drop-down and then click on Go. In the Add-ins dialog box that opens, check the Analysis Toolpak option Click OK. There are, however, a few things that are easier to do with the data analysis toolpak. Note: I am not an expert on statistics and my intent in this tutorial is not to cover everything about moving averages. Suppose you have a dataset as shown below: Below are the steps to create a bar chart using this data and adding a three-part moving average trendline to this chart: Select the dataset (including the headers) Click the Insert tab In the Chart group, click on the ‘Insert Column or Bar chart’ icon. With the chart selected, click on the Design tab (this tab only appears when the chart is selected) In the Chart Layouts group, click on ‘Add Chart Element’. Since we are calculating a 3-point Simple Moving Average (SMA), the first two cells (for the first two days) are empty and we start using the formula from the third day onwards. This will insert the chart in the worksheet. Remember: When calculating SMA using formulas, you need to make sure the references on the formula are relative. In case you already have the Data Analysis option in the Data tab, skip the steps below and see the steps on calculating moving averages. In this example, I am using C2 as the output range Click OK The above steps would give you the moving average result as shown below. Click OK. We now consider the case where these weights can be different. To make this reflect in our moving average, you can give more weight to the latest data and less to past data. Weighted Moving Average (WMA) Let’s say that the weather is getting cooler with every passing day and you are using a 10-day moving average to get the temperature trend.

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