



## Calc Guide

# *Chapter 3* *Creating Charts and Graphs*

*Presenting information visually*

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## Using LibreOffice on macOS

Some keystrokes and menu items are different on macOS from those used in Windows and Linux. The table below gives some common substitutions for the instructions in this book. For a more detailed list, see the application Help and Appendix A (Keyboard Shortcuts) to this guide.

<i>Windows or Linux</i>	<i>macOS equivalent</i>	<i>Effect</i>
<b>Tools &gt; Options</b> menu selection	<b>LibreOffice &gt; Preferences</b>	Access setup options
Right-click	Control+click and/or right-click depending on computer setup	Open a context menu
<i>Ctrl</i> ( <i>Control</i> )	⌘ ( <i>Command</i> )	Used with other keys
<i>Ctrl</i> + <i>Q</i>	⌘+ <i>Q</i>	Exit / quit LibreOffice
<i>F11</i>	⌘+ <i>T</i>	Open the Sidebar's Styles deck

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## Introduction

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Charts and graphs can be powerful ways to convey information and Calc offers a variety of ways to present data. They can be customized to a considerable extent, enabling information to be shown in the clearest manner.

For readers interested in effective ways to present information graphically, two excellent introductions to the topic are William S. Cleveland's *The Elements of Graphing Data*, 2nd edition, Hobart Press (1994) and Edward R. Tufte's *The Visual Display of Quantitative Information*, 2nd edition, Graphics Press (2001).

## Chart Wizard

---

Use Chart Wizard to create an initial chart using data in a spreadsheet. Then use the Chart Wizard options to change the type of chart, adjust data ranges, and edit some chart elements. Each change is immediately seen in the chart.

### Overview of Chart Wizard

	A	B	C	D
1		<b>Equipment Rentals</b>		
2		Canoes	Boats	Motors
3	Jan	12	23	47
4	Feb	9	31	54
5	Mar	14	27	56
6	Apr	17	28	48
7	May	13	19	39
8	Jun	8	27	52

Figure 1: Example data for creating a chart

To demonstrate the process of using Chart Wizard to create charts, the data shown in Figure 1 is used in the following sections. Here is an overview of the basic steps:

- 1) Select the cells containing all of the data — including names, categories, and labels — to be included in the chart. The selection can be a single block, individual cells, or groups of cells (columns or rows). In this example, it may be best to select the cell range A2:D8, which will intentionally omit the overall title “Equipment Rentals” from the chart.



### Tip

When the data is in one place, the Chart Wizard can guess the range and create an initial chart even if all of the data is not selected. Before opening the Chart Wizard, just place the cursor or select a cell anywhere in the area of the data.

---

- 2) Do one of the following. This will cause a chart to be placed on the spreadsheet as an object (Figure 2) and open the Chart Wizard dialog (Figure 3).
  - Go to **Insert > Chart** on the Menu bar.
  - Click the **Insert Chart** icon  on the Standard toolbar.
- 3) Choose the chart type and make any other selections desired. The options are explained below.
- 4) Click **Finish** to save the selections and close the Chart Wizard.

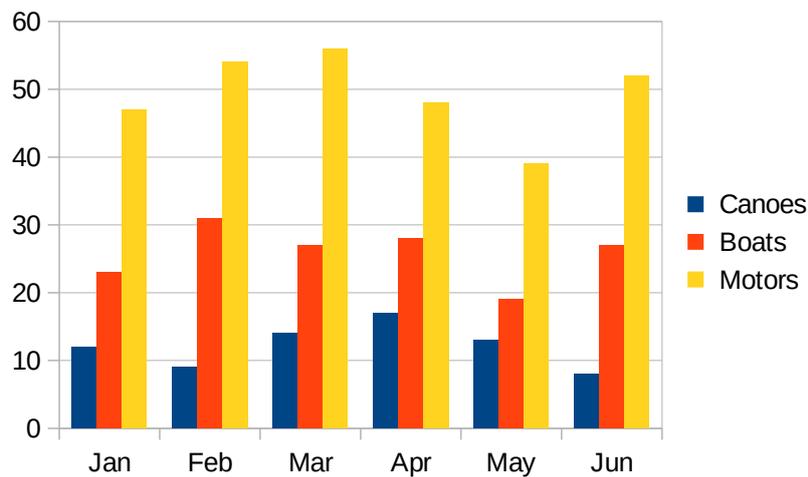


Figure 2: Example chart automatically created using Chart Wizard

The following sections provide further details about using the Chart Wizard.

## Selecting chart type

Calc offers a choice of ten basic chart types. Further options vary according to the type of chart selected. For more information about the different chart types see “Gallery of chart types” on page 61.

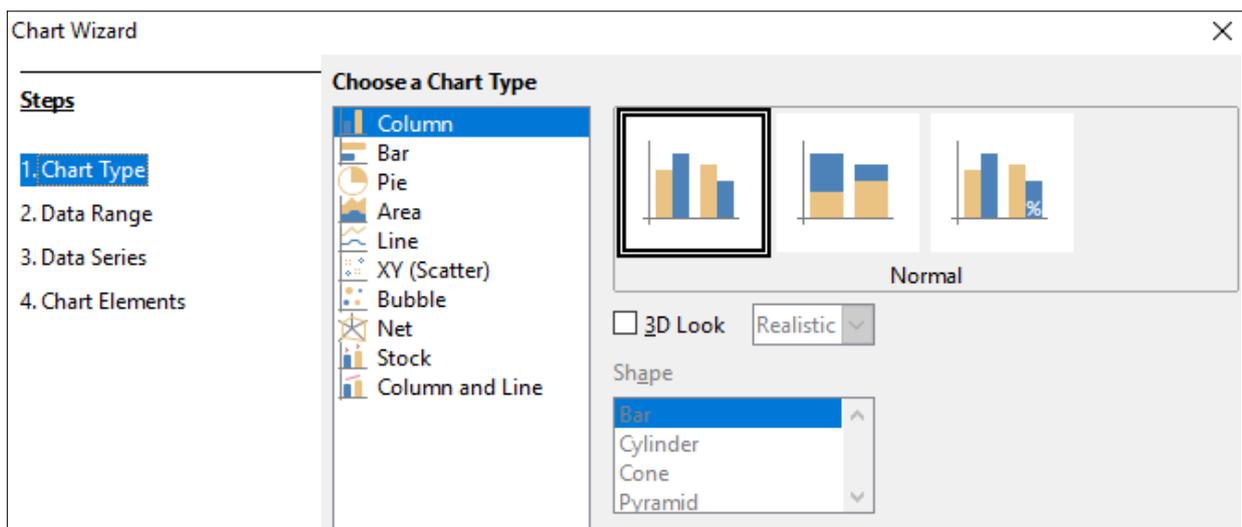


Figure 3: Chart Wizard dialog – selecting chart type

The initial chart created using the Chart Wizard is a 2D column chart. A small preview of the selected variant is highlighted with a surrounding border, as shown in Figure 3. The name of the variant (*Normal* in Figure 3) is shown below the preview.

To change chart types and options:

- 1) Select the type of chart from the list under *Choose a Chart Type*.
- 2) If needed, select a chart variant in the preview box by clicking on it. The options available depend on the type of chart selected. The chart changes instantly to reflect the selection.
- 3) To use a 3D chart, select the checkbox **3D Look** and select the type of 3D view (**Realistic** or **Simple**). This option is available only for column, bar, pie, or area chart types.
- 4) Click **Next** to make changes to data range, data series, and chart elements, explained in greater detail below.
- 5) When satisfied with the chart, click **Finish** to close the Chart Wizard.



## Note

To recreate many of the charts shown in the following sections, select the **Column** chart type, **Normal** variant, with the **3D Look** option unchecked.

## Selecting data range

The data range contains all of the cells with data (including labels and categories) that should be included in the chart. In the Data Range step of the Chart Wizard (Figure 4), manually correct any mistakes in data selection for the chart.

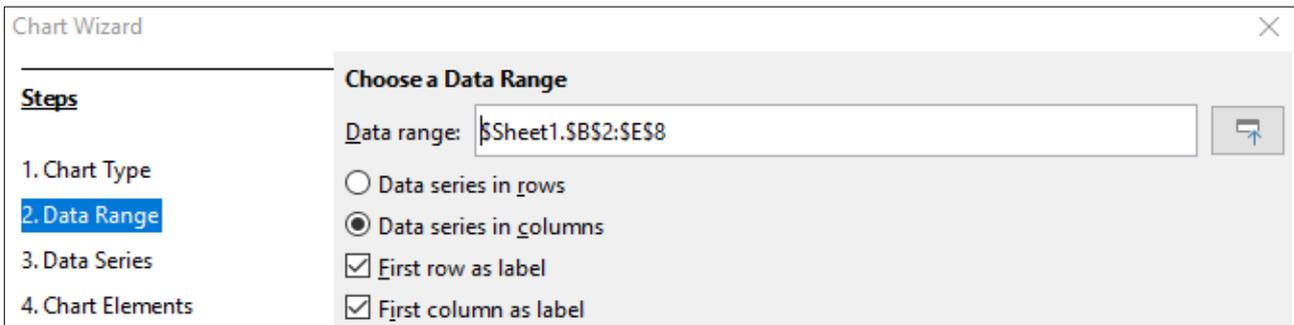


Figure 4: Chart Wizard dialog – selecting data range

To use the Data Range page:

- 1) If necessary, change the rows and columns used as data for the chart by editing the cell references in the *Data range* text box. Edit the cell references in one of these two ways:
  - Directly modify the text in the *Data range* text box.
  - Click the **Select data range** button to the right of the *Data range* box. Then use the cursor to select the data range(s) on the spreadsheet.
- 2) Specify whether the data series are arranged in rows or in columns. In the example data, shown in Figure 1, the data series are in columns.
- 3) Select whether to use the first row, or first column, or both, as labels.
- 4) Click **Next >** to move to making changes to the data series (Figure 5).
- 5) When satisfied with the chart, click **Finish** to close the Chart Wizard.



## Note

If the syntax for a data range is not correct, Calc shows the text in red.

## Selecting non-adjacent data

To create a complete data range from multiple cells that are not next to each other, use a delimiter between individual ranges. For example, the English (USA) locale uses a comma as a delimiter and "\$Sheet1.A1:A5,\$Sheet1.D1:D5" is a valid data range. A semi-colon is another commonly used delimiter.

The appropriate delimiter depends on the locale selected at **Tools > Options > Language Settings > Languages > Locale setting**. See or change the default delimiter for a locale at **Tools > Options > LibreOffice Calc > Formula**. In the *Separators* section, *Array column* shows the default delimiter.



## Note

The options under **Tools > Options** may not be available when the chart is in edit mode. If desired, click outside the chart to leave edit mode and see the options. Click the chart twice to enter edit mode again.

---

To select non-adjacent data, do one of the following in step 1 above:

- Manually enter the data ranges in the text box with delimiter(s) between them.
- Select the data with the cursor by first clicking the **Select data range** button to the right of the *Data range* box. Place the cursor at the end of the first data range in the text box (otherwise the first range is selected and then deleted) and enter the delimiter. Then drag the cursor in the spreadsheet to select the next data range.



## Note

When the data is in the same document as the chart, changes to the data are instantly reflected in the chart.

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### Linking to external data

Calc offers several options for linking data to external sources. This enables data (and the chart using the data) to automatically update when the external data changes. The following types of files can be linked: HTML, Calc, Base, CSV, Excel, and registered data sources. For further information, refer to Chapter 10, Linking Data, in this guide.

### Selecting data series

The Data Series page of the Chart Wizard (Figure 5) enables fine tuning of the data. Each data series contains a set of data that have something in common, such as the types of rental equipment listed in Figure 1. Use the Data Series page to change the source range of each data series and to organize how the data is presented in the chart. This includes removing unnecessary data and specifying how data is plotted along the axes.

### Organizing data series



## Tip

The Chart Wizard makes initial assumptions about how the data should be displayed, but the assumptions could be incorrect. If a chart does not look as expected, the first thing to check is if all data series are defined correctly.

Also, check the settings on the Data Range page that define whether the data are in rows or columns and whether the first row or first column should be considered labels.

---

The names of each data series appear in the *Data series* list box (the middle box in Figure 5). To organize the data series, select an entry in the *Data series* list and do one or more of the following:

- To change the name of the data series, select **Name** in the *Data ranges* list on the right. Edit the cell references in the *Range for Name* text box that appears.
- To change the cell references for data series categories, edit the cell references in the *Categories* text box below the *Data ranges* box.
- Click **Add** to add another data series below the selected entry. The data ranges for the new data series will then need to be defined.
- Click **Remove** to remove the selected entry from the *Data series* list.

- Click the **Up** or **Down** button to move the selected entry up or down in the list. This does not change the order in the data source table, but changes only the arrangement in the chart.



## Note

Different data series must be in separate columns or rows. Otherwise Calc will assume that they are the same data series.

## Setting data series ranges

To understand how Calc treats data in charts, it is important to understand the distinction between values and categories. Values are numeric data that vary continuously. By contrast, categories have no mathematical relationship with each other. For example, the categories for the chart data referred to in Figure 5 and the chart shown in Figure 2 are months of the year.

Most Calc charts require both value and category data, with values plotted along the Y axis and categories plotted along the X axis. The exceptions are XY (scatter) charts and bubble charts, which use only value data along both axes.

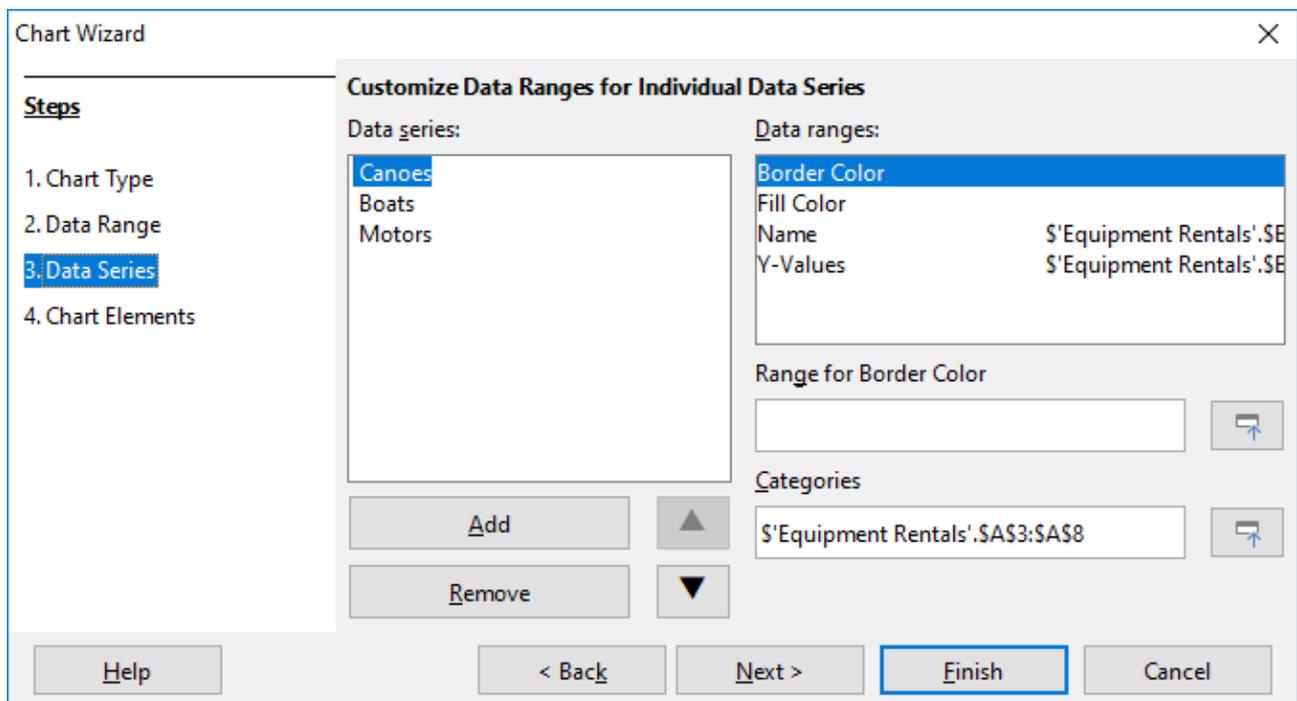


Figure 5: Chart Wizard dialog - selecting data series

Data ranges that may be defined for a specific chart type appear in the *Data ranges* box on the right side of the Data Series page, shown in Figure 5. Not all data ranges may need to be filled in. The data ranges may include:

### Border Color and Fill Color

Border and fill colors for each data point in the data series can be specified here using numeric values for the RGBA color system. If not specified here, Calc will use default colors. Conditional formatting can also be used. This enables data point colors to vary, depending on whether they meet certain conditions or values. For further information, refer to “Assigning colors” on page 28.

### Name

When **Data series in columns** and **First row as label** are selected on the Data Range page, Calc assumes that the column labels of the selected data are the data series names. Thus, Calc assumes that the data series names of the data in Figure 1 are “Canoes”,

“Boats”, and “Motors”. Similarly, when **Data series in rows** and **First column as label** are selected, Calc assumes that the row labels of the selected data are the data series names.

The only way to change a data series name is by selecting **Name** in the *Data ranges* box in the upper right of Figure 5. Then enter a different cell range in the *Range for Name* box that appears below the *Data ranges* box. (Note that the data series name is often contained in a single cell, rather than a range of cells.)

### Y-Values

These are numeric values that are often plotted along the vertical axis. However, this is not always the case. For example, while Y-values are plotted on the vertical axis in column charts, they are plotted along the horizontal axis in bar charts.

### Categories

The range for category data is defined in a separate *Categories* box below the *Data ranges* box. Note the difference between categories and data series names. For the data in Figure 1, the categories are the row labels while the data series names are the column labels.



### Note

Category data usually appears along the X axis (except for XY (scatter) and bubble charts, which require value data for the X axis).

Depending on the type of chart, other data ranges may need to be defined in addition to those shown in Figure 5.

## Selecting chart elements

The screenshot shows the 'Chart Wizard' dialog box with the '4. Chart Elements' step selected in the 'Steps' list on the left. The main area is titled 'Choose Titles, Legend, and Grid Settings'. It contains several input fields: 'Title', 'Subtitle', 'X axis', 'Y axis', and 'Z axis'. To the right of these fields are radio button options for 'Display legend' (checked), 'Left', 'Right' (selected), 'Top', and 'Bottom'. At the bottom, there is a 'Display Grids' section with checkboxes for 'X axis', 'Y axis' (checked), and 'Z axis'.

Figure 6: Chart Wizard dialog – selecting and changing chart elements

On the Chart Elements page of the Chart Wizard dialog (Figure 6), add or change the title, subtitle, axes names, and grids. Use titles that draw the attention of viewers to the purpose of the chart and describe what they should focus on.

The chart elements for 2D and 3D charts are illustrated in Figure 7.

- The chart wall contains the graphic displaying the data.
- The chart area is the background of the entire chart.
- The chart title and subtitle, chart legend, axes labels, and axes names are in the chart area.
- The chart floor is only available for 3D charts.

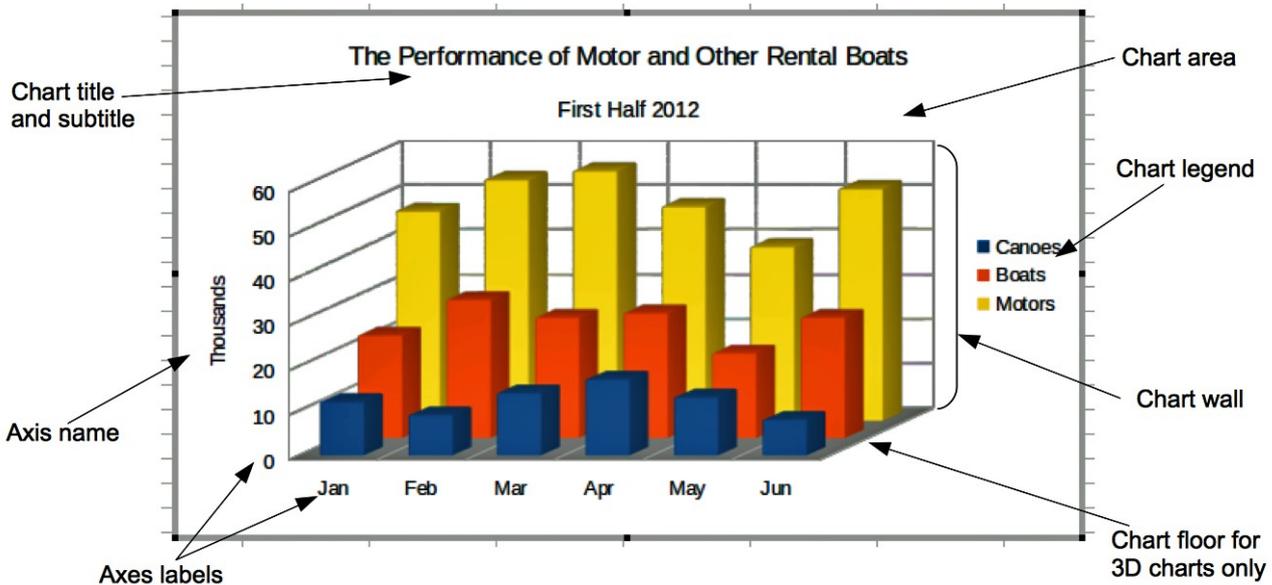


Figure 7: Chart elements

To add elements to a chart, do one or more of the following on the Chart Elements page (Figure 6):

- Enter a title and subtitle (if desired) in the *Title* and *Subtitle* text boxes.
- Enter names to be used in the *X axis* and *Y axis* text boxes. The *Z axis* text box is only active if creating a 3D chart.
- Select the **Display legend** checkbox (turned on by default) and choose where to display the legend – **Left**, **Right**, **Top**, or **Bottom**. The names in the legend are the data series names. Specify the names in the *Range for Name* field in the Data Series page.
- Under *Display Grids*, select the **Y axis** or **X axis** check boxes to display horizontal or vertical grid lines. For some charts, the axis grids are displayed by default. Grids are not available for pie charts. The **Z axis** checkbox is only active when creating a 3D chart. For further information about grids, refer to Grids on page 41.



### Note

While clicking **Finish** closes the Chart Wizard, the chart is still in edit mode, indicated by gray borders, and can still be modified. Click outside the chart in any cell to exit the edit mode.

## Using the Sidebar to change chart settings

The Properties deck of the Sidebar (Figure 8) makes some basic options readily available for specifying the appearance of charts. To open the Sidebar, first click outside the chart to deselect it, then go to **View > Sidebar** on the Menu bar or press **Ctrl+F5**. By default, the Sidebar opens on the right side of the screen.



### Tip

If you follow the directions above and the Properties deck of the Sidebar does not appear, click the Properties icon  on the upper right of the Sidebar. If the Properties deck still does not appear, click the chart again.

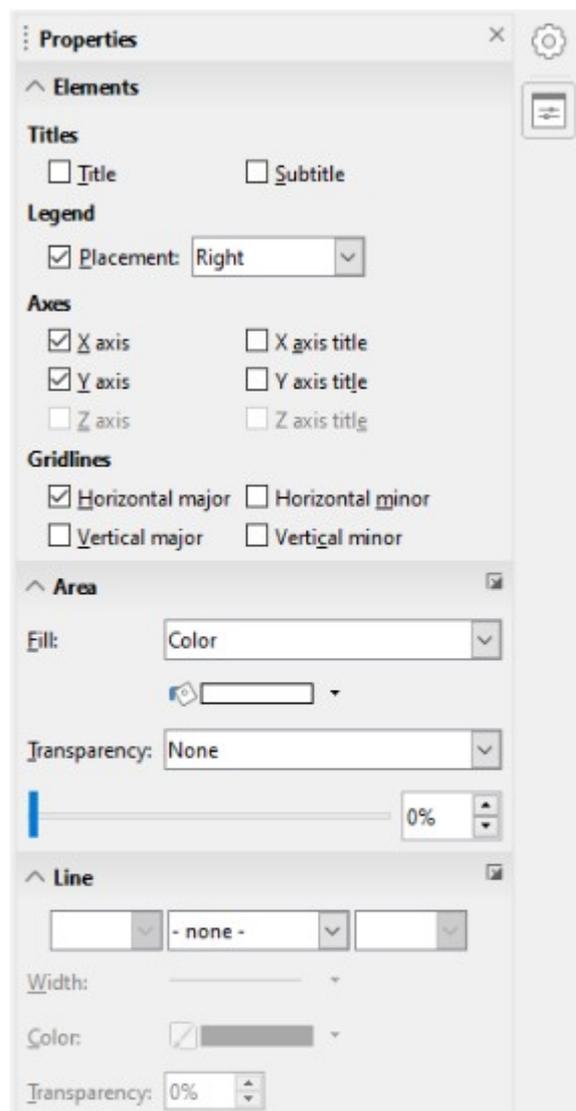
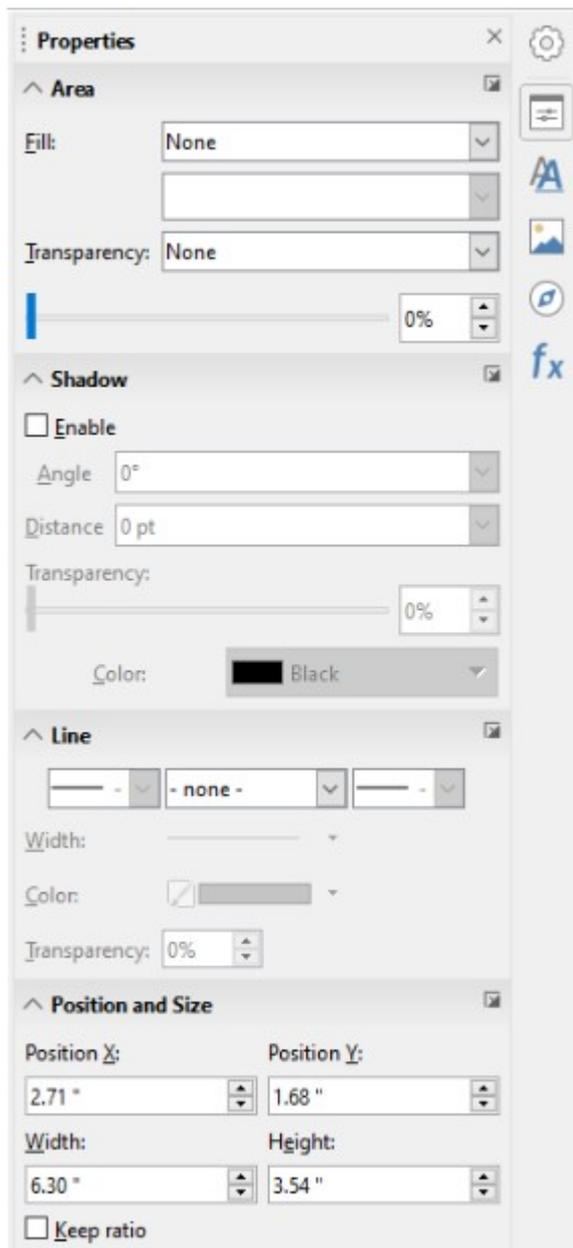


Figure 8: Properties deck of the Sidebar when chart is selected (left) and when chart is in edit mode (right)

The contents of the Sidebar depend on whether the chart is selected or is in edit mode. The Sidebar on the left in Figure 8 shows the Properties deck when a chart is selected (by clicking on it once). When a chart is in edit mode (by clicking on it twice), the Properties deck on the right in Figure 8 appears.

The options available on the Properties deck of the Sidebar are also available elsewhere. They may be found in the Menu bar, the Formatting toolbar, or context menus (made available by right-clicking a chart element).



### Note

The Sidebar can be quite useful. However, because the options are easy to see and are available elsewhere, further references to it are not included in this chapter.

## Modifying charts

---

The Chart Wizard establishes basic features of a chart. After using it, you may want to change data ranges or modify the look of the chart. Calc provides many options for formatting and fine-tuning the appearance of charts. This includes tools for editing the chart type, chart elements, data ranges, fonts, colors, and many other options.

Modify charts in one of two ways, depending on what you want to change.

### Edit object properties

Click a chart once to edit its object properties. These include size, position on the page, alignment, outer borders, copying, exporting, and more. See the sections starting with “Resizing, moving, and positioning charts” on page 54 for more information.

### Use edit mode

Use edit mode to change data selection and chart type as well as elements such as axes, titles, backgrounds, grids, data series, data labels, trend lines, and more.

## Overview of using edit mode

Here are some general ways to modify charts in edit mode. These are discussed in greater detail in the following sections.

- To add an element not already in the chart, use the **Insert** menu on the Menu bar. Insert titles, legends, axis labels, grids, data labels, trend lines, mean value lines, and error bars.
- To move or change the size of titles, axis names, chart walls, and legends, click on them once. The cursor changes to a move icon (appearance depends on the system). Drag the element to the new location. To change the size, drag the selection handles.
- Modify elements in a few basic ways. The following methods may open the appropriate dialog or menu. Not all of these methods will work for every element:
  - Double-click the element (see an exception below).
  - Select the element from the **Insert** menu (Figure 9) or **Format** menu (Figure 10) on the Menu bar.
  - Click the element once, then click on the **Format Selection** icon  on the Formatting toolbar (Figure 11).
  - Select the element from the Select Chart Element drop-down list, then click the **Format Selection** icon  next to it on the Formatting toolbar.
  - Right-click the element to open the context menu.
- Double-click titles and axis names to change their spelling. To modify the spelling of other text, such as categories, data labels, and legend entries, change the text in the data on the spreadsheet.
- Click once on a data point (such as a column or bar) to select and edit the associated data series.
  - With a data series selected, double-click a single data point to edit its properties (for example, a single column in a column chart).

## Entering edit mode

To edit or format charts, double-click on the chart to place it in edit mode. The chart is now surrounded by a gray border. In edit mode, the Menu bar changes and the Formatting toolbar contains a number of formatting options and icons, as discussed in the following sections.



## Note

The next several sections (until “Resizing, moving, and positioning charts” on page 54) require a chart to be in edit mode.

---

## Insert menu

In edit mode, the **Insert** menu on the Menu bar displays the options shown in Figure 9 and discussed below:

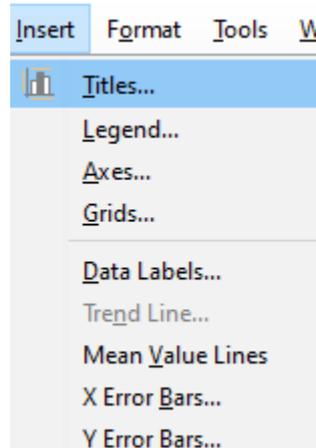


Figure 9: Insert menu when chart is in edit mode

### Titles

Provides spaces for entering chart title and subtitle as well as titles for X-, Y-, and Z- axes, including secondary axes. For more information, see “Titles, subtitles, and axis names” on page 19.

### Legend

Specifies if a legend should be included and if so, where. For more information, see “Legends” on page 21.

### Axes

Provides options for showing or not showing axis labels. The Chart Wizard automatically shows the labels. For more information, see “Axes” on page 30.

### Grids

Provides options for showing or not showing major and minor grids for X-, Y-, and Z- axes. To format grids, see “Grids” on page 41.

### Data Labels

Provides options for text attributes, whether to show categories, and the position and rotation of the labels. These labels appear on each data point. For more information, see “Data labels” on page 37.

### Trend Line

Specifies the type of regression line to be used, options for extrapolation, where the axes should intersect, the name of the trend line, and whether and how the equation should be displayed. The option is grayed out until a data series is selected. For more information, see “Trend and mean value lines” on page 45.

### Mean Value Lines

Displays mean value lines for selected or all data series. For more information, see “Mean value lines” on page 49.

## X Error Bars and Y Error Bars

Specifies the error category to be used, parameters, and display options for positive and negative indicators. For more information, see “Error bars” on page 50.

## Format menu

In edit mode, these settings appear on the **Format** menu (Figure 10) of the Menu bar. Descriptions of the options follow:

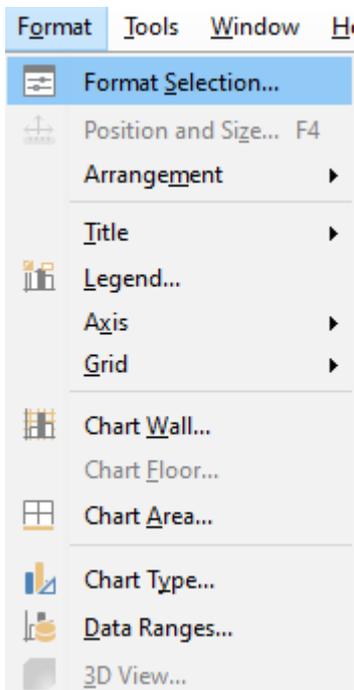


Figure 10: Format menu when chart is in edit mode

### Format Selection

Opens a dialog with settings for whatever element is selected. Options may include area fill, borders, positioning, transparency, fonts, labels, scale, and other attributes.

### Position and Size

Enables precise specification of the position and size of a selected element. The position is defined in relationship to the chart. See “Position and Size dialog” on page 55 for more information.

### Arrangement

Provides two options: **Bring Forward** and **Send Backward**. Only one option may be active for some items. Use these options to arrange overlapping data series.

### Title

Formats the title and subtitle for the chart as well as axis names. The text must first be entered on the Chart Elements page of the Chart Wizard or by going to **Insert > Titles**.

### Legend

Formats legend appearance and position. The legend must first be turned on by using the Chart Elements page of the Chart Wizard or by going to **Insert > Legend**.

### Axis

Formats properties such as where the axes cross each other, the scale of units, and formatting of the axis labels.

**Grid**

Formats the grid lines. Use the Chart Elements page of the Chart Wizard to turn on grids or go to **Insert > Grids** to turn grids on or off.

**Chart Wall, Chart Floor, or Chart Area**

Formats borders, area, and transparency of these elements. Note that the chart floor is available only for 3D charts. See “Formatting chart backgrounds” on page 22 for more information.

**Chart Type**

Changes the type of chart and whether it is a 2D or 3D chart. The various chart types are explained in “Gallery of chart types” starting on page 61.

**Data Ranges**

Sets ranges for all data in the chart and for individual data series, as explained in “Selecting data range” on page 8 and “Selecting data series” on page 9.

**3D View**

Formats 3D charts and is only available for 3D charts. Note that only column, bar, pie, and area charts can be displayed as 3D charts. See “3D charts” on page 42 for information.

**Formatting toolbar**

1. Select Chart Element	7. Data Ranges	13. Vertical Grids
2. Format Selection	8. Data Table	14. X Axis
3. Chart Type	9. Titles	15. Y Axis
4. Chart Area	10. Legend On/Off	16. Z Axis
5. Chart Wall	11. Legend	17. All Axes
6. 3D View	12. Horizontal Grids	

Figure 11: Formatting toolbar when chart is in edit mode

In edit mode, the Formatting bar appears as in Figure 11. Click one of the icons to open a dialog or turn an option on or off. The **Insert** and **Format** menus on the Menu bar, described above, contain the same options, with one exception.

The option *Select Chart Element* drop-down list does not appear elsewhere. Use it to easily select individual chart elements. It can be especially helpful when the chart is crowded or it is otherwise difficult to select elements using the cursor. Note that options such as **Data Labels** or **Trend Line** do not appear on this list unless they have already been inserted using the **Insert** menu.



## Note

The next several sections (until “Resizing, moving, and positioning charts” on page 54) require a chart to be in edit mode.

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## Selecting and moving chart elements

---

### Selecting chart elements

After double-clicking on the chart to enter edit mode, select chart elements using one of the following methods:

- Click once on the element in the chart (to select individual data points, click twice — but not too quickly — after clicking once on the data series).
- Select the element from the *Select Chart Element* drop-down list that appears on the left of the Formatting toolbar, as shown in Figure 11.

When selected, the chart element will be highlighted with square selection handles.



## Tip

When you hover the cursor over an element, Calc will display the element name, making it easier to select the correct element. The name of the selected element also appears in the Status Bar.

---

### Moving chart elements

You may wish to move individual elements of a chart, independent of other chart elements. For example, you may wish to reposition the title or axis names. To do so:

- 1) Select the element as described above.
- 2) Keep holding down the mouse button. The cursor changes to the move icon (appearance depends on computer setup).
- 3) Drag the cursor to move the element.
- 4) Release the mouse button when the element is in the desired location.

Alternatively, use the Position and Size dialog for some elements, as described on page 55.

Individual points or data series cannot be moved, with the exception of pie charts. Individual wedges of a pie can be moved or the entire pie can be exploded. See “Pie charts” on page 63 for information.

To move axis labels, see “Positioning axis, labels, and interval marks” on page 33. To move data labels, see “Adding and formatting data labels for a data series” on page 37.



## Tip

For some chart elements (such as title, subtitle, axis name, and legend), press the arrow keys to move the object in small steps.

---



## Note

When a 3D chart element is selected, round selection handles may appear. These control the 3D angle of the element. You cannot resize or reposition the element while they are showing. Click again to obtain the square selection handles that allow you to resize and reposition the 3D chart graphic.

---

## Changing chart type

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To change the type of chart (bar, column, pie, line, and so on):

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Open the Chart Type dialog using one of these methods:
  - Go to **Format > Chart Type** on the Menu bar.
  - Click the **Chart Type** icon  on the Formatting toolbar.
  - Right-click on the chart and select **Chart Type** from the context menu.

The dialog is the same as the first page of the Chart Wizard dialog shown in Figure 4 on page 8.

- 3) Select the chart type and variant desired.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

For further information about the types of charts, please refer to the “Gallery of chart types” on page 61.

## Titles, subtitles, and axis names

---

### Creating or changing text

To create or change the text of a chart title, subtitle, or axis name:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Use one of these methods to open the Titles dialog (Figure 12):
  - Go to **Insert > Titles** on the Menu bar.
  - Click on the **Titles** icon  on the Formatting toolbar.
  - Right-click in the chart area and select **Insert Titles** from the context menu.
- 3) Enter or edit the text in the appropriate text box(es).
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.



## Tip

The text of a title (but not formatting) can be modified directly. Click on it once in the chart (with the chart in edit mode). Click again inside the selection handles to directly change the text (it may take a few clicks to do this). Use *Shift+Enter* at the end of the line to create an additional line that splits the text.

---

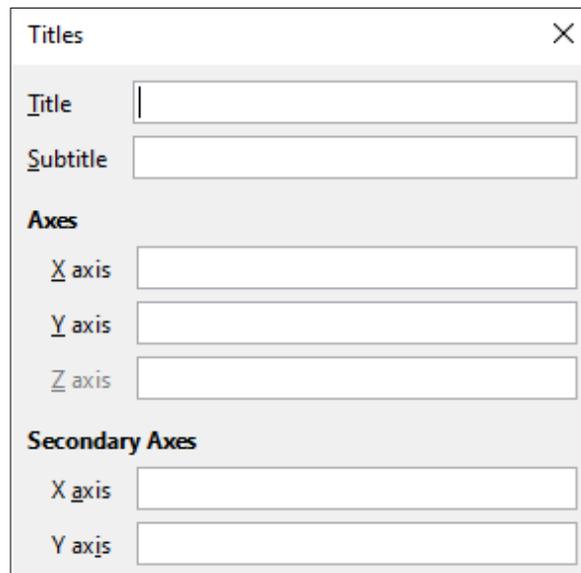


Figure 12: Basic Titles dialog

## Formatting text

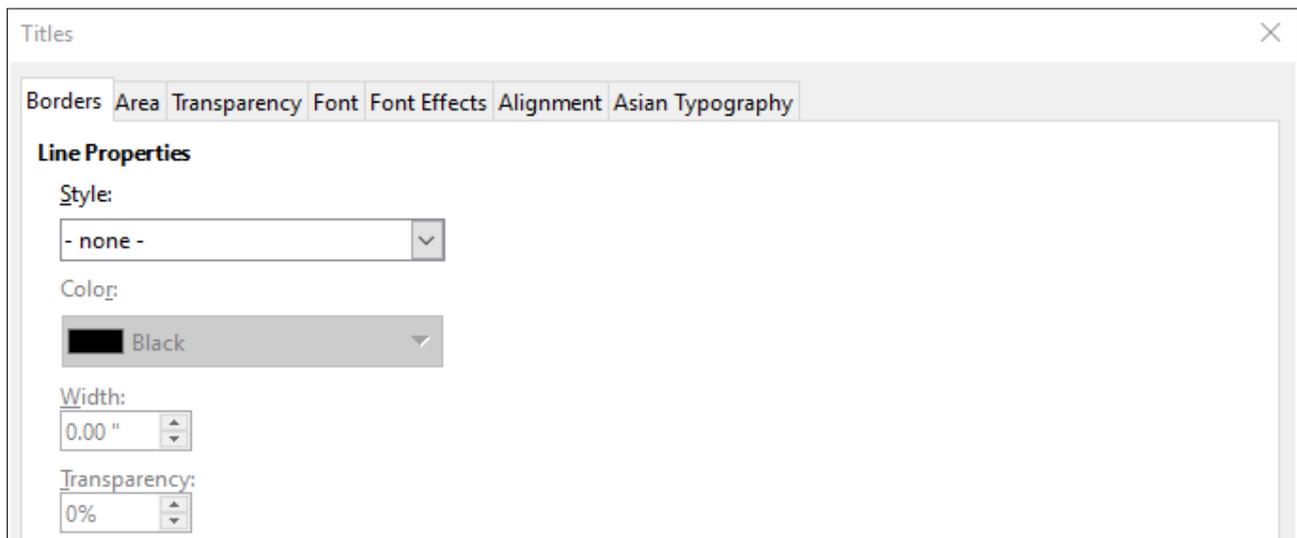


Figure 13: Titles formatting dialog (after selecting All Titles option)

Use a more extensive Titles dialog to format the appearance of a chart title, subtitle, or axis name. To access this dialog:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to open the Titles dialog for formatting (Figure 13):
  - Click **Format > Title** and select the desired type of title or the **All Titles** option.
  - Click on the element in the chart, right-click, and select **Format Title** (or appropriate element) from the context menu.
  - Click on the element in the chart or select it in the *Select Chart Element* drop-down list on the Formatting toolbar. Then select **Format > Format Selection** on the Menu bar or click on the **Format Selection** icon  on the Formatting toolbar.
- 3) Format titles or names as needed. The options are self-explanatory or easily researched.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

## Legends

When a legend is displayed, it shows data series names along with their graphical representations, such as bars, lines, or points. It will also show trend lines when those are turned on, as shown in Figure 14.

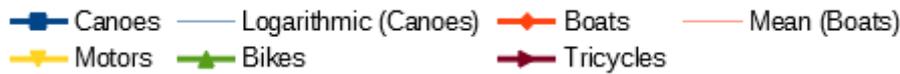


Figure 14: Example of a chart legend at the bottom of a chart.

## Positioning, inserting or deleting legends

### Inserting or deleting only

To only insert or delete a legend:

- 1) Enter edit mode by double-clicking the chart. The chart should now be surrounded by a gray border.
- 2) Do one of the following:
  - Click on the **Legend On/Off** icon  on the Formatting toolbar. The default position for inserting a legend is on the right side of the chart.
  - Right-click in the chart area and select **Insert Legend** or **Delete Legend** from the context menu.
- 3) If desired, click outside the chart to leave edit mode.



### Note

The names in the legend are the data series names. They are taken from the Name data range, discussed in “Selecting data series” on page 9. Change a legend name by changing the text in the spreadsheet.

### Positioning, inserting, and deleting

To position a legend using the basic Legend dialog (Figure 15) as well as insert or delete it, follow the same steps as above but do the following instead of step 2:

- 1) Go to **Insert > Legend** on the Menu bar to open the basic Legend dialog.

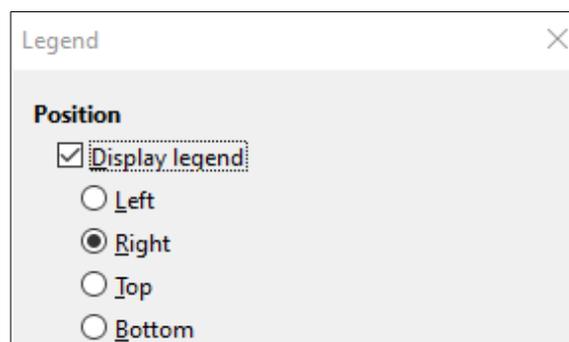


Figure 15: Basic Legend dialog

- 2) Select or deselect the **Display legend** checkbox to either display or not display the legend.
- 3) Select the desired location for the legend – **Left**, **Right**, **Top**, or **Bottom**.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.



## Tip

For finer positioning of the Legend, use one of the methods described in “Moving chart elements” on page 18.

## Formatting legends

For advanced editing of a legend's appearance, a more extensive Legend dialog (Figure 16) has several options for formatting borders, fill, fonts, transparency, and position.

- 1) Enter edit mode by double-clicking the chart. The chart should now be surrounded by a gray border.
- 2) Do one of the following to open the Legend dialog (Figure 16):
  - Click on the **Legend** icon  on the Formatting toolbar.
  - Select **Format > Format Legend** on the Menu bar.
  - Right-click on the legend and select **Format Legend** from the context menu.
  - Click on **Legend** in the *Select Chart Element* drop-down list on the Formatting toolbar or click the legend in the chart to select it. Then click on the **Format Selection** icon  on the Formatting toolbar or select **Format > Format Selection**.

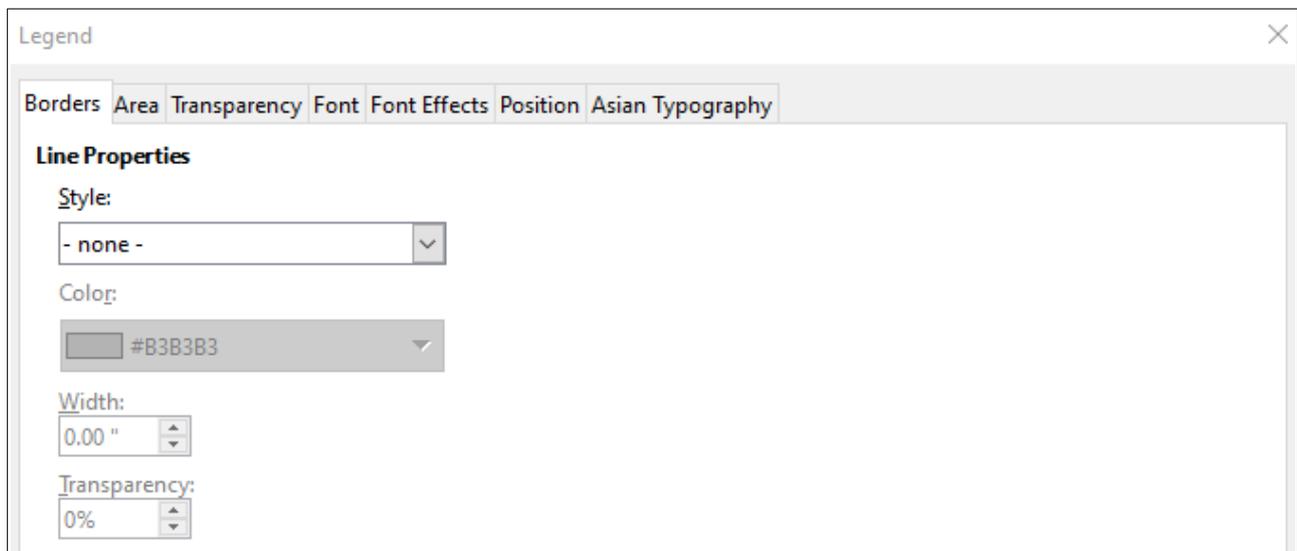


Figure 16: Legend dialog with more extensive options

- 3) Make any desired changes. The options are self-explanatory or easily researched.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

## Formatting chart backgrounds

The background of a chart is divided into chart area, chart wall, and chart floor, as shown in Figure 7 on page 12. Border, area, and transparency options for these areas are set in the following way:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to open the appropriate dialog (such as Figure 17):
  - Go to **Format** on the Menu bar and select **Chart Area**, **Chart Wall**, or **Chart Floor**.

- Right-click the chart wall, chart floor, or chart area in the chart and select **Format Wall**, **Format Floor**, or **Format Chart Area** from the context menu. (For help with selecting these areas, see “Selecting chart elements” on page 18.)
- On the Formatting toolbar, click on the icon for Chart Area  or Chart Wall  (there is no icon for chart floor).
- Click on **Chart Area**, **Chart Wall**, or **Chart Floor** in the *Select Chart Element* drop-down list on the Formatting toolbar. Then click the adjacent **Format Selection** icon or select **Format > Format Selection**.

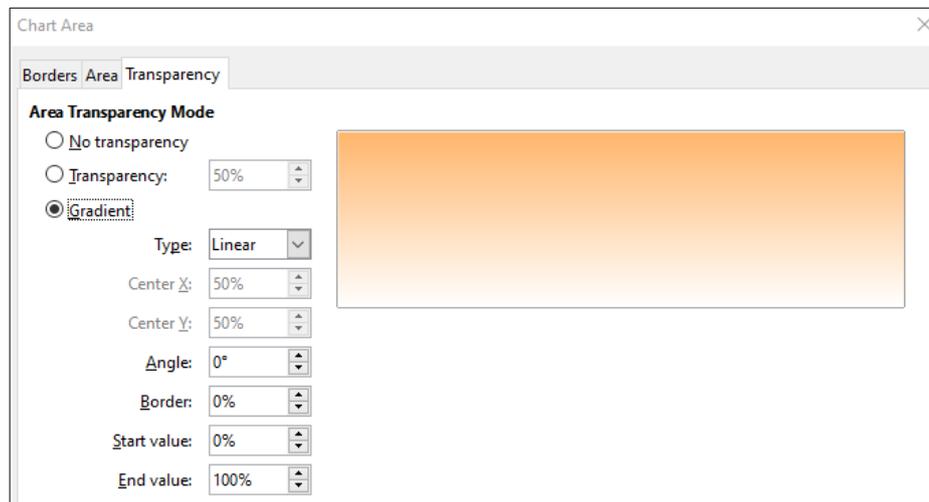


Figure 17: Chart Area dialog – Transparency tab

- 3) Select the desired settings from the *Borders*, *Area*, and *Transparency* tabs.
- 4) Click **OK** to save the changes and close the dialog. If desired, click outside the chart to leave edit mode.

## Data range and series

The goal of making a chart is to clearly present one or more data series and Calc provides a number of ways to define and present those data. The following sections discuss topics such as defining and changing data ranges, aligning data to a secondary Y axis, and formatting the appearance of the data series.

### Changing data ranges

When data ranges change in the spreadsheet, modify the chart settings to reflect those changes. Use one of the following methods.



#### Note

The chart automatically reflects changes in the spreadsheet data. Thus, changing a number from 5 to 50 in the data will instantly show the new number in the chart.

### Replacing data by dragging

It is easy to manually replace one set of data with another set of data. Do this in the following way:

- 1) Use the mouse to select all of the new data.
- 2) Drag the data over the chart, then release the mouse. This opens the Change Source Data Range dialog shown in Figure 18.

- 3) Specify whether or not the first column or row contains labels, then click **OK**. If desired, click outside the chart to leave edit mode.

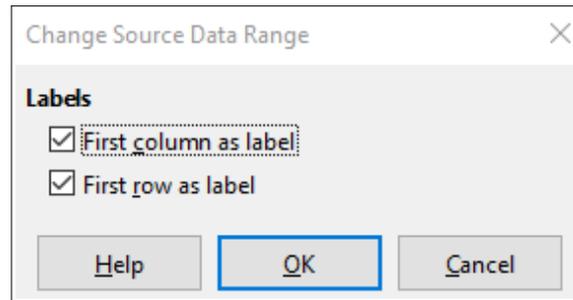


Figure 18: Change Source Data Range dialog

## Modifying the data range and data series

To change the data range or data series, do the following:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Open the Data Ranges dialog using one of these methods:
  - Go to **Format > Data Ranges** on the Menu bar.
  - Click on the **Data Ranges** icon  on the Formatting toolbar.
  - Right-click on the chart and select **Data Ranges** from the context menu.
- 3) Edit the data range on the *Data Range* tab, which is the same as shown in Figure 4 on page 8.
- 4) Edit data series on the *Data Series* tab, which is the same as shown in Figure 5 on page 10.
- 5) Click **OK** to save changes and close the dialog. If desired, click outside the chart to leave edit mode.



### Tip

If Calc is taking a significant amount of time to process a large amount of data for a chart, try this: Select only limited data for each data series to initially organize the chart. Adjust the settings until the chart looks as desired, then select all of the data.

For further information, see “Selecting data range” on page 8 and “Selecting data series” on page 9.

## Opening the Data Series dialog

The Data Series dialog offers several options for presenting data in the chart. Note that only one data series can be selected at a time.

To open the Data Series dialog (Figure 19):

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to select the data series:
  - Click on the data series in the chart.
  - Click the data series name in the *Select Chart Element* drop-down list on the Formatting toolbar.
- 3) Do one of the following to open the Data Series dialog:

- Go to **Format > Format Selection** on the Menu bar.
  - Click on the **Format Selection** icon  on the Formatting toolbar.
  - Right-click on the data series and select **Format Data Series**.
- 4) Click the tab of the appropriate page to make the changes needed. The options for each page are explained below.
  - 5) Click **OK** to save changes and close the dialog. If desired, click outside the chart to leave edit mode.

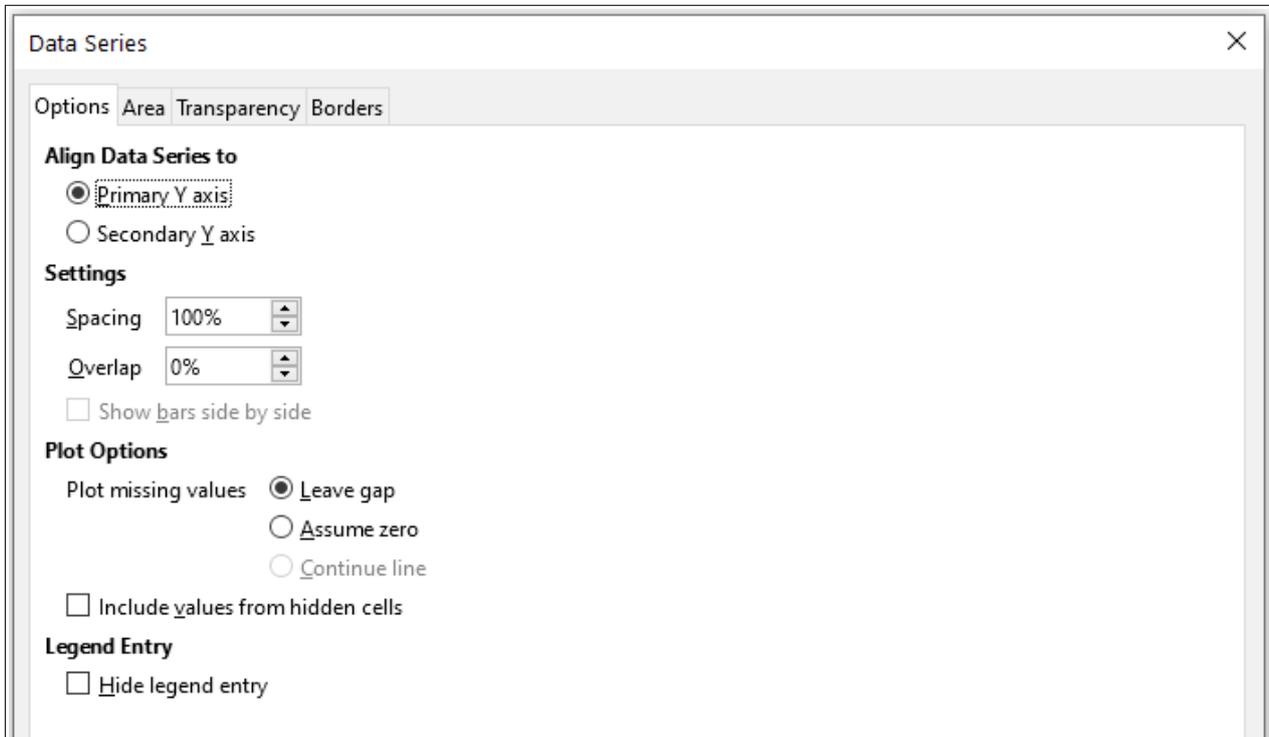


Figure 19: Data Series dialog – Options tab



## Note

The tabs that appear on the Data Series dialog depend on the type of chart selected. Similarly the controls that appear on each tab may differ depending on the type of chart.

## Alignment, spacing, and plot options

### Aligning data to secondary Y axis

A secondary axis may be helpful when data differ in units or scale, as in Figure 20. In this case, there are significantly more numbers of one data series (kayaks). To plot all three data series on the same chart, the kayak data series is aligned to a secondary Y axis, which has a wider scale. The color of the secondary Y axis and the axis titles help to show this relationship.



## Note

A data series can be associated with a secondary Y axis only after Chart Wizard has finished creating the chart.

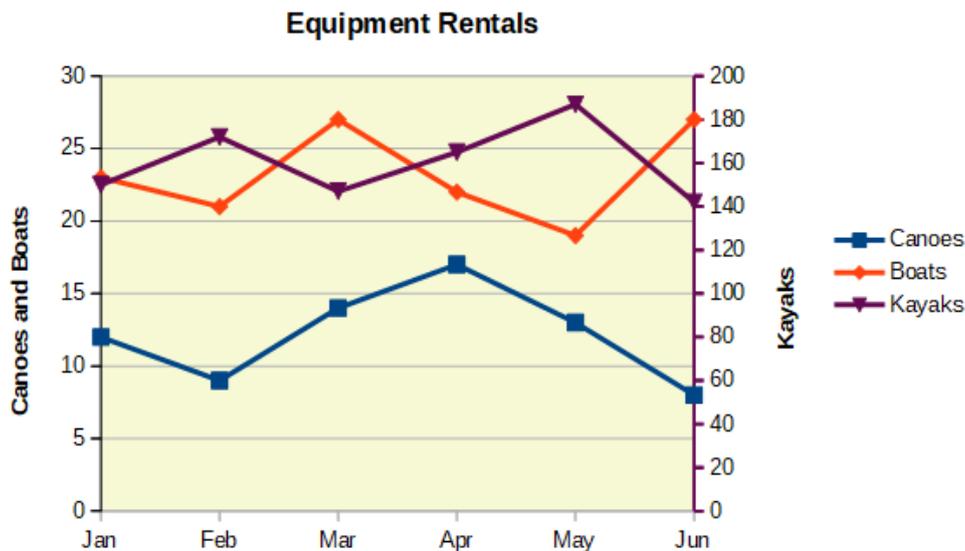


Figure 20: Data series aligned to a secondary Y axis

To align a data series to a secondary Y axis:

- 1) Select the data series and open the Data Series dialog as described in the previous section.
- 2) On the *Options* tab, under *Align Data Series to*, select **Secondary Y axis**.
- 3) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

Data can only be aligned to a secondary Y axis, not a secondary X axis. However, it is possible to create secondary X and Y axes that duplicate the primary axes on the opposite sides of a chart. This is described in “Add or remove axis labels” on page 30. It is also possible to show different units or scales on the secondary axis (with or without aligning data to it), as described under “Defining Scales” on page 32.

### Spacing and plot options

The *Options* tab of the Data Series dialog (Figure 19) contains additional settings that depend on the type of chart. These include:

#### Spacing

Sets the spacing interval of columns or bars between category settings, such as time. Values above 100% increase the spacing while values below 100% decrease the spacing. Maximum spacing is 600%.

#### Overlap

Sets overlap of columns or bars within the same category setting, such as a specific time. The higher the percentage, the greater the overlap (maximum of 100%). Negative percentages increase the separation (minimum of -100%).

#### Show bars side by side

When checked, shows no gap in columns or bars in the interval between categories. When this option is not checked, data aligned to a secondary Y axis may hide other data. Enable the option to prevent this.

#### Plot missing values

Specifies handling of missing values, with options depending on the type of chart.

#### Include values from hidden cells

Enables data from hidden cells to be included or not included.

#### Hide legend entry

Enables the name of the selected data series to be included or removed from the legend.

Two additional options (not shown in Figure 19) appear for pie or donut charts:

### Orientation

Specifies the order of the pie sections (data points) – clockwise or counter-clockwise. The default direction is counterclockwise.

### Starting Angle

Specifies the starting angle of the first pie section (data point), in the range 0 to 359 degrees. Drag the small dot around the circle or enter a number for the degrees. Use 0 degrees to start the first section at the 3 o'clock position and 90 degrees to start the first section at 12 o'clock.

## Area, transparency, and borders

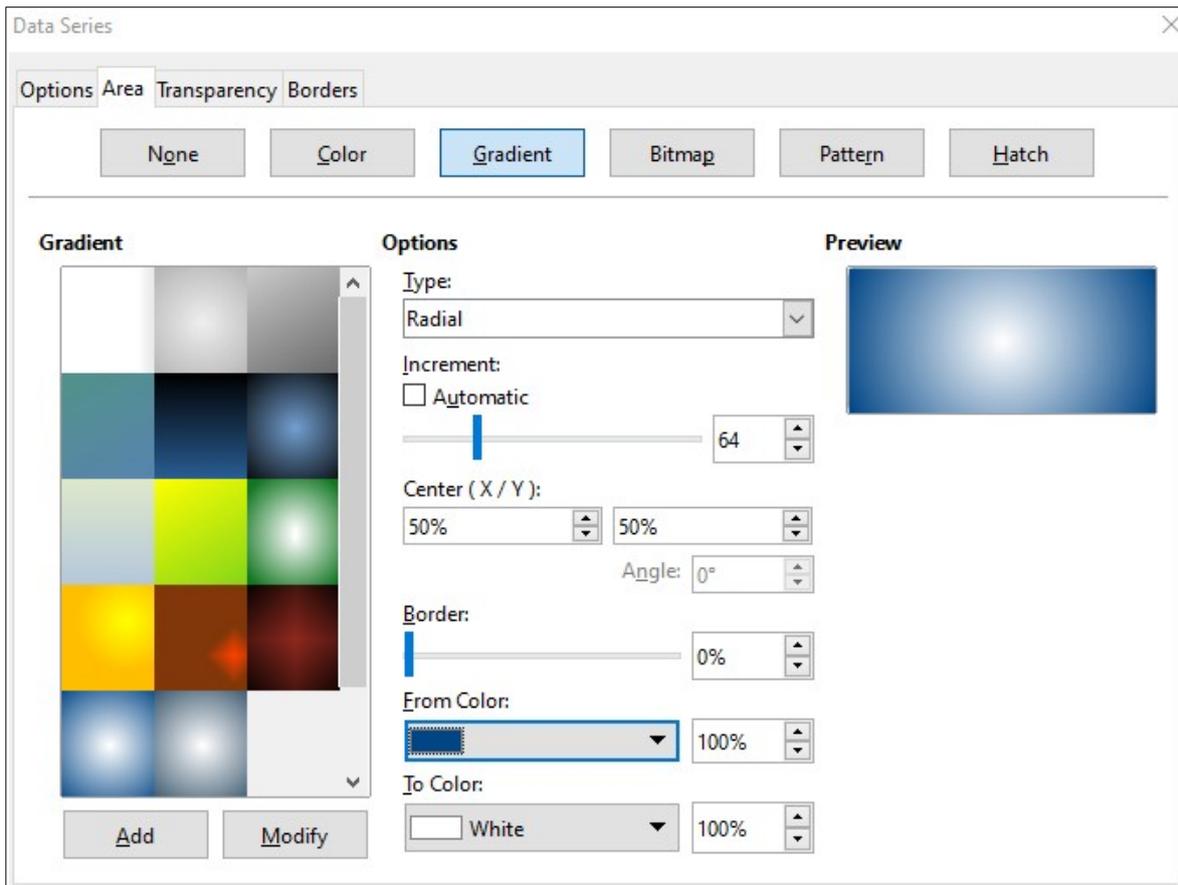


Figure 21: Data Series dialog – Area tab, Gradient page

For chart types other than line and scatter, the Data Series dialog (Figure 21) contains pages for formatting the fill and borders of graphical representations such as columns and bars. The Area tab offers options for selecting color by clicking directly on a color in a palette, adding a custom palette, or by specifying the RGB or Hex color codes. Other pages contain options for gradient, bitmap, pattern, hatch, transparency, and borders. The options are self-explanatory or can be readily researched.



### Tip

If applying a gradient does not work as expected, do this: After selecting the desired options on the Gradient page, click **Add**, provide a name for the gradient (or accept the default), and click **OK**.

## Lines, areas, and data point icons

For some chart types (such as line charts and xy (scatter) charts), the Data Series dialog contains only an *Options* tab and a *Line* tab (Figure 22).

Specify line style, color, width, and transparency of the line on the left side of the *Line* tab. In the *Icon* section, select an option for the symbol from the drop-down list: **No Symbol**, **Automatic**, **From file**, **Gallery**, or **Symbols**.

- **From file** opens a browser for selecting the file that contains the desired symbol.
- **Gallery** opens a list of available graphics that can be selected.
- **Symbols** opens a list showing available symbols that can be selected.

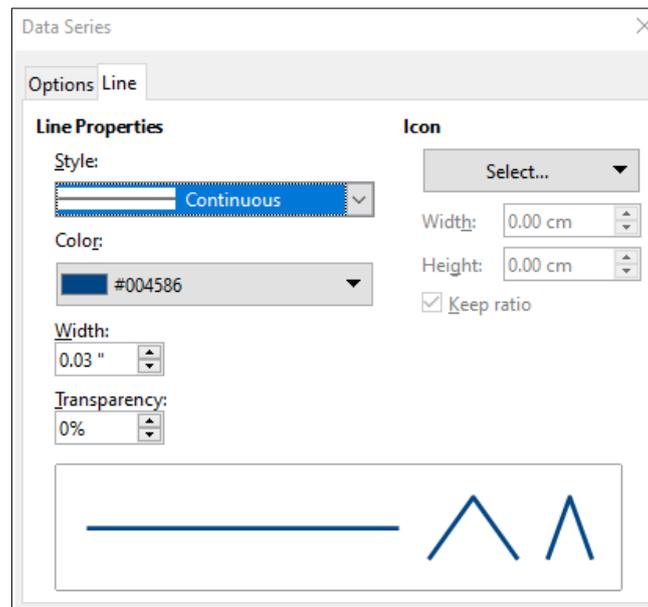


Figure 22: Data Series dialog for line and scatter charts – Line tab

A preview of the selection is shown in the preview box at the bottom of the dialog. Enter the desired width and height of the symbol. Select **Keep ratio** if the ratio of width to height of the symbol should be maintained.

## Assigning colors

Colors for the display of data series can be specified in three ways: changing the default color scheme, using the Data Series dialog, or using data ranges to set colors for border and fill.

### Changing default color scheme

To modify the default color scheme for data series, go to **Tools > Options > Charts > Default Colors** to specify colors for each data series. Changes made here affect the default colors for any future chart.

### Using Data Series dialog

As discussed in the previous section, the Data Series dialog has options for assigning colors for lines, areas, and borders. Available options depend on the type of chart.

## Using data ranges to assign colors

Use the COLOR function in the Function Wizard (described in Chapter 7, Using Formulas and Functions) to specify colors with numbers based on combined RGB values. Then assign the numbers to data ranges for border and fill colors in the *Data Series* page of the Chart Wizard (see “Selecting data series” on page 9) or in the *Data Series* tab of the Data Ranges dialog (see “Changing data ranges” on page 23).

For example, using the COLOR function in the Function Wizard, enter 255 for R (red), 0 for G (green), and 255 for B (blue). The COLOR function calculates a combined RGB value of 16711935. Then, when defining data ranges, enter the RGB value(s) in the cell range for border or fill color. Optionally, include a value for the alpha channel (A) in the COLOR function. The value of A can range from 0 (fully transparent) to 255 (fully opaque).



### Note

Data ranges for border color and fill can only be specified for column, bar, pie, bubble, and column and line charts.

In addition to directly assigning colors, use conditional formatting to define criteria for when specific colors will be used. (Conditional formatting is described in Chapter 2, Entering, Editing, and Formatting Data.)

Figure 23 shows an example of using conditional formatting to specify colors. The COLOR function in the Formula Wizard was used to create the conditional formula  
`=IF(B2>100,COLOR(240,240,20),COLOR(150,0,150,20))`

This formula says that when the value in column B is over 100, the first RGB setting is used to color that data point in the chart. When the value in column B is 100 or less, the default color (150, 0, 150) is used. This formula is in all cells of column C. The numbers appearing in column C are the RGB values calculated using the conditional formula (with cell references changed accordingly).

Temperature	Number	Color
20	67	345374870
25	78	345374870
30	90	345374870
35	101	351334400
40	111	351334400
45	106	351334400
50	98	345374870
55	87	345374870

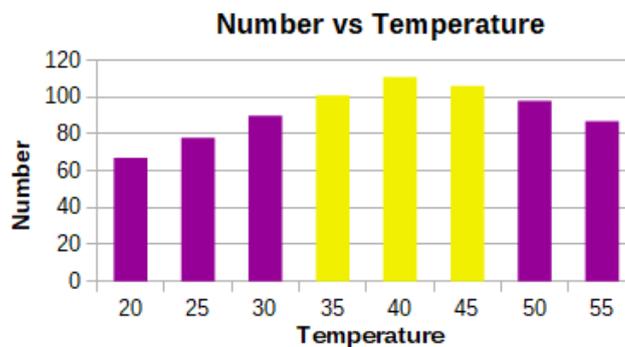


Figure 23: Using the COLOR function and a conditional formula to specify colors.

The chart on the right in Figure 23 shows how the colors change to reflect the conditional formatting.

## Formatting Data Points

Modify the appearance of an individual data point such as a column or bar using the Data Point dialog. For most chart types, the dialog contains the same *Area*, *Transparency*, and *Borders* pages as the Data Series dialog shown in Figure 21 on page 27. For line, scatter, net, and stock charts, the dialog contains the same options as the *Line* tab of the Data Series dialog shown in Figure 22 on page 28.

To format data points:

- 1) Enter edit mode by double-clicking the chart. The chart should now be surrounded by a gray border.
- 2) Click two times (but not too quickly) on the data point to be formatted. The data point will show square selection handles.
- 3) To open the Data Point dialog, do one of the following:
  - Go to **Format > Format Selection**.
  - Right-click on the data point and select **Format Data Point** from the context menu.
  - Click the **Format Selection** icon  on the Formatting toolbar.
- 4) Apply formatting options as desired.
- 5) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

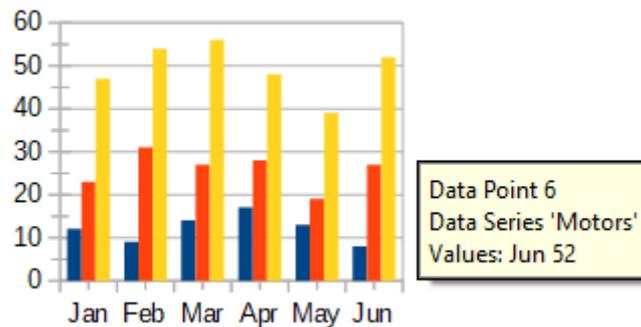


Figure 24: Tooltip showing information about a data point



### Tip

As shown in Figure 24, hover the cursor over a data point to show the number of the data point, the number of the series, and the X and Y values of the data point.

## Axes

### Add or remove axis labels

Use the basic Axes dialog shown in Figure 25 to add or remove axis labels, such as numbers or categories. (To change the name of an axis, see “Titles, subtitles, and axis names” on page 19).

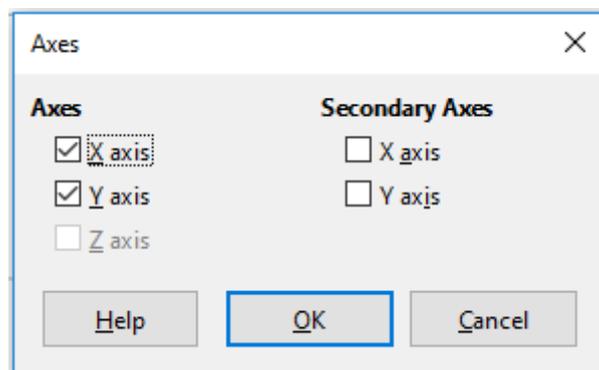


Figure 25: Axes dialog – basic version

To use the basic Axes dialog:

- 1) Enter edit mode by double-clicking the chart. The chart should now be surrounded by a gray border.
- 2) Open the basic Axes dialog by doing one of the following:
  - Go to **Insert > Axes** on the Menu bar.
  - Right-click on the chart and select **Insert/Delete Axes** from the context menu.
- 3) Select or deselect the check boxes for axis labels. The Z-axis checkbox is only active when a 3D chart has been created.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

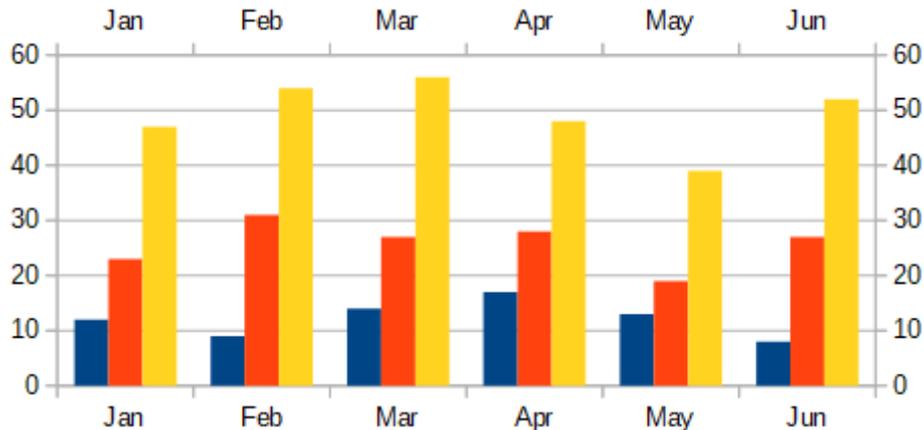


Figure 26: Both secondary axes enabled.

Selecting a secondary X axis or a secondary Y axis in this dialog creates duplicate labels on the opposite side of the chart, as shown in Figure 26. To specify different units or intervals for the secondary axis, use the *Scale* tab of the more extensive Axes dialog described in the following section.

It is also possible to align one or more data series to the secondary Y axis. Do this using the Data Series dialog, described in “Aligning data to secondary Y axis” on page 25.

## Edit and format axes

In addition to the simple dialog above, a more extensive Axis dialog contains options for grid intervals, positioning the axis, formatting the axis line and axis labels, and defining the scale, among other settings. Use a dialog for a specific axis, or use a dialog that applies to all axes. The options in the dialog depend on which axis was selected, type of chart, and whether the chart is 2D or 3D.

To open the more extensive Axis dialog:

- 1) Enter edit mode by double-clicking the chart. The chart should now be surrounded by a gray border.
- 2) Open a specific axis dialog (Figure 27) by doing one of the following (some options do not allow choosing all axes):
  - Go to **Format > Axis** on the Menu bar and select the desired axis (**X Axis**, **Y Axis**, **Z Axis**, **Secondary X Axis**, **Secondary Y Axis**, or **All Axes**).
  - Right-click on the desired axis in the chart to open the context menu. Then select **Format Axis**.
  - Click the axis on the chart or select the axis in the *Select Chart Element* drop-down list on the Formatting toolbar and click the adjacent **Format Selection** icon.

- Click on the icon for **X Axis** , **Y Axis** , or **Z Axis**  on the Formatting toolbar. Or click on the **All Axes** option to the right of the other icons.
- 3) Click the tab of the appropriate page to make the changes needed. The options for each page are explained below.
  - 4) Click **OK** to save changes and close the dialog. If desired, click outside the chart to leave edit mode.

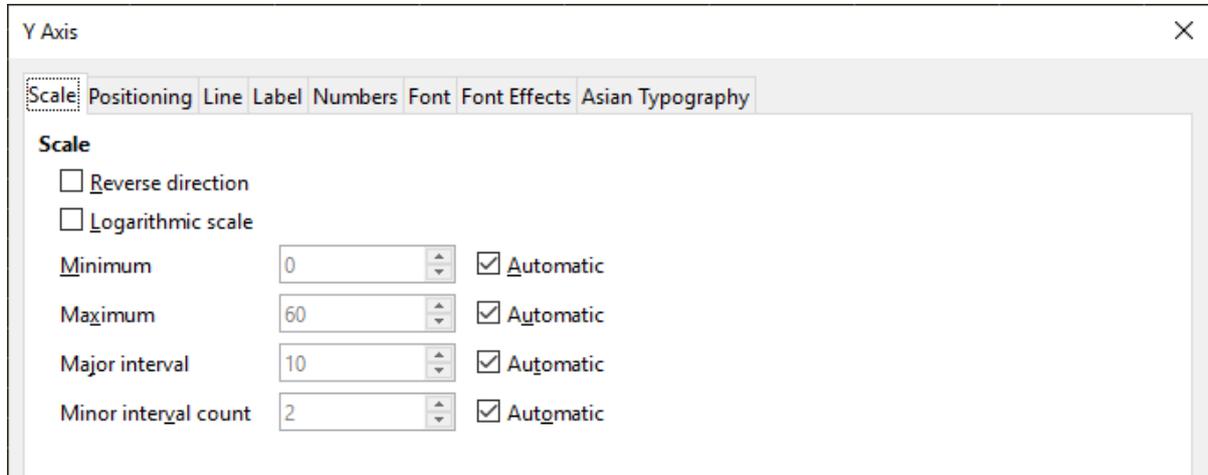


Figure 27: Axis dialog – Scale tab

## Defining Scales

Use the *Scale* tab to modify the automatically generated scale for a primary axis. In addition, use the *Scale* tabs for secondary axes to specify scales that are different from the scales for primary axes. This can be quite useful for showing Celsius and Fahrenheit scales on the same chart, for example, or for when data are aligned to a secondary Y axis (see “Aligning data to secondary Y axis” on page 25).

The contents of the *Scale* tab (Figure 27) vary but may contain the following options:

### Reverse direction

Defines the order of lower and higher values along the axis. When not selected, the X axis shows the lower values on the left and the Y axis shows the lower values at the bottom. When selected, the orientation of the data display is reversed, as in Figure 28.

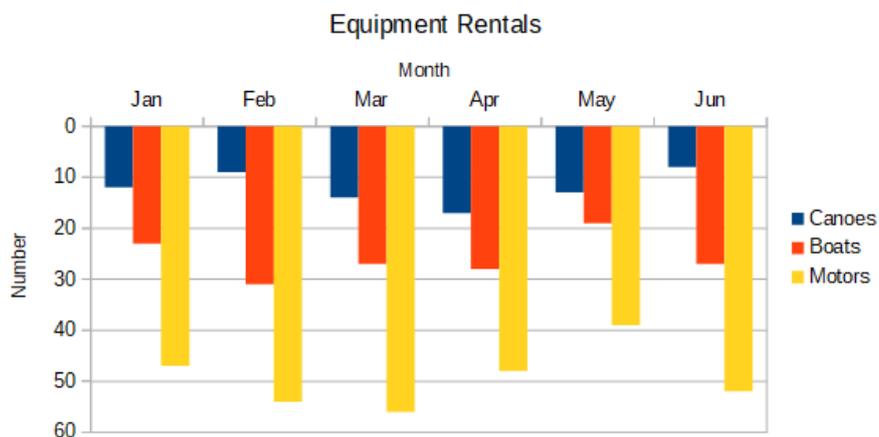


Figure 28: Result when direction is reversed on the Y axis

## Logarithmic scale

Specifies that the axis is to be subdivided logarithmically. Logarithmic scaling makes the grid lines of the axis equidistant from each other, but the values between the lines are not equal. Use this option when working with values that differ sharply from each other.

## Minimum/Maximum

Sets the first/last value for the axis. **Automatic** must be deselected to set this option manually.

## Major interval

Defines the intervals between major divisions of the axis. These intervals will be used for interval marks (specified on the *Positioning* tab of the Axis dialog) and gridlines. **Automatic** must be deselected to set this option manually.

## Minor interval count

Defines the number of intervals (not the values between intervals) that subdivide the major intervals. The same as for major intervals, the interval count defined here will be used for interval marks (specified on the *Positioning* tab of the Axis dialog) and gridlines. **Automatic** must be deselected to set this option manually.

For some types of charts, additional options may be available:

## Type

Specifies whether the labels are text, date, or should be detected automatically.

## Resolution

For dates, specifies that the interval steps should be days, months, or years.



## Tip

If the X axis is not displaying time as expected, manually entering the minimum and maximum times on the *Scale* tab may solve the problem.

## Positioning axis, labels, and interval marks

The *Positioning* tab (Figure 29) controls the position of axis labels and interval marks.

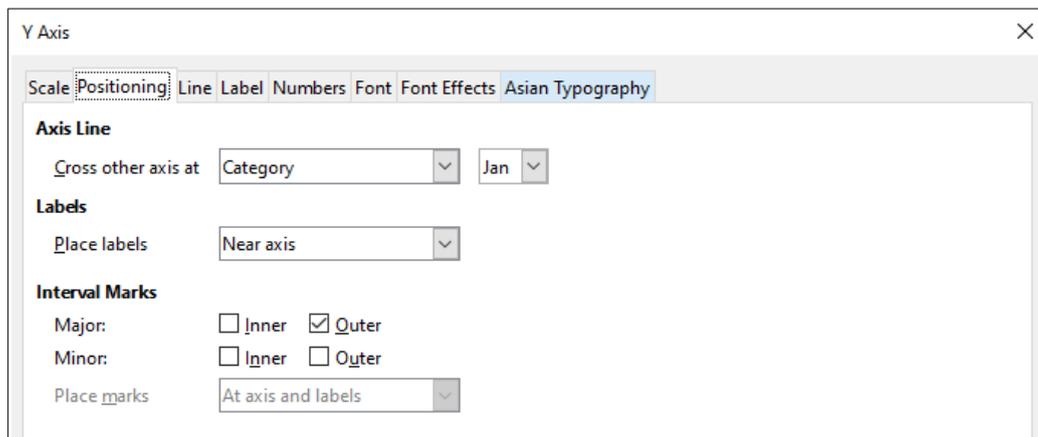


Figure 29: Axis dialog – Positioning tab

## Axis Line

Sets where the axis crosses the other axis, as shown in Figure 30. The options on the drop-down list are **Start**, **End**, or a specific value or category.

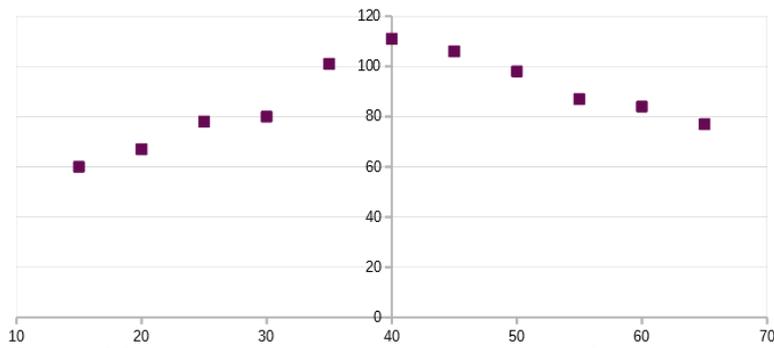


Figure 30: Y axis set to cross X axis at specified value

## Labels

Sets where axis labels are placed, using the *Place labels* drop-down list, The **Outside end** and **Outside start** options are useful for positioning labels on axes with negative numbers, as shown in Figure 31.

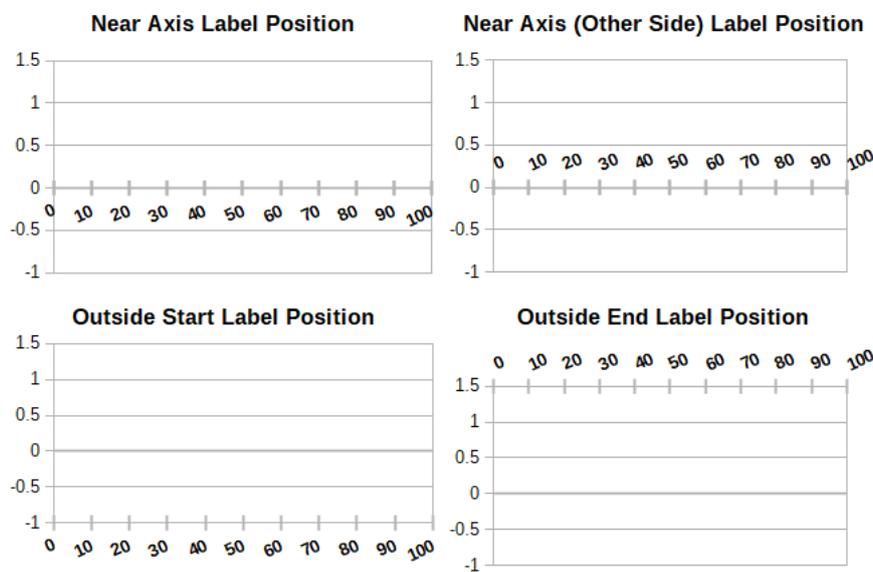


Figure 31: Axis label positions

## Interval Marks

- **Major/Minor** – specifies whether interval marks are displayed for major/minor intervals. These intervals are defined on the *Scale* tab, described above.
- **Inner/Outer** – specifies whether interval marks are placed on the inner or outer side of the axis. The interval marks in Figure 31 are on both sides.
- **Place marks** – specifies where to place the marks: **At labels**, **At axis**, or **At axis and labels**. (The top two charts in Figure 31 show the labels along the axes. The marks are thus both at axis and labels. The marks in the bottom two charts are located at the labels.)

## Line tab

The *Line* tab has options for formatting the axis line style, color, width, and transparency. It has the same contents as the *Line* tab of the Data Series dialog shown in Figure 22 on page 28 but excluding the controls in the *Icon* area.

## Label tab

On the *Label* tab (Figure 32), choose whether to show or hide the labels and specify how to handle them when they do not fit neatly in the chart. The options are described below.

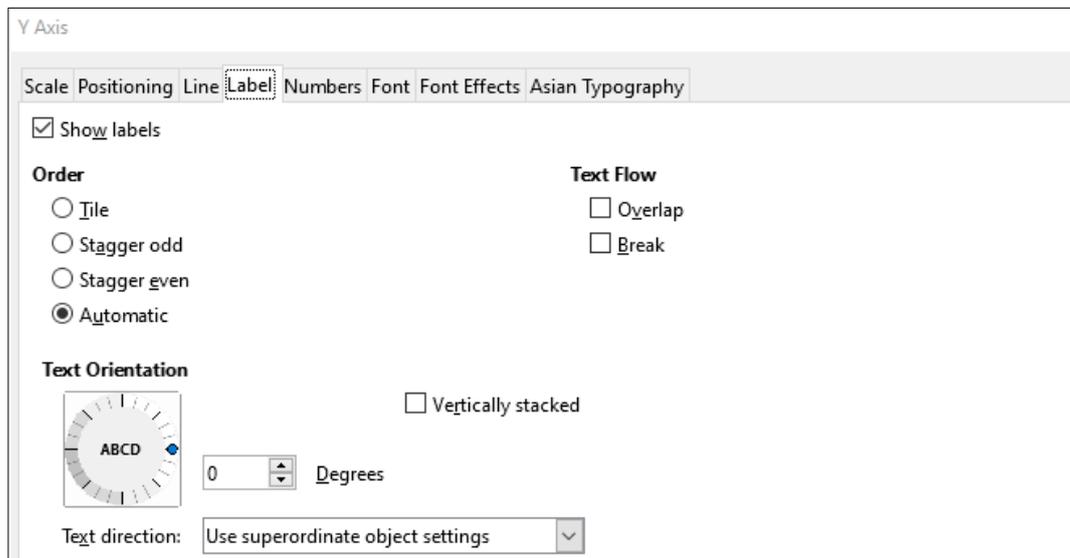


Figure 32: Axis dialog – Label tab

### Show labels

Sets whether to show or hide the axis labels.

### Order

Defines the horizontal or vertical alignment of the labels on the X or Y axis. These options are available only for 2D charts.

- **Tile** – arranges labels on the axis side by side.
- **Stagger odd** – staggers labels on the axis, with even numbers lower than odd numbers (even numbers to the left on vertical axis).
- **Stagger even** – staggers labels, with odd numbers lower than even numbers (odd numbers to the left on vertical axis).
- **Automatic** – automatically arranges labels on the axis.



### Note

Problems may arise in displaying labels if the chart is too small. Avoid this by either enlarging the chart or decreasing the font size.

### Text flow

Determines how text flows in axis labels.

- **Overlap** – allows axis labels to overlap.
- **Break** – allows text breaks, enabling text to wrap into new lines in the available space.

### Text Orientation

Defines the direction and orientation of label text.

### Vertically stacked

Stacks characters vertically so that text is read from top to bottom.

### ABCD wheel

Defines text orientation by clicking and dragging the indicator on the wheel. Orientation of the characters "ABCD" on the wheel corresponds to the new setting.

### Degrees

Shows the orientation angle of the text as determined by the ABCD wheel or by manually entering the degrees in the spin box.

## Text direction

Specifies the direction for any text that uses complex text layout (CTL). CTL is only available if enhanced language support is enabled in **Tools > Options > Language Settings > Languages**. Under *Enhanced Language Support*, check **Ignore system input language**.

## Numbers

Use the *Numbers* tab (Figure 33) to set the attributes for any numbers used on the axis. When **Source format** is selected (as it is by default), numbers are formatted exactly as they are formatted on the spreadsheet. Deselect this option to change number formatting. For information about formatting numbers, see Chapter 2, Entering, Editing, and Formatting Data, in this guide as well as the online Help.

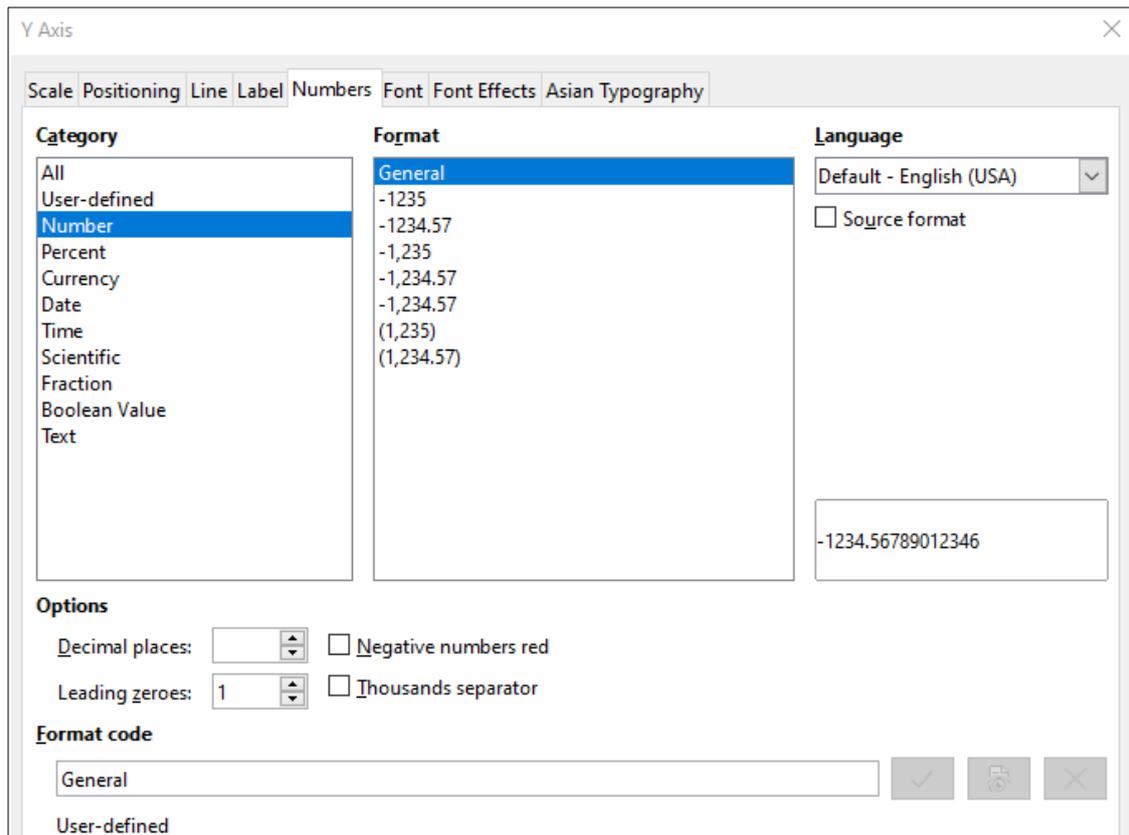


Figure 33: Numbers tab of Axis dialog

## Font and font effects

Use the *Font* and *Font Effects* tabs to set the font and font effects for the axis labels. These pages are the same as the tabs for specifying fonts and font effects in cells. See Chapter 2, Entering, Editing, and Formatting Data for more information.

## Asian typography

Sets the Asian typographic options for axis labels. It is only available if enhanced language support is enabled in **Tools > Options > Language Settings > Languages**. Under *Enhanced Language Support*, check **Ignore system input language**. Options on this page include:

### Apply list of forbidden characters to the beginning and end of lines

Prevents the characters in the list from starting or ending a line. The characters are relocated to either the previous or the next line. To edit the list of restricted characters, go to **Tools > Options > Language Settings > Asian Layout**.

## Allow hanging punctuation

Prevents commas and periods from breaking a line. Instead, these characters are added to the end of the line, even in the page margin.

## Apply spacing between Asian and non-Asian text

Inserts a space between Asian and non-Asian text.

## Hierarchical axis labels

Multiple levels of categories can be displayed in a hierarchical manner along the axis of a chart. Hierarchical axes labels are created automatically if the first column or row defined as data is text (as opposed to the first column or row defined as labels). An example of hierarchical labels is shown in Figure 34. In this case, Calc automatically defines the data range for categories as the first two columns in the spreadsheet. This is reflected in the chart, which shows the hierarchical relationship between quarters and months.

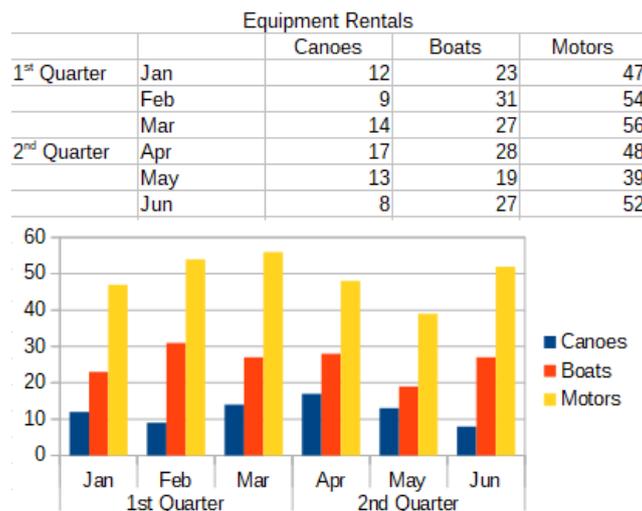


Figure 34: Example of hierarchical axes labels

## Data labels

Data labels display information next to data points on the chart. They can be quite useful for highlighting specific data when presenting detailed information, but be careful not to create a chart that is too cluttered to read easily.

## Adding and formatting data labels for a data series

To add or format data labels for a data series:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to select a specific data series:
  - Click once somewhere in the data series.
  - In the *Select Chart Element* drop-down list of the Formatting toolbar, select the data series name.



### Note

If no data series is selected, then all data series on the chart will be labeled.

- 3) To open the Data Labels dialog (Figure 35), do one of the following:
  - Go to **Insert > Data Labels** on the Formatting toolbar.

- First right-click on the selected data series in the chart and select **Insert Data Labels** from the context menu. Calc displays data labels with default settings. Then right-click again and select **Format Data Labels** from the context menu.
- 4) Select the options as desired. The options are explained below.
- 5) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.



## Tip

Select a data series by clicking once on a column, bar, or other graphic representation of the data series. Select a single data point by pausing, then clicking again.

Most of the pages in the Data Labels dialog are used in other dialogs and can be readily understood or easily researched. The exception is the *Data Labels* tab (Figure 35), which contains the following options:

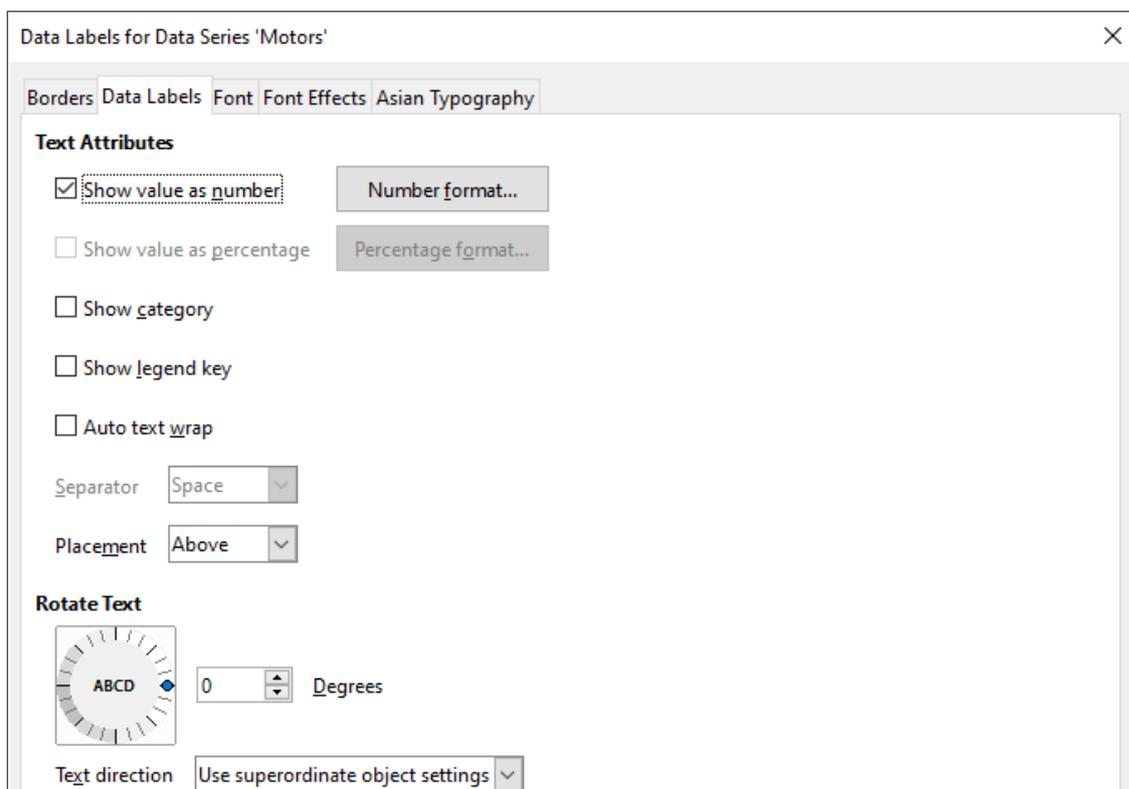


Figure 35: Data Labels tab of the Data Labels dialog

### Show value as number

Displays the numeric value of a data point. When selected, this option activates the **Number format** button.

### Number format

Opens the Format Number dialog, which is the same as the *Numbers* tab of the Format Cells dialog discussed in Chapter 2, Entering, Editing, and Formatting Data. Deselect **Source format** to activate options on this page.

### Show value as percentage

Displays the percentage value of the data points in each data series. When selected, this option activates the **Percentage format** button. Note that the percentage referred to is a data point's Y value as a percent of total Y values for a specific X category or value. Thus, in Figure 36, the February canoe value 9 is 10% of the total February value of 94 (the sum of 9, 31, and 54).

## Percentage format

Opens the Number Format for Percentage Value dialog. Deselect **Source format** to activate options on this page.

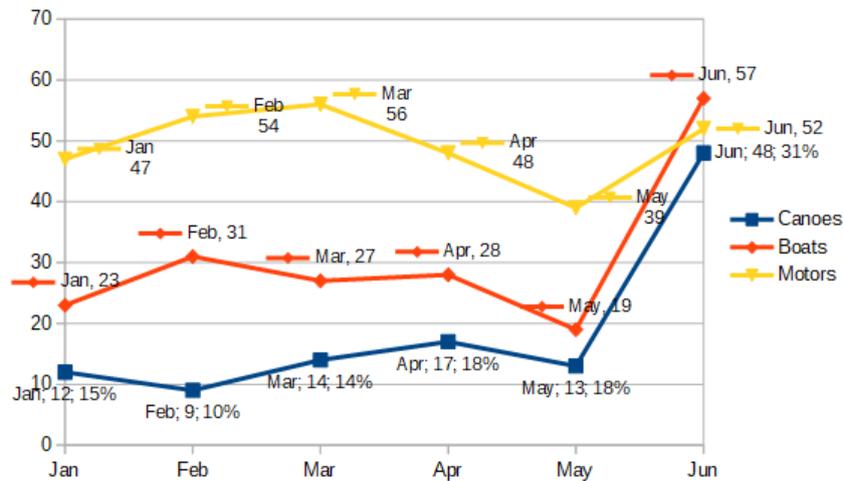


Figure 36: Examples of data label options

## Show category

Displays the category next to each data point. This option is activated for all data labels in Figure 36. Thus, all data labels show the month. The text for data labels comes from the category data series and cannot be changed in the chart. It can only be changed in the spreadsheet data.

## Show legend key

Displays the legend icon for the data series next to each data point. Figure 36 shows the legend keys for motors and boats, but not for canoes.

## Auto text wrap

Wraps data label text if needed.

## Separator

Selects what will be used to separate multiple text strings when at least two options above are selected. In Figure 36, the separator is **Semicolon** for the canoes data labels, **New line** for the motors data labels, and **Comma** for the boats data labels (with the exception of the June label, which was modified for better fit). A further option is **Space**.

## Placement

Specifies the placement of data labels relative to the data point representation. In Figure 36, the placement of data labels is **Below** for canoes, **Above** for boats, and **Right** for motors. Other available options are **Left** and **Center**.

## Rotate Text

Sets the text orientation of data labels by using the dial or entering the rotation angle.

## Text Direction

Specifies the text direction when Complex Text Layout (CTL) is enabled. (CTL is needed when the shape or position of characters depends on the context, such as in Arabic script).

## Data labels for individual data points

Sometimes it is appropriate to apply data labels to one or a few data points rather than all data points. This reduces clutter and highlights the most important data.

## Adding a single data label

Insert a data label for a single data point in the following way:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Click the data point once, pause, then click again to select it. (Clicking too quickly opens the Data Series dialog.)
- 3) Right-click on the selected data point and select **Insert Single Data Label** from the context menu. The data label will have the default settings.
- 4) Click **OK** to close the dialog.
- 5) If desired, click outside the chart to leave edit mode.

## Formatting the label for a single data point

To format an existing label for a single data point, follow the directions above but instead of step 3, do the following to open the Data Label dialog (Figure 35): right-click on the data point and select **Format Single Data Label** from the context menu.

The options in the Data Label dialog are described above.

You can also access the Data Label dialog by clicking on the data label, pausing, and then clicking on it again. Then right-click and select **Format Single Data Label** from the context menu.

## Removing data labels

Remove labels from a single data point, a single data series, or all data points using one of the methods below.

Before doing any of the following, first select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border. When finished, click **OK** to close the dialog and remove the data labels. Then if desired, click outside the chart to leave edit mode.

### Removing all data labels from a single data series

#### Method One

Right-click somewhere in the data series and select **Delete Data Labels** from the context menu.

#### Method Two

- 1) Do one of the following to open the Data Labels dialog (Figure 35):
  - Click somewhere in the data series to select it. Go to **Insert > Data Labels** on the Menu bar.
  - In the *Select Chart Element* drop-down list of the Formatting toolbar, select the data labels entry for the required series name and then click the adjacent **Format Selection** icon .
  - Right-click in the data series and select **Format Data Labels** from the context menu.
- 2) On the *Data Labels* tab, deselect all of the options.

### Removing a data label from a single data point

- 1) Click once on the data point, pause, then click again to select it.
- 2) Right-click to open the context menu and select **Delete Single Data Label**.

### Removing all data labels

- 1) Make sure that no data label or data series is selected.
- 2) Go to **Insert > Data Labels** on the Menu bar.

- 3) On the Data Labels dialog, deselect all of the options for the data labels to be removed, then click **OK**.

## Grids

Grid lines or grids divide the intervals along axes to help estimate data point values. Major and minor grid lines are shown in Figure 37. The darker lines with numbers are major grid lines while the lighter lines between them are minor grid lines. Note that the Y-axis major grid line is activated by default.

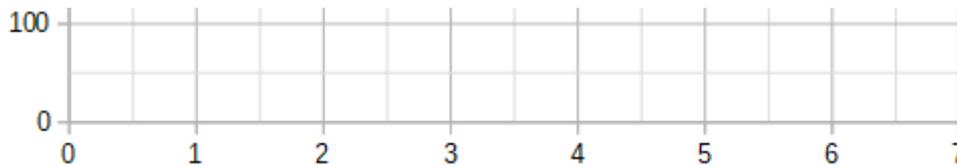


Figure 37: Major and minor gridlines for the X and Y axes

Grids are available for all chart types with the exception of pie charts.

## Adding/removing grid lines

- 1) First select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following:
  - Go to **Insert > Grids** on the Menu bar to open the basic Grids dialog (Figure 38). Select/deselect the check boxes as needed. The **Z axis** checkbox is only active for a 3D chart.



Figure 38: Basic Grids dialog

- Click the **Horizontal Grids** icon  or **Vertical Grids** icon , both located on the Formatting toolbar. Clicking once turns on the major grid lines. Clicking twice turns on the minor grid lines as well. Clicking again turns off the grids.
- 3) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.



### Note

In the Formatting toolbar, the **Horizontal Grids** icon  and the **Vertical Grids** icon  set grid lines for the Y axis and X axis, respectively. This can be misleading because both the Y axis and the X axis can be horizontal or vertical, depending on the type of chart. Thus, for a bar chart, click the **Horizontal Grids** icon to control the vertical grids.

## Formatting grids

In addition to the basic Grids dialog shown in Figure 38, there is another dialog for formatting grids. To open the grid formatting dialog:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Go to **Format > Grid** on the Menu bar and click on the appropriate type of grid to open the Grid formatting dialog (Figure 39).

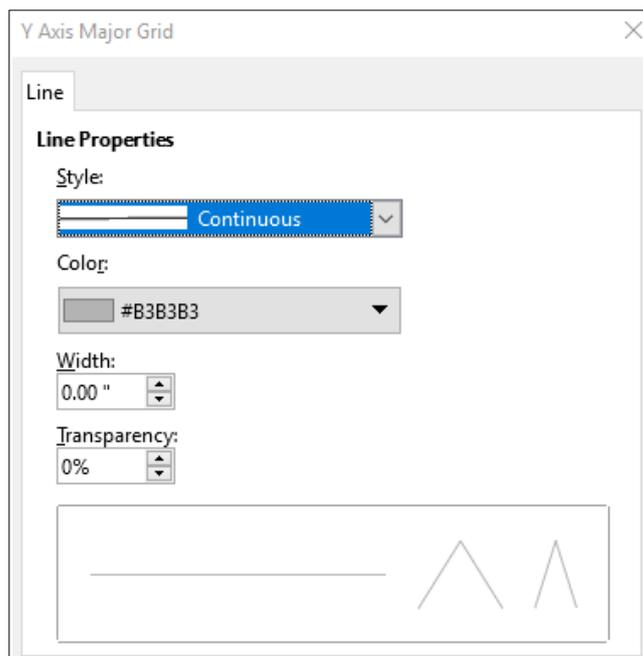


Figure 39: Grid formatting dialog

- 3) Set formatting options for line style, color, width, and transparency.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.



### Note

Use the *Scale* tab of the Axis dialog to specify the intervals between grid lines. This is described in “Defining Scales” on page 32.

## 3D charts

### Setting 3D look

Column, bar, pie, and area charts can be displayed as 3D charts. The setting to make a chart 3D is on the first page of the Chart Wizard. If the chart has already been created, do the following to give it a 3D look:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following:
  - Go to **Format > Chart Type**.
  - Click on the **Chart Type**  icon in the Formatting toolbar.
  - Right-click in the chart and select the **Chart Type** option in the context menu.
- 3) Select **3D Look** in the Chart Type dialog.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

## Formatting 3D view

To make changes to a 3D chart, use the 3D View dialog (Figure 40).

Use the 3D View dialog to change the 3D appearance, including perspective, formatting scheme, and illumination. Note that the chart must already be set to show a 3D look, as described above. To open the 3D View dialog:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following:
  - Right-click on the chart and select **3D View** from the context menu.
  - Go to **Format > 3D View**.
  - Click on the **3D View** icon  in the Formatting toolbar.
- 3) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

This dialog has three tabs, which are explained below.

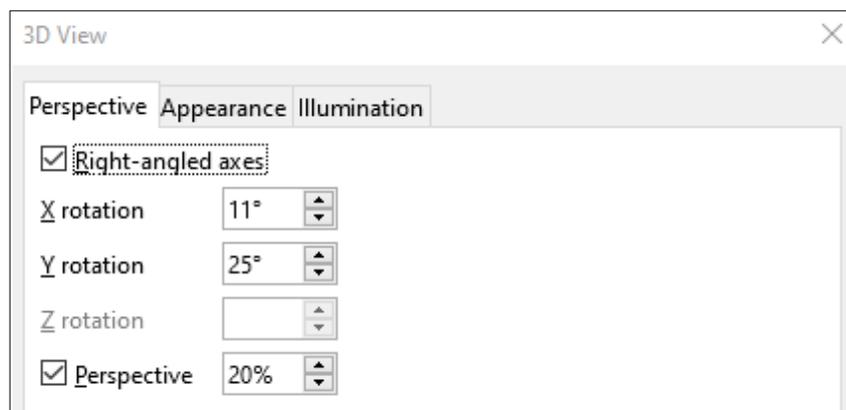


Figure 40: 3D View dialog – Perspective tab

### Rotation and perspective

Some hints for using the *Perspective* tab (Figure 40) to rotate a 3D chart or change its perspective view:

- Set all angles to 0 for a front view of the chart. Pie charts and donut charts are shown as circles.
- With **Right-angled axes** enabled, the chart can be rotated only in the X and Y direction; that is, parallel to the chart borders.
- An X value of 90, with Y and Z set to 0, provides a view from the top of the chart. With X set to -90, the view is from the bottom of the chart.
- Rotation is applied in the following order: X axis first, then Y axis, and Z axis last.
- When shading is enabled and the chart is rotated, the lights are rotated as if they are fixed to the chart.
- The rotation axes always relate to the page, not to the axes of the chart. This is different from some other chart programs.
- Select the **Perspective** option to view the chart in central perspective as through a camera lens (as opposed to using a parallel projection). Set the focal length with the spin box or type a number in the box. With a 100% setting, a far edge in the chart looks approximately half as big as a near edge.

## Rotating 3D charts interactively

In addition to using the *Perspective* tab of the 3D View dialog to rotate 3D charts, rotate 3D charts interactively in the following way:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Click once on the chart wall to select it, causing round selection handles to appear. The cursor changes to a rotation icon.
- 3) Press and hold the left mouse button while dragging in the direction desired. A dashed outline of the chart is visible to help see how the result will look.
- 4) Release the mouse button when satisfied.
- 5) Click outside the chart to exit edit mode.

## Appearance

Use the *Appearance* tab of the 3D View dialog (Figure 41) to modify some aspects of the appearance of the data in a 3D chart.

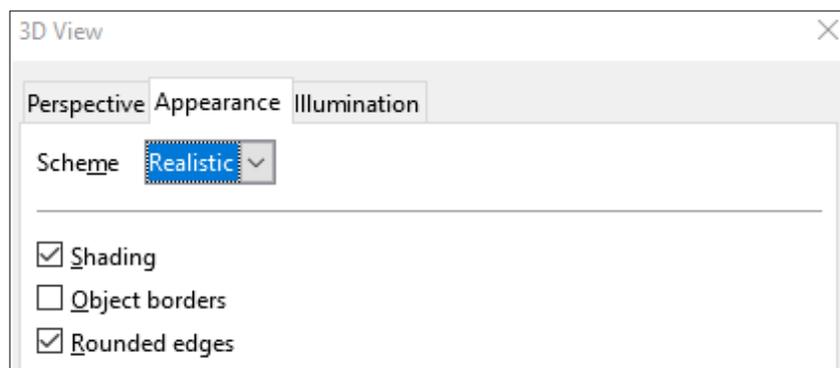


Figure 41: 3D View dialog – Appearance tab

First select a scheme from the Scheme drop-down list – **Realistic** (default) or **Simple**. The scheme selected sets the options and light sources. Depending on the scheme selected, not all options may be available. To create a custom scheme, select or deselect a combination of **Shading**, **Object borders**, and **Rounded edges**.

Some hints:

- Select **Shading** to use the Gouraud method for rendering the surface. Otherwise, a flat method is used. The flat method sets a single color and brightness for each polygon. The edges are visible but soft gradients and spotlights are not possible. The Gouraud method applies gradients for a smoother, more realistic look. See the *Draw Guide* for more information on the use of shading.
- Select **Object borders** to draw lines along the edges.
- Select **Rounded edges** to smooth the edges of boxy shapes.

## Illumination

Use the *Illumination* tab (Figure 42) of the 3D View dialog to control light sources for the 3D view.

Here are the options with some hints:

- Click any of the eight buttons to switch a directed light source on or off.
- The first light source projects a specular light with highlights.
- By default, the second light source is switched on. It is the first of seven normal, uniform light sources.

- For the selected light source, select a color from the first drop-down list below the eight light source buttons. Note that the brightness values of all lights are added together, so use dark colors when enabling multiple lights.
- The small preview in the dialog shows the effect of repositioning the light source.
- Each selected light source appears as a small colored sphere in the specified color. The sphere is larger when the light source is actively selected.
- Each light source always points at the middle of the object initially. Move the vertical slider to adjust the lighting angle. The horizontal slider rotates the light around the object. In addition, click the light source and drag it to the desired location.
- Click the button in the bottom right corner of the preview to switch the internal illumination model between a sphere and a cuboid.
- Use the *Ambient light* drop-down list to define the ambient light, which shines with a uniform intensity from all directions.

See the *Draw Guide* for more information on setting the illumination.

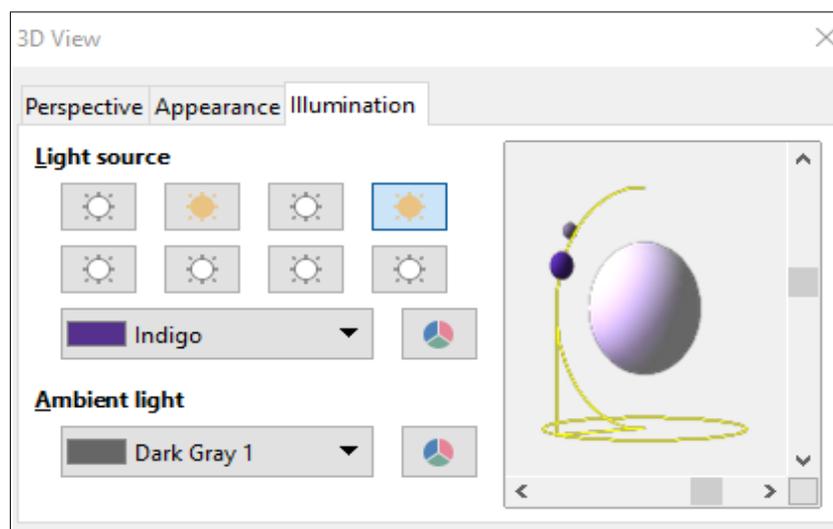


Figure 42: 3D View dialog – Illumination tab

## Trend and mean value lines

Trend lines help show the relationships among scattered data points of a data series. Calc has a good selection of regression types for creating trend lines: linear, logarithmic, exponential, power, polynomial, and moving average. Choose the type that comes closest to passing through all of the points in a data series.

Trend lines can be added to all 2D chart types except for pie, net, and stock charts. When inserted in the chart, representations of the trend lines are automatically shown in the chart legend.



### Note

For chart types that use categories for the X axis, such as column, bar, or line charts, the numbers 1, 2, 3... are used as values for calculating trend lines. By contrast, XY (scatter) chart types (which include bubble charts) show data rather than categories along the X axis. Thus, only XY chart types can show meaningful regression equations.

## Adding and modifying trend lines

Trend lines can only be added to one data series at a time. To add a trend line to a data series:

- 1) Double-click on the chart to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Select the data series by doing one of the following:
  - Click once on a data series representation such as a bar, column, line, or point.
  - Select the data series from the *Select Chart Element* drop-down list on the Formatting toolbar.
- 3) Do one of the following to open the Trend Lines dialog (Figure 43):
  - Go to **Insert > Trend Lines** on the Menu bar.
  - Right-click on the data series and select **Insert Trend Line** from the context menu.
- 4) Select the type of regression and choose desired options. These are explained below.
- 5) Click **OK** to close the dialog and place the trend line in the chart. If desired, click outside the chart to leave edit mode.

### Regression types

By default,  $x$  is used for the abscissa variable and  $f(x)$  for the ordinate variable. Change the names under *X Variable Name* and *Y Variable Name* on the Trend Line dialog.

#### Linear trend line

Regression through equation  $y = a \cdot x + b$ . Intercept  $b$  can be forced and only positive  $x$  values are considered.

#### Polynomial trend line

Regression through equation  $y = \sum_i (a_i \cdot x^i)$ . Intercept  $a$  can be forced. Degree of polynomial must be given (at least 2).

#### Logarithmic trend line

Regression through equation  $y = a \cdot \ln(x) + b$ . Only positive  $x$  values are used.

#### Exponential trend line

Regression through equation  $y = b \cdot \exp(a \cdot x)$ . This equation is equivalent to  $y = b \cdot m^x$ , with  $m = \exp(a)$ . Intercept  $b$  can be forced. Only positive  $y$  values are considered, except if all  $y$  values are negative. In that case, the equation used is  $y = -b \cdot \exp(a \cdot x)$ .

#### Power trend line

Regression through equation  $y = b \cdot x^a$ . Only positive  $y$  values are considered, except if all  $y$  values are negative. In that case, the equation used is  $y = -b \cdot x^a$ .

#### Moving Average trend line

Simple moving average for  $n$  previous  $y$ -values, with  $n$  being the period. No equation is available for this trend line.

### Trend line options

#### Trendline Name

Specifies the name to be used for labeling the equation in the legend; see Figure 44.

#### Extrapolate Forward/Backward

Specifies the number of units the trend line should be extended forward or back. This only works for charts that have numeric values along the  $X$  axis rather than categories.

#### Force Intercept

Forces the line to cross the  $Y$  axis at the specified value.

#### Show Equation

Displays the equation in the chart, as shown in Figure 44.

### Show Coefficient of Determination (R<sup>2</sup>)

Displays the coefficient of determination in the chart. Shown with the polynomial equation in Figure 44.

### X and Y Variable Names

Enables changing the names of X or Y variables for displaying the equation in the chart. The **Show Equation** option must be checked for these options to be active.

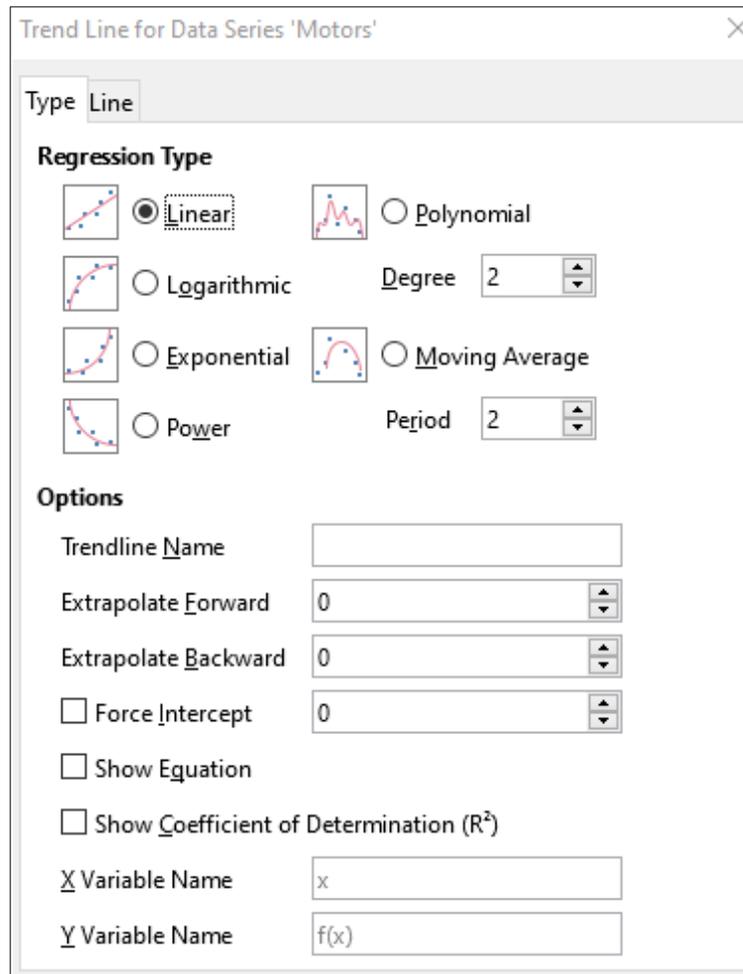


Figure 43: Trend Line dialog – Type page

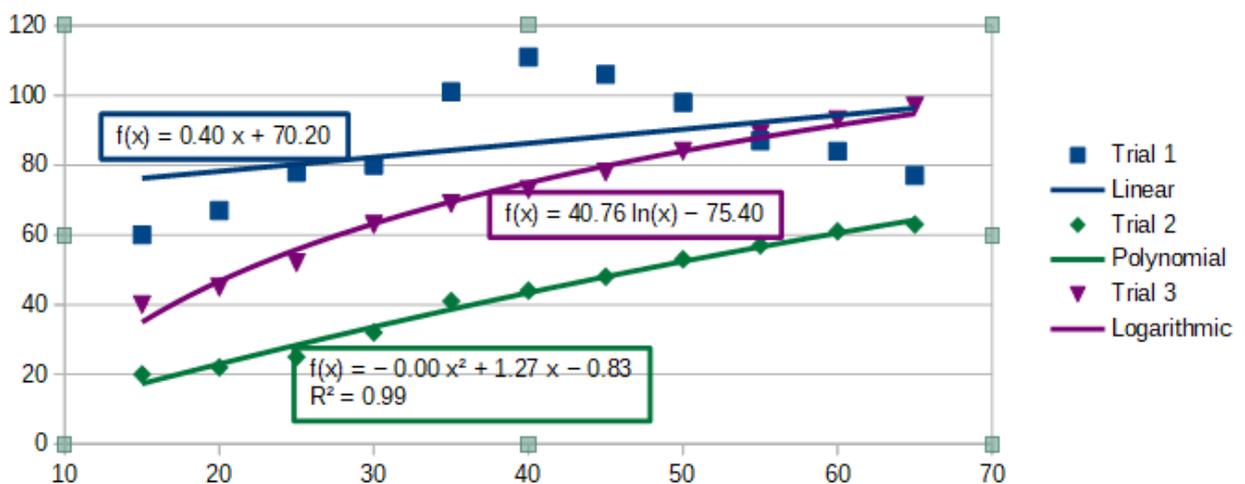


Figure 44: Trend lines showing various equations

Select a trend line to display information about it in the Status bar, as shown in Figure 45. The Status bar is normally located at the bottom of the spreadsheet.

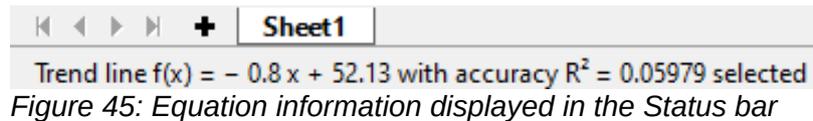


Figure 45: Equation information displayed in the Status bar

### Formatting trend lines

When inserted, a trend line has the same color as the corresponding data series. To change the style, color, width, or transparency of a trend line, use the *Line* tab of the Trend Line dialog (Figure 46). The options are easily understood or researched.

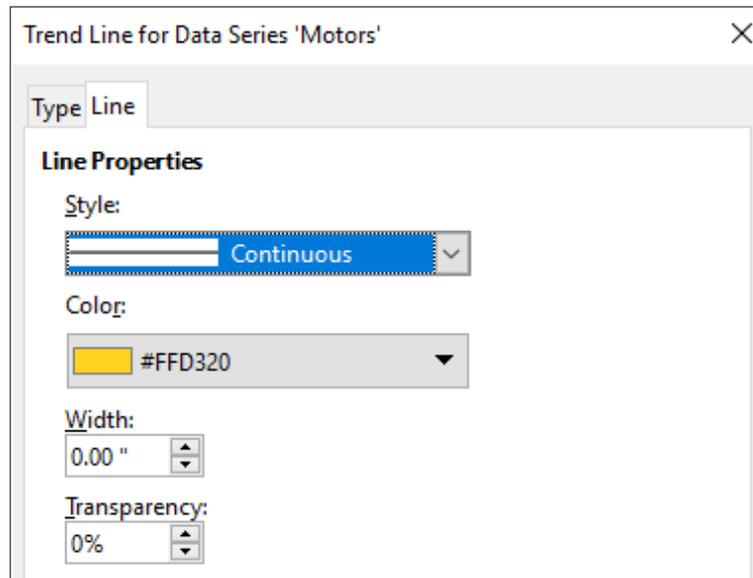


Figure 46: Trend Line dialog – Line tab

### Formatting trend line equations

Display the equation in the chart by selecting **Show Equation** in the Trend Line dialog (Figure 43). Options for the trend line equation include formatting the border around the equation, area fill, transparency, font, and alignment. The number style can also be specified — this may be quite useful, especially for specifying the number of decimal places.

To format trend line equations:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to open the Equation dialog:
  - Select the equation on the **Select Chart Element** drop-down list and then click the **Format Selection** icon  next to it on the Formatting toolbar.
  - Click once on the equation to select it then click the **Format Selection** icon  on the Formatting toolbar.
  - Right-click on the equation and select **Format Trend Line Equation** from the context menu.
- 3) Select the desired options on the dialog. The options are self-explanatory or easily researched. The *Numbers* tab has the same options as the *Numbers* tab of the Axis dialog, Figure 33 on page 36.
- 4) Click **OK** to close the dialog.
- 5) If desired, click outside the chart to leave edit mode.

## Deleting trend lines

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following:
  - Select the trend line and press the *Delete* key.
  - Right-click on the trend line and select **Delete Trend Line** from the context menu.
- 3) If desired, click outside the chart to leave edit mode.

## Mean value lines

Mean value lines are a special type of trend line. To create one, Calc calculates the average of a data series and places a colored line at that value in the chart, as shown in Figure 47. They can only be created for 2D charts and cannot be created for pie, net, or stock charts.

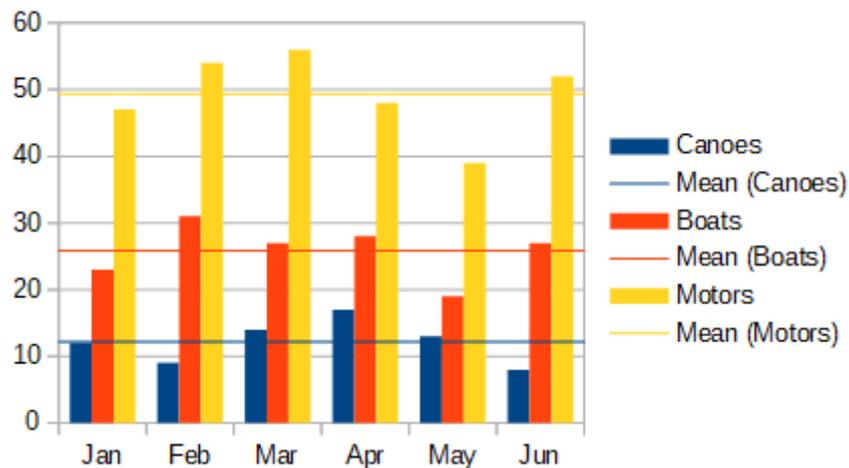


Figure 47: Mean value lines

## Inserting mean value lines

For all data series (if no data series is selected, mean value lines are inserted for all data series):

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Go to **Insert > Mean Value Lines** on the Menu bar.
- 3) If desired, click outside the chart to leave edit mode.

For a single data series:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Select a data series by doing one of the following:
  - Click once somewhere in the data series.
  - Select the data series from the *Select Chart Element* drop-down list on the Formatting toolbar.
- 3) Add the mean value line by doing one of the following:
  - Go to **Insert > Mean Value Lines** on the Menu bar.
  - Right-click on the data series and select **Insert Mean Value Line** from the context menu.
- 4) If desired, click outside the chart to leave edit mode.

## Modifying mean value lines

When inserted, a mean value line has the same color as the corresponding data series. To modify the style, color, width, and transparency of a mean value line:

- 1) Double-click on the chart to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to open the Mean Value Line dialog (the dialog has the same options as the *Line* tab of the Trend Line dialog in Figure 46):
  - Right-click on the mean value line and select **Format Mean Value Line** from the context menu.
  - Select the appropriate mean value line from the *Select Chart Element* drop-down list on the Formatting bar, then click the **Format Selection** icon  in the Formatting toolbar, or select **Format > Format Selection**.
- 3) Make desired changes.
- 4) Click **OK** to close the dialog. If desired, click outside the chart to leave edit mode.

## Deleting mean value lines

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following:
  - Select the mean value line and press the *Delete* key.
  - Right-click on the data series and select **Delete Mean Value Line** from the context menu.
- 3) If desired, click outside the chart to leave edit mode.

## Error bars

---

Error bars, shown in Figure 48, can be useful for presenting data that has a known possibility of error, such as social surveys using a particular sampling method, or for showing the measuring accuracy of the tool used. They can be created for 2D charts only and cannot be created for pie, net, or stock charts.

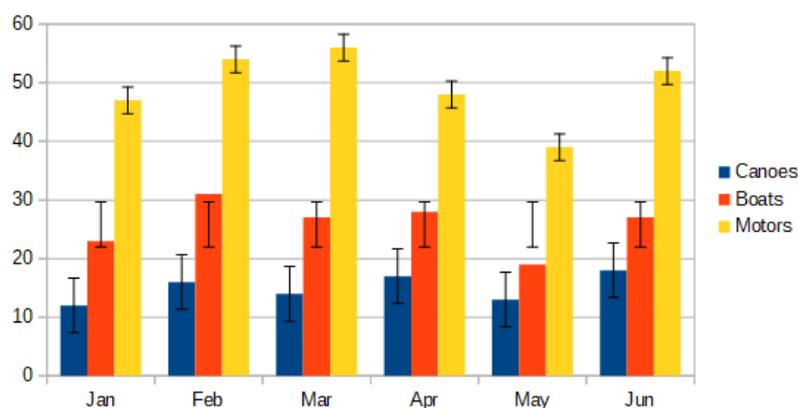


Figure 48: Error bars showing variance (Canoes), standard deviation (Boats), and standard error (Motors)

## Inserting error bars

If no data series is selected, X or Y error bars are inserted for all data series. To add error bars for all data series:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Go to **Insert > X Error Bars** or **Insert > Y Error Bars** on the Menu bar to open the Error Bars dialog (Figure 49).

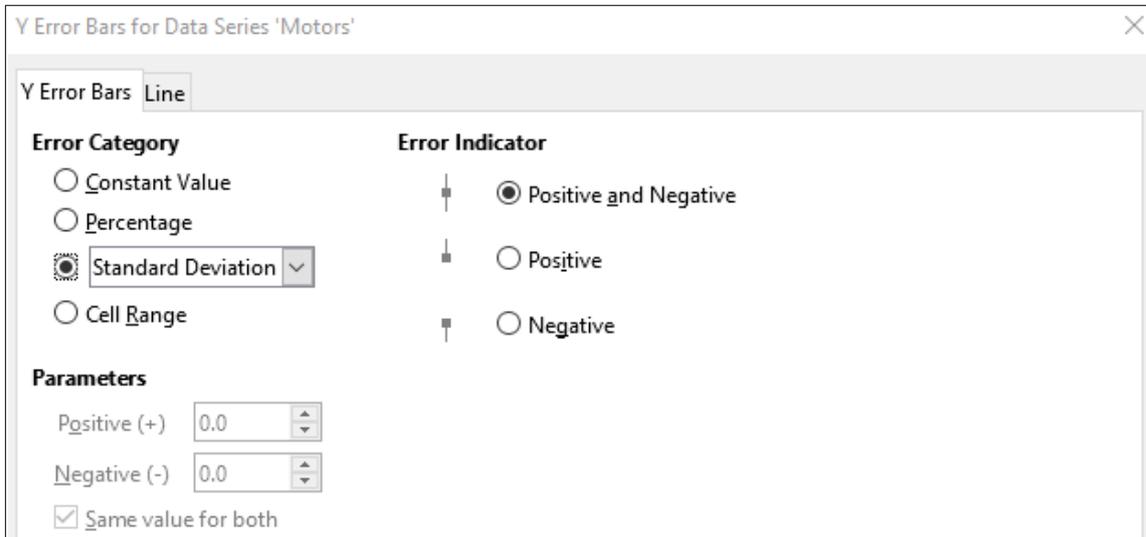


Figure 49: Error Bars dialog – Error Bars tab

- 3) Select the desired options. See below for more information about the options.
- 4) Click **OK** to close the dialog and add the error bars to the chart. If desired, click outside the chart to leave edit mode.

To insert error bars for a single data series:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to select the data series:
  - Click once on a bar, column, line, or other graphical representation in the data series.
  - Select the data series from the *Select Chart Element* drop-down list on the Formatting Toolbar.
- 3) Do one of the following to open the Error Bars dialog (Figure 49):
  - Go to **Insert > X Error Bars** or **Insert > Y Error Bars** on the Menu bar.
  - Right-click on the data series and select **Insert X Error Bars** or **Insert Y Error Bars** from the context menu.
- 4) Select the desired options. See below for more information about these options.
- 5) Click **OK** to close the dialog and add the error bars to the chart. If desired, click outside the chart to leave edit mode.

## Error bar dialog options

Under *Error Category*, only one of the following options can be selected at a time.

**Constant Value** – shows the error as constant positive and/or negative value(s). Specify these values in the *Parameters* section.

**Percentage** – shows the error as a percentage of the data points. Specify this in the *Parameters* section.

The drop-down list has four measures of the error value:

- **Standard Error**
- **Variance**
- **Standard Deviation**
- **Error Margin** – uses the value for the error margin that is specified in the *Parameters* section.

**Cell Range** – uses error values defined in a range of cells. Specify the range in the *Parameters* section.

Under *Parameters*, specify positive and negative values or ranges for the error bars. **Constant Value, Percentage, Error Margin, or Cell Range** must be checked for these options to be active.

Under *Error Indicator*, select whether the error graphic shows both positive and negative errors, or only positive errors, or only negative errors.

## Modifying error bars

Error bars can only be changed one data series at a time, using the Error Bars dialog (Figure 49). Do one of the following to open the Error Bars dialog:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Do one of the following to open the Error Bars dialog:
  - Click once on the data series to select it, then go to **Insert > X Error Bars** or **Insert > Y Error Bars** on the Menu bar.
  - Select the error bars for the specific data series from the *Select Chart Element* drop-down list on the Formatting toolbar. Then go to **Format > Format Selection** or click the **Format Selection** icon  on the Formatting toolbar.
  - Right-click on the data series and select **Format X Error Bars** or **Format Y Error Bars** from the context menu.
- 3) Select the desired options. See below for more information about these options.
- 4) Click **OK** to close the dialog and update the error bars for the selected series. If desired, click outside the chart to leave edit mode.

If needed, modify the appearance of the error bars on the *Line* tab of the Error Bars dialog.

## Deleting error bars

To delete error bars for all data series:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Go to **Insert > X Error Bars** or **Insert > Y Error Bars** on the Menu bar to open the Error Bars dialog (Figure 49). When no data series has been selected, the dialog also includes the option **None** under *Error Category*.
- 3) Select **None**.
- 4) Click **OK** to close the dialog and delete the error bars. If desired, click outside the chart to leave edit mode.

To delete error bars for a single data series, follow the same steps as above but instead of steps 2 and 3, right-click on the data series and select **Delete X Error Bars** or **Delete Y Error Bars** from the context menu.

## Adding drawing objects to charts

Use the Drawing toolbar to add shapes such as lines, rectangles, circles, text objects, or more complex shapes such as symbols or block arrows. Use additional shapes to add explanatory notes, highlight places on a chart, or even hide certain data or text.

Open the Drawing toolbar by going to **View > Toolbars > Drawing**. Note that it can be moved around the workspace as needed. For more information on using the Drawing toolbar and drawing shapes, see Chapter 5, Using Graphics, as well as the *Draw Guide*.

The Drawing toolbar appears as follows when the chart is in edit mode (by clicking on it twice).



### Tip

To place arrows, text, or other drawing objects in a chart, be sure that the chart is in edit mode. Otherwise, an object will not be connected to the chart and will not be moved with it.

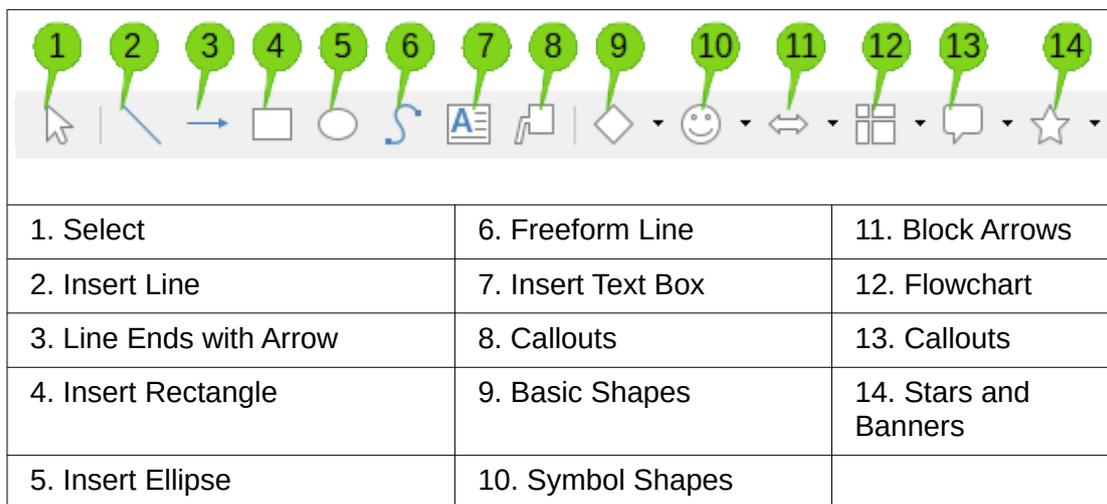


Figure 50: Drawing toolbar when chart is placed in edit mode (by clicking twice on the chart).

Most of these options are self-evident or can be readily researched, especially by referring to the *Draw Guide*. Clicking on the icon for an option changes the cursor's appearance, depending on the option. Click and drag the cursor to create the desired drawing object in the chart. Information that may be helpful for charts follows.

### Insert Line

Draws a straight line where dragged.



### Note

If you draw a line in the spreadsheet (outside any chart), you can hold down *Shift* while dragging to constrain angles of the line to multiples of 45 degrees. This facility is not applicable when inserting a line on a chart.

Write on the line by double-clicking the line and typing or pasting text. If the text is too low, press *Enter* to raise it above the line.

### Insert Text Box

Draws a text box with horizontal text direction. To place the text at an angle, click once on the text box to select it, right-click, and select **Position and Size** from the context menu. Specify the angle on the *Rotation* tab.

## Callouts

Draws a line that ends in a graphic in which text can be placed. Use a callout to describe or draw attention to a specific point or area. Double-click the callout to write text in it. In Figure 50, Callouts option 8 creates a default callout while option 13 opens a tool palette of callout styles.

Clicking the down arrows next to the six options on the right in Figure 50 opens the tool palettes shown in Figure 51.

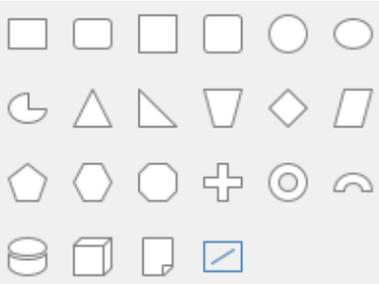
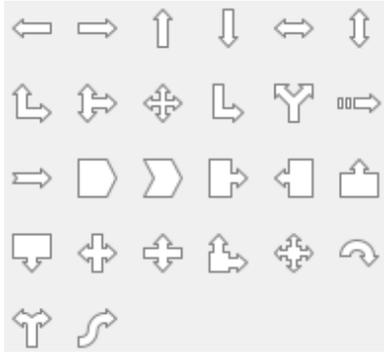
<p>Basic Shapes</p> 	<p>Symbol Shapes</p> 	<p>Block Arrows</p> 
<p>Flowcharts</p> 	<p>Callouts</p> 	<p>Stars and Banners</p> 

Figure 51: Tool palettes that can be opened from the Drawing toolbar.

## Resizing, moving, and positioning charts

To resize or move a chart, click it once to put it in selection mode. Resize or move a chart in two ways: interactively, or by using the Position and Size dialog. Combining both methods may be useful. Position a chart interactively for quick and easy changes, then use the Position and Size dialog for precise sizing and positioning.

### Changing interactively

#### Resizing

To resize a chart interactively:

- 1) Click once on the chart to select it. Square selection handles appear around the border of the chart.
- 2) Click and drag one of the selection handles. The cursor indicates the direction to increase or decrease the chart size. Clicking and dragging a corner preserves the horizontal to vertical size ratio.

- 3) When finished, click outside the chart to leave selection mode.

## Moving

Move a chart interactively using one of two methods:

### For small moves

- 1) Click once on the chart to select it. Square selection handles appear around the border of the chart.
- 2) Press *Alt* + an arrow key to move the chart one pixel at a time.
- 3) When finished, click outside the chart to leave selection mode.

### For larger moves

- 1) Click once on the chart to select it. Square selection handles appear around the border of the chart.
- 2) Hover the cursor anywhere over the chart until it changes to a move cursor (shape depends on computer setup).
- 3) Click and drag the chart to its new location.
- 4) Release the mouse button when the chart is in the required position.
- 5) When finished, click outside the chart to leave selection mode.

## Position and Size dialog

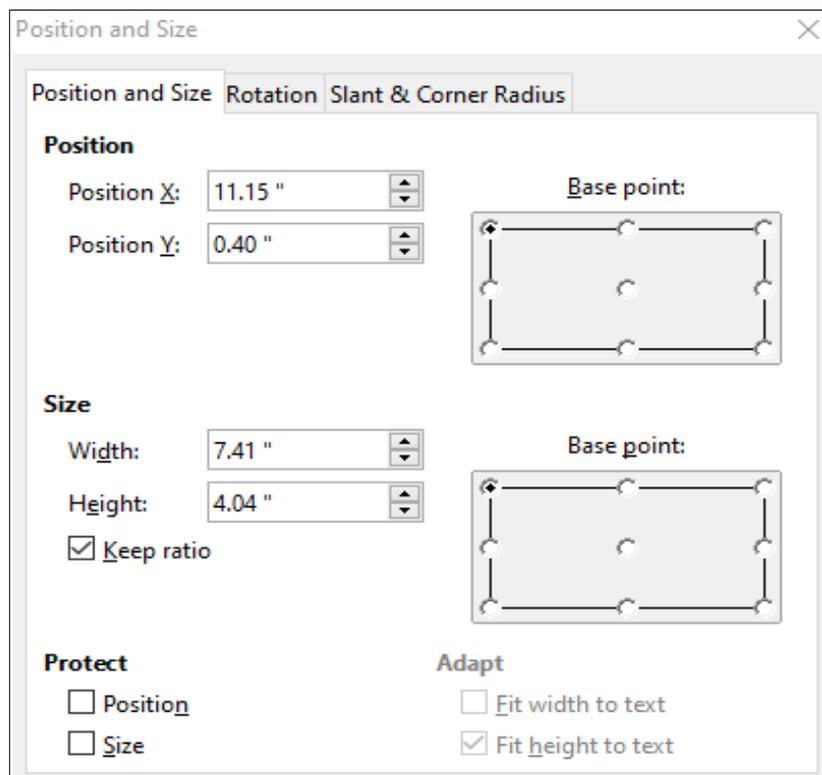


Figure 52: Position and Size dialog — Position and Size tab

The Position and Size dialog contains options for defining the position of the chart on the page, specifying its size, and rotating, slanting, or rounding the corners of a chart.



## Note

In addition to charts, the Position and Size dialog can also be used to modify and position other graphic elements, such as those available on the Drawing toolbar.

To resize or move a chart using the Position and Size dialog:

- 1) Click once on the chart to select it. Square selection handles appear around the border of the chart.
- 2) Right-click and select **Position and Size** from the context menu to open the Position and Size dialog (Figure 52).
- 3) Select the desired options on the *Position and Size*, *Rotation*, and *Slant & Corner Radius* tabs on this dialog. See below for further information about the options on these tabs.
- 4) Click **OK** to close the dialog and save changes.
- 5) When finished, click outside the chart to leave selection mode.

Click one of the points in the *Base point* graphic corresponding to the location to use for anchoring either the position of the chart or its size.

Note that either the position or the size can be protected from unwanted changes by clicking the appropriate box in the *Protect* section. Either or both option(s) selected will remain active after the dialog is closed. By contrast, Calc resets the base point to the default position after the dialog is closed.

### Position and Size

The options available on the *Position and Size* tab (Figure 52) are as follows:

#### Position

Determines the location of the chart on the page. The position of a chart is coordinated relative to a fixed point (the base point). By default, this base point is located at the upper left of a chart. To make positioning of a chart simpler, the base point can be temporarily changed.

- *Position X* – specifies the horizontal location of the chart relative to the base point.
- *Position Y* – specifies the vertical location of the chart relative to the base point.
- *Base point* – specifies a temporary base point for the chart.

#### Size

Specifies the amount by which to resize the selected chart with respect to the selected base point.

- *Width* – sets a width for the selected object.
- *Height* – sets a height for the selected object.
- **Keep ratio** – maintains proportions between width and height when resizing the chart.
- *Base point* – determines the directions in which the chart size will be increased or decreased.

#### Protect

Prevents unintended changes to the position or the size of the chart.

- **Position** – prevents unintentionally moving the chart.
- **Size** – prevents unintentionally resizing the chart.

#### Adapt

Specifies if the size should be adjusted to fit the size of entered text. Availability of these options depends on the context.

- **Fit width to text** – expands the width of the object to the width of the text, if the object is smaller than the text.
- **Fit height to text** – expands the height of the object to the height of the text, if the object is smaller than the text.

## Rotation

The options for the *Rotation* tab (Figure 53) are as follows:

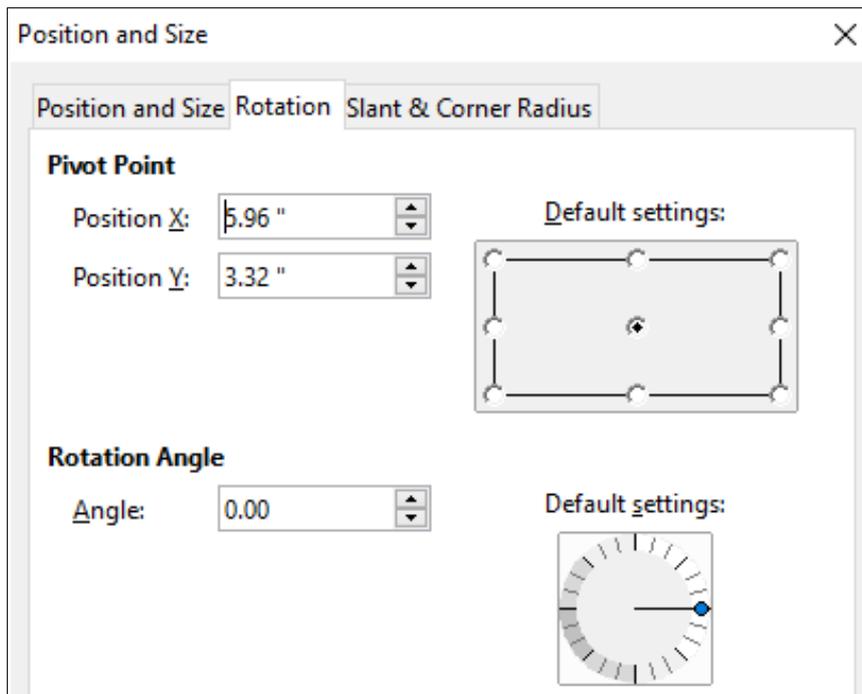


Figure 53: Position and size dialog – Rotation tab

### Pivot Point

The chart can be rotated around a pivot point. The default pivot point is at the center of the chart. Note that if there is not enough room to rotate the chart, it could be rotated off of the page.

- *Position X* – specifies the horizontal distance from the left edge of the page to the pivot point.
- *Position Y* – specifies the vertical distance from the top edge of the page to the pivot point.
- *Default settings* – sets the location of the pivot point. The pivot point can be temporarily changed. But when the dialog is opened again, the pivot point will be the default location at the center of the chart and the X and Y positions will reflect the default location.

### Rotation Angle

Specifies the number of degrees that the chart is rotated.

- *Angle* – shows the number of degrees of rotation (in the range 0 to 359 degrees). The number can be entered directly or it can be set using the indicator labeled *Default settings*.
- *Default settings* – graphically shows the rotation angle. The angle can be set by clicking and dragging the indicator. The number of degrees rotated is shown in the *Angle* box.

## Slant & Corner Radius

The options for the *Slant & Corner Radius* tab (Figure 54) are as follows:

### Corner Radius

This option is not available for charts.

### Slant

Slants the chart along an axis. Specify the angle of the axis (in the range -89° to +89°).

## Control Points

These options are not available for charts.

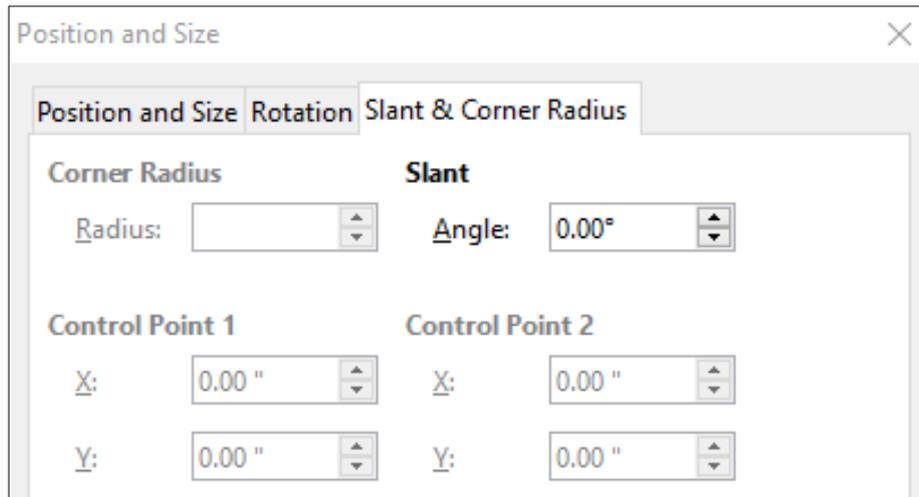


Figure 54: Position and Size dialog – Slant and Corner Radius tab

## Selecting multiple charts

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Select multiple charts by clicking once on the first chart then pressing *Shift* while clicking on additional charts. An invisible selection rectangle covers all of the selected charts and selection handles appear at the corners and midway between corners. The multiple charts are now treated as a single object and actions such as the following can be conducted.

- Cut and paste or drag them to new locations.
- Use the Position and Size dialog described in the previous section.
- Use the Drawing Object Properties toolbar to align all of the charts, format the outer borders, or anchor the charts to the same cell or page.

## Changing overall appearance of charts

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When a chart is selected (by clicking on it once) it can be formatted as an object. The Drawing Object Properties toolbar (Figure 55) usually appears below the Standard toolbar (but the location depends on setup) and shows tools available for all objects, including charts.

Most of the options are self-evident or can be easily researched. Please refer to Chapter 5, Using Graphics, in this guide and the *Draw Guide* for further information. Following are a few tips for using these tools with charts.

### Anchor

Connects a chart to either remain in the same position on a page or to move with a cell (when rows and columns are inserted or deleted). When **To cell (resize with cell)** is chosen, the chart or object increases or decreases in size when the cell is made larger or smaller.

### Align

Click the icon to open options for aligning multiple charts horizontally (left, centered, right) or vertically (top, center, or bottom). This option is only active when two or more charts (or other objects) are selected.

### Bring to Front/Forward One/Back One/Send to Back

Stacks charts or other objects in front of or behind other objects.

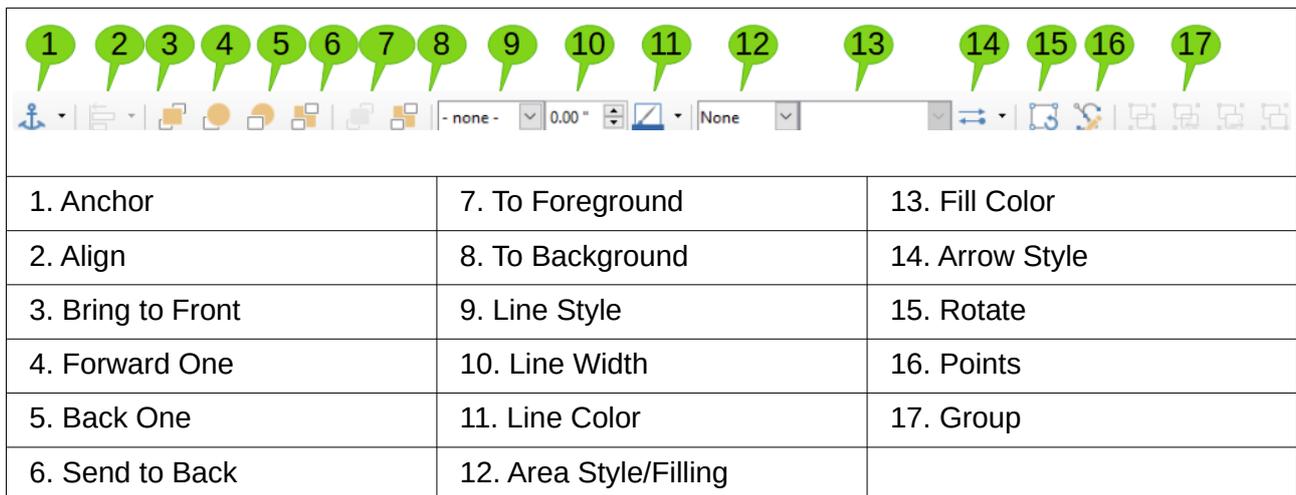


Figure 55: Drawing Object Properties toolbar that appears when chart is selected

### To Foreground/To Background

Places charts or stacks of objects in either the foreground or the background. In Calc, objects in the background are behind the cell grid and may be difficult to select. Use the **Select** tool (arrow icon) on the Drawing toolbar (Figure 50) to select them.

### Line Style/Line Width/Line Color

Formats the outer borders of charts.

### Area Style/Filling and Fill Color

Colors objects such as arrows, shapes, and callouts. For charts, use the fill options available in edit mode.

### Arrow Style

Specifies the appearance of line arrows and lines. Does not apply to the block arrows shown in Figures 50 and 51.

### Rotate

Rotates the chart around a base point. When selected, places round rotation handles at each corner. Move these to rotate the chart. Move the small circle in the center of the chart to change the base point. Move the handles midway between the corners to slant the chart or other object.

### Points

Changes the shape of curved objects. Move the points to shape curves created with the **Curve** tool on the Drawing toolbar.

### Group

Groups or ungroups two or more objects. When grouped, the objects can be moved together and global changes can be applied to them. From left to right, the four icons are **Group**, **Enter Group**, **Exit Group**, and **Ungroup**.

## Copying, exporting, and deleting charts

### Copying charts in the same spreadsheet document

When a chart is copied, it retains a connection to the source data it is built on as long as it is in the same document. This means that changes made to the source data will be reflected in the chart.

Copying and pasting the chart is easy. Just click the chart once to select it, then either press **Ctrl+C**, or right-click on the chart and select **Copy** from the context menu, or click the **Copy** icon on the Standard toolbar, or select **Edit > Copy**. To paste the chart in the desired location, press

*Ctrl+V*, or right-click and select **Paste** from the context menu, or click the **Paste** icon in the Standard toolbar, or select **Edit > Paste**.

## Copying to another LibreOffice document

When a chart is copied and pasted into another LibreOffice document, any connection to the data it is based on is lost. The data is kept with the chart and is now called a data table rather than a data range. Figure 56 shows an example of this internal data table.



### Note

A copied chart links to or retains its data only when pasted into a LibreOffice document. To retain data or links outside LibreOffice, use embedding or linking, as explained in Chapter 10, Linking Data.

### Keeping original data

If the goal is to use the original data for the chart, follow the same procedure as above to copy and paste the chart to another document. Nothing more needs to be done.

### Modifying original data

If the original data for the chart needs to be modified, do the following:

- 1) Select the chart by double-clicking on it to enter edit mode. The chart should now be surrounded by a gray border.
- 2) Right-click on the chart and select **Data Table** to open the data table shown in Figure 56.

	Categories	Y-Values	Y-Values	Y-Values
1	Jan	12	23	47
2	Feb	9	31	54
3	Mar	14	27	56
4	Apr	17	28	48
5	May	13	19	39
6	Jun	8	27	52

Figure 56: Data table when a chart is copied into another document

- 3) Modify the data as desired. In addition to changing numbers in the data, use options to insert, move, or delete columns and rows.
- 4) Click **OK** to close the dialog.
- 5) If desired, click outside the chart to leave edit mode.

### Dragging replacement data

If the chart is still in Calc and replacement data is in the same spreadsheet, select and drag the new data onto the chart. This is described in “Replacing data by dragging” on page 23.



## Note

Calc does not provide a direct way to save chart settings for creating another chart in LibreOffice. Here are three options for using the same chart settings: 1) copy and paste the chart into another file; 2) save the file containing the chart as a new file; and 3) save the chart in a template. Depending on the method used, create a new chart by modifying either the data range or the data table.

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## Exporting chart images

Charts can be exported in a variety of image formats for use in other documents. File types include BMP, EMF, EPS, GIF, JPEG, PDF, PNG, SVG, SVM, TIFF, and WMF.

To export a chart in an image format:

- 1) Click once on the chart to select it. Square selection handles appear around the border of the chart.
- 2) Right-click on the selected chart and select **Export as Image** from the context menu to open the Save as Image dialog.
- 3) In the dialog, type a name for the graphic file, select the location for saving the file, and select the desired graphic format.
- 4) Click **Save** and an image of the chart will be exported to the location specified.

## Deleting charts

To delete a chart, simply click it once to select it. Square selection handles appear on the borders of the chart. Then press *Delete*.

## Gallery of chart types

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While data can be presented using a variety of charts, focus on the message of the chart to determine which type of chart to use. The following sections present examples of the chart types that Calc provides, with some notes on the uses of each one.

### Column charts

A column chart shows vertical bars, with the height of each bar proportional to its value. The X axis shows categories and the Y axis shows the value for each category.

Column charts are commonly used for data that show trends over time. They are best for a relatively small number of data points. It is the default chart type provided by Calc, as it is one of the most useful and easy to understand. For a larger time series, a line chart would be more appropriate.

The column chart type has three variants, with a preview pane for each variant as shown in Figure 57. When a preview is clicked, its borders are highlighted and the name appears below. The 2D variants are:

#### Normal

Shows all data values belonging to a category next to each other. The main focus is on the individual absolute values, compared to every other value.

#### Stacked

Shows the data values of each category on top of each other. The main focus is the overall category value and the individual contribution of each value within the category.

## Percent stacked

Shows the relative percentage of each data value with regard to the total of its category. The main focus is the relative contribution of each value to the category total. (Contrary to the preview picture in Figure 57, the values are stacked, not next to each other.)

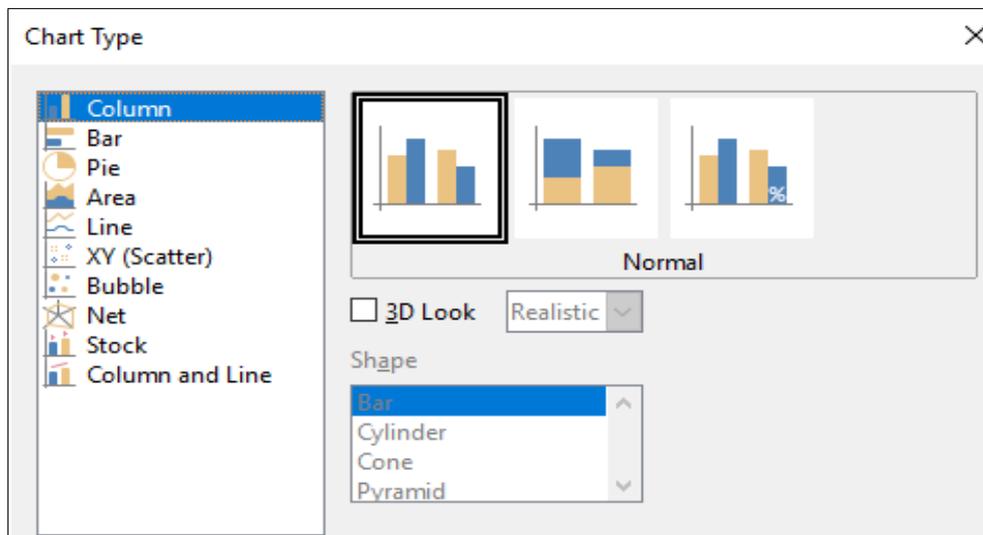


Figure 57: Chart Type dialog – Column

Additional options for creating column charts are:

### 3D Look

When this box is checked, two options become available in the drop-down list:

- **Realistic** – tries to give the best 3D look.
- **Simple** – tries to mimic the chart view of other products.

When you check the **3D Look** box, a fourth chart variant becomes available called **Deep**. This shows the data values of each category lined up, one behind the other.

### Shape

Gives options for the shape of the columns in 3D charts. The choices are: **Bar**, **Cylinder**, **Cone**, and **Pyramid**.

## Bar charts

A bar chart is like a column chart that has been shifted 90 degrees. It shows horizontal bars rather than vertical columns. In contrast to some other chart types, the Y axis is horizontal and the X axis is vertical. The Chart Type dialog for a bar chart is essentially the same as for a column chart, described above.

Bar charts can have an immediate visual impact when time is not an important factor — for example, when comparing the popularity of a few products in a marketplace. They may be preferred to column charts when the category names are long or there are a significant number of categories.

In the examples in Figure 58 below:

- To make the first chart after using the Chart Wizard, go to **Insert > Grids**, deselect **Y axis**, and choose **Insert > Mean Value Lines**. Right-click each mean value line and select **Format Mean Value Line** to increase the width of the lines. Create rectangles from the Drawing toolbar to cover the mean value line entries in the legend. Make them white by right-clicking and selecting **Line** and then **Area**.
- The second chart is a 3D chart created with a simple border and cylinder shape. The chart area is rotated (described under “Rotation and perspective” on page 43).

- The third chart eliminates the legend by using labels with the names of the companies on the Y axis. Whereas the first two charts treat the data as separate data series, this chart treats the data as one data series in order to have category labels for the X axis. Rather than colors, a colored horizontal hatch pattern is used for the bars.

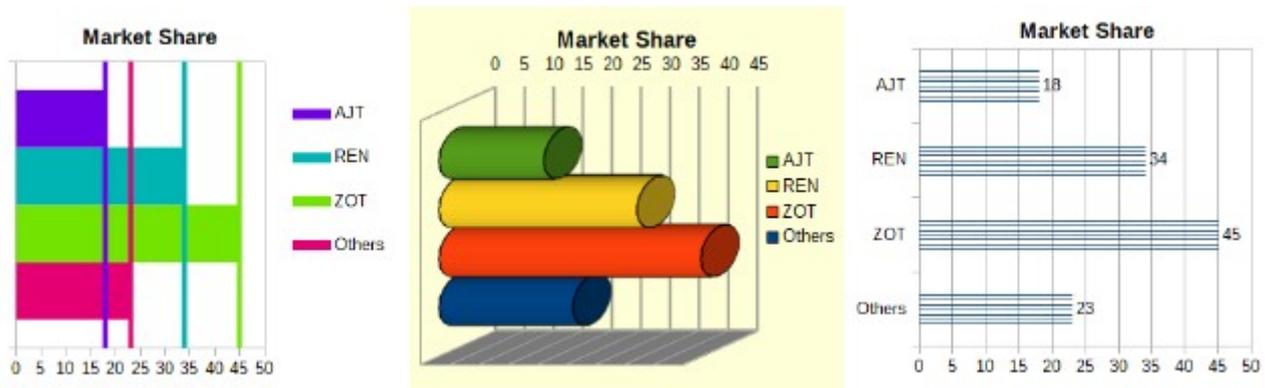


Figure 58: Bar chart examples

## Pie charts

A pie chart shows values as circular sections of a circle. The area of each section is proportional to its value.

Pie charts are excellent for comparing proportions — comparisons of departmental spending, for example. They work best with smaller numbers of values, up to about half a dozen; more than this and the visual impact begins to fade.

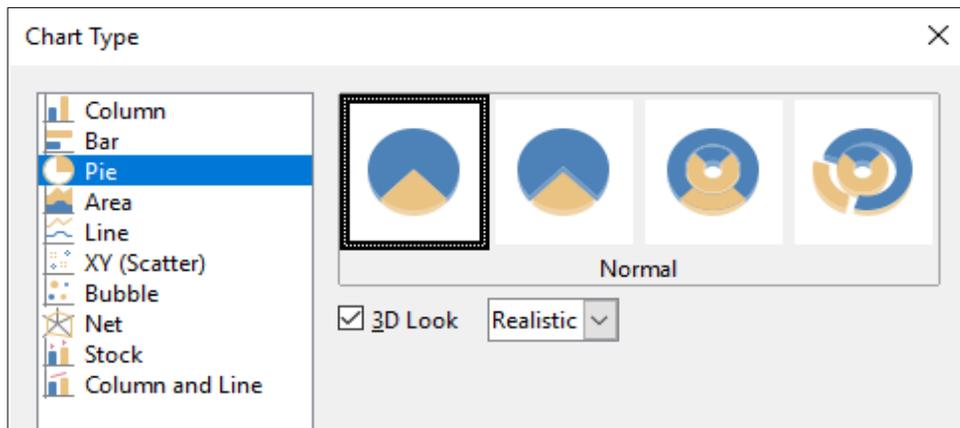


Figure 59: Chart Type dialog - Pie

Pie variant options, shown in Figure 59, are:

### Normal

Shows values as sections of a complete pie, with the option of separating out individual pieces. Click the outer edge of a section to separate it from the remaining pie or to join it back.

### Exploded Pie

Shows all of the sections separated from each other. Click and drag any section to move it along radial lines from the pie center.

### Donut

Shows multiple data series. Each data series is shown as one donut shape with a hole inside, where the next data series can be shown. Click and drag an outer section to move it along radial lines from the donut center.

## Exploded Donut

Shows the outer sections already separated from the remaining donut. Click and drag an outer section to move it along radial lines from the center.

The Chart Wizard initially guesses how the data should be presented in the chart. Adjust this on the Data Range and Data Series pages of the wizard or by using the Data Ranges dialog.

You can do some interesting things with a pie chart, especially if you make it into a 3D chart. It can be tilted, given shadows, and generally turned into a work of art. Just do not clutter it so much that the message is lost, and be careful that tilting does not distort the relative sizes of the segments.

You can choose in the Chart Wizard to use the exploded pie variant, but this option explodes all of the pieces (contrary to the preview graphic in Figure 59). If the aim is to accentuate just one piece of the pie, separate out a piece by carefully highlighting it and dragging it out of the group. After this, the chart area may need to be enlarged to regain the original size of the pieces.

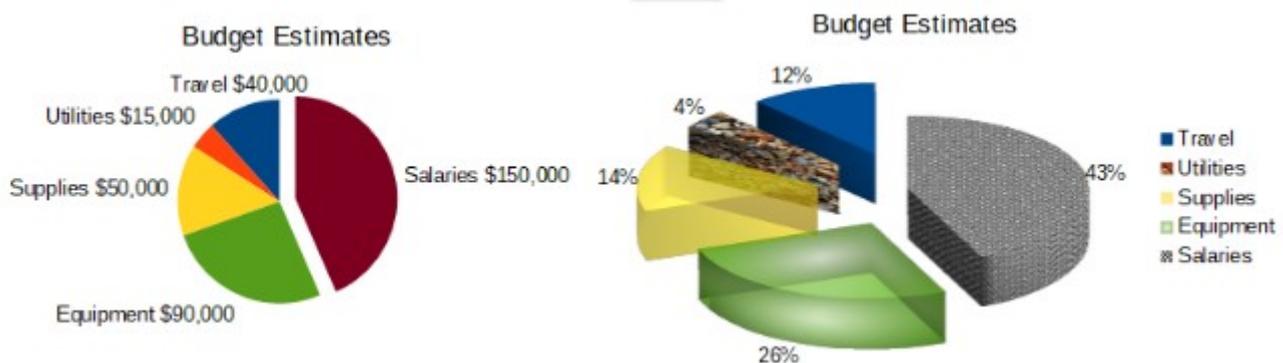


Figure 60: Pie chart examples

The effects achieved in Figure 60 are explained below.

### 2D pie chart with one section of the pie exploded

Select **Insert > Legend** and deselect the **Display legend** box. Select **Insert > Data Labels**. Select **Show value as number** and also **Show category**. Click the edge of the section (the section will have highlight squares to mark it), and drag it out from the rest of the sections. The sections will decrease in size. If needed, highlight the chart wall and drag it at a corner to increase the size.

### 3D pie chart, exploded variant, with realistic schema and various fill effects

Go to **Format > Chart Type** and select **3D Look**. Go to **Insert > Data Labels** and select **Show value as percentage**. Then carefully select each section so that it has a wire frame highlight. Right-click and select **Format Data Point** to get the Data Point dialog. Choose the **Area** tab. The illustration in Figure 60 shows one section formatted with bitmap, one with a radial gradient, one with 50% transparency, and one with a pattern.

Donut and exploded donut variants, shown in Figure 61, are used to display two set of related information, such as two years of financial data. This variant can be misleading for comparing numeric data, since inner circles are necessarily smaller. For more variety, use a 3D look.

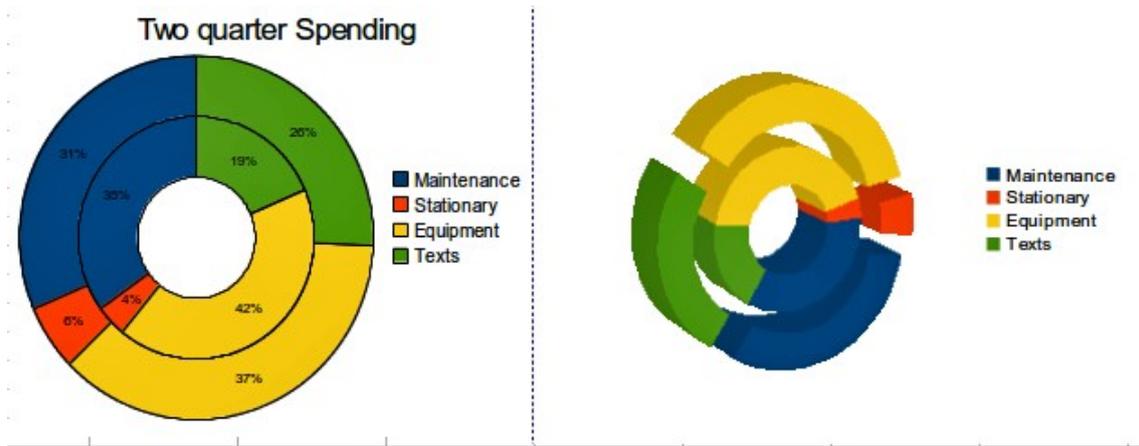


Figure 61: Donut chart examples

## Area charts

Like a line or column chart, an area chart shows values as points on the Y axis and categories on the X axis. The Y values of each data series are connected by lines and the areas below the lines are colored.

Area charts emphasize volumes of change from one category to the next. They have greater visual impact than line charts, but the data used will make a difference.

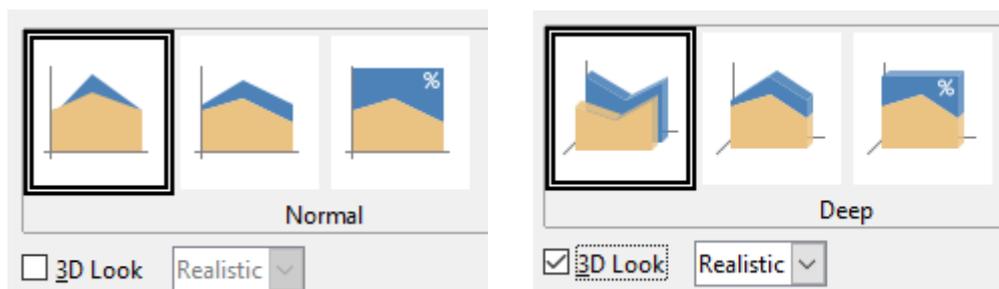


Figure 62: Chart Type dialog - 2D and 3D Area

Area chart variants, shown in Figure 62, are:

### Normal

Plots all data as absolute Y values. It first plots the area of the last data series in the data range, then the next to last, and so on. Finally the first data series is drawn over the other data. Thus, higher values in the first data series will hide lower values of later data series.

### Deep

When **3D Look** is selected, this variant shows the first data series in front, with subsequent data series behind.

### Stacked

Stacks cumulative values on top of each other. This ensures that all values are visible, and no data set is hidden by others. However, the Y values no longer represent absolute values, except for the first data series, which is shown at the bottom of the stacked areas.

### Percent Stacked

Stacks cumulative values on each other and also scales the values as percentages of the category total.

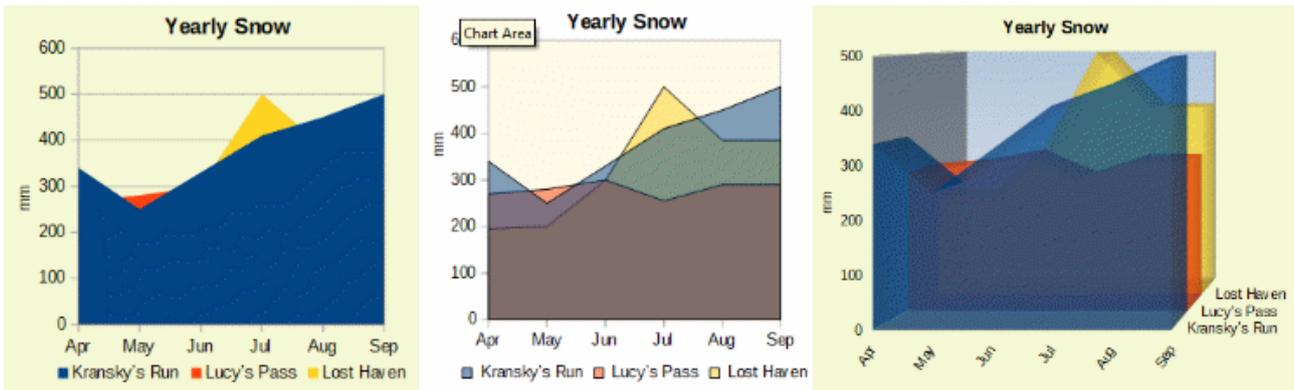


Figure 63: Area chart examples

### Normal area charts

Area charts are sometimes tricky to create. Using transparency values may be helpful. To create the charts in Figure 63, first set up the basic chart using the Chart Wizard. The chart on the left shows the result. Because of the data overlap, some of it is missing behind the first data series. This is probably not desirable. The other examples are better solutions.

To create the chart in the center:

After deselecting the Y axis grid, right-click on each data series in turn and select **Format Data Series**. On the *Transparency* tab, set Transparency to 50%. The transparency makes it easy to see the data hidden behind the first data series.

To create the chart on the right:

After doing the steps above, right-click and select **Chart Type**. Select the **3D Look** option and select **Realistic** from the drop-down list. Rotate the chart area using the 3D View dialog. Instead of a legend, use labels on the Z axis.

### Stacked area charts

Other ways of visualizing the same data series are the stacked area chart and the percentage stacked area chart (Figure 64). In the first example, each point in a data series is added to the other data series to show the total area. The second example shows a percentage stacked chart, showing each value in the series as a percentage of the whole.

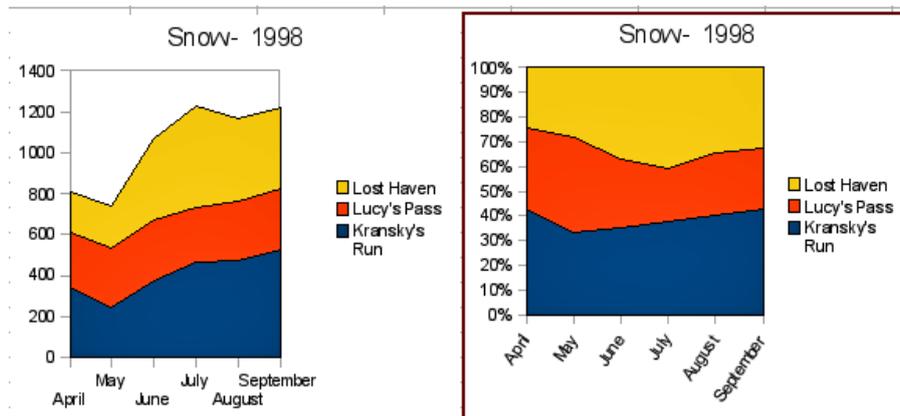


Figure 64: Stacked and percentage stacked area charts

### Line charts

A line chart is useful for showing trends or changes over time when you want to emphasize continuity. Values are shown as points on the Y axis and the X axis shows categories — often time series data. The Y values of each data series may be connected by a line.



## Note

The difference between line charts, described in this section, and XY (scatter) charts, described in the next section, is this: line charts show categories along the X axis while XY (scatter) charts show values along the X axis.

As shown in Figure 65, four variants are available:

### Points Only

Plots only points.

### Points and Lines

Plots points and connects points of the same data series by a line.

### Lines Only

Plots only lines.

### 3D Lines

Connects points of the same data series by a 3D line.

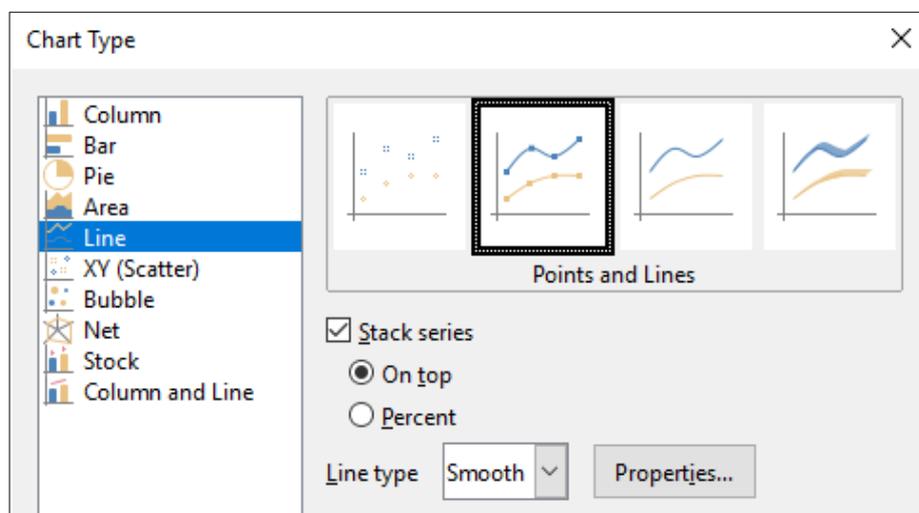


Figure 65: Chart Type dialog – Line

When **Stack series** is selected, it shows cumulative Y values above each other. The options are:

- **On top** – places the value of each data series above the others. The Y values no longer represent absolute values, except for the first data series, which appears at the bottom of the chart. This is the default setting.
- **Percent** – scales the Y values as percentages of the category total.

The *Line type* drop-down list has three options that determine how the data points are connected:

### Straight

Draws straight lines between the points.

### Smooth

Connects the points with curves instead of lines. When this option is selected, click **Properties** to open the Smooth Lines dialog (Figure 66) and further specify the curves.

For smooth lines, there are two line type options: **Cubic spline** or **B-spline**. These are mathematical models that join together segments of polynomials to display the curves. For B-spline lines, there is an option to set the degree of the polynomials. Select a higher resolution for smoother curves.

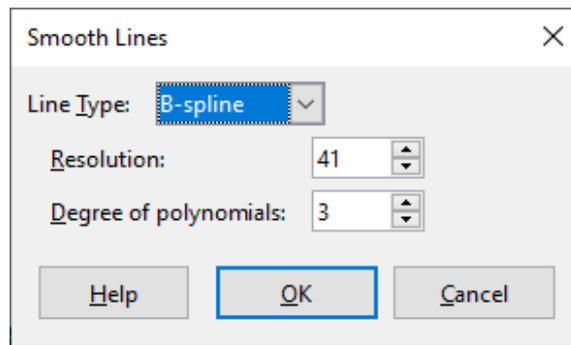


Figure 66: Smooth Lines dialog

### Stepped

Connects points with horizontal and vertical lines only. Click **Properties** to further specify the formatting of the lines (Figure 67). The options are self-explanatory.

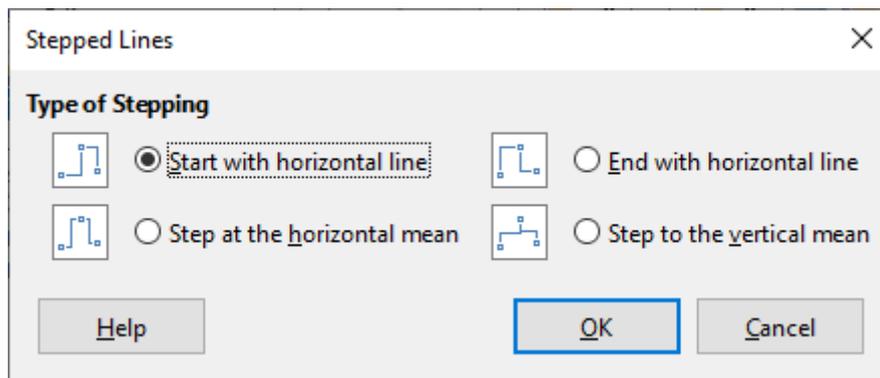


Figure 67: Stepped Lines dialog

Things to do with lines: thicken them, smooth the contours, just use points, or make them 3D. However, 3D lines can confuse the viewer, so just using a thicker line often works better. Figure 68 shows some examples of line charts.

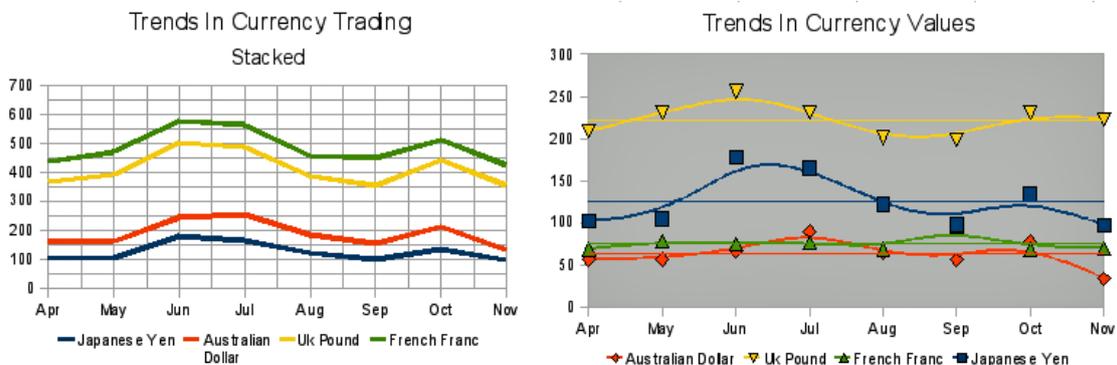


Figure 68: Line chart examples

### Scatter or XY charts

In contrast to line, column, and bar charts, which contain numeric values on the Y axis and categories on the X axis, scatter or XY charts contain values along both axes. They are quite useful, especially for understanding relationships among data that are precise and complex. An XY chart may contain more than one data series and can perform many tasks, such as generating a parameter curve or drawing the graph of a function.



## Tip

When plotting time on the X axis, make sure that it is not text and is written in the correct format for your locale. For example, instead of January, use a format such as 1/1/2022. Check locale formats at **Tools > Options > Language Settings > Languages > Date acceptance patterns**.

XY charts are most frequently used to explore the statistical associations among quantitative variables. There is often a constant value against which to compare the data — for example, weather data, reactions under different acidity levels, or conditions at various altitudes.



## Tip

By custom, if one of the variables is either controlled by an experimenter or it changes consistently (such as time) it is considered an independent variable and plotted on the X axis.

## XY chart variants

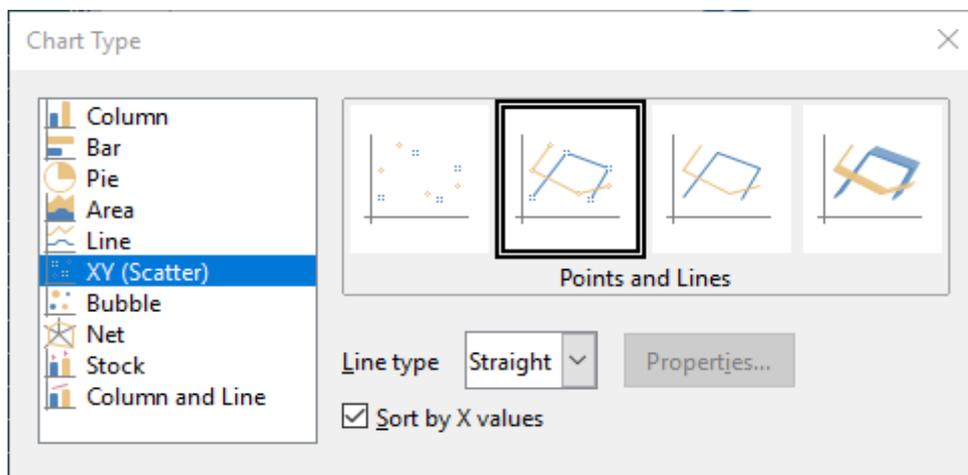


Figure 69: Chart Type dialog – XY (Scatter)

As shown in Figure 69, when the **XY (Scatter)** chart type is selected, the following variants are available:

### Points Only

Shows an icon for each data point. Calc uses default icons with different forms and colors for each data series. The default colors are set in **Tools > Options > Charts > Default Colors**. Changing the colors and icons is discussed in “Lines, areas, and data point icons” on page 28.

### Lines Only

Draws straight lines from one data point to the next. The data points are not indicated by icons. By default, the drawing order is the same as the order in the data series, but note the option to sort by X values.

### Points and Lines

Shows both points and lines.

### 3D Lines

Makes the lines look like tapes. The data points are not shown by icons. In the finished chart, use the **3D View** dialog to set properties like illumination and angle of view.

The following options may appear:

### Sort by X values

Draws the lines in order of the X values. This can be helpful if the data series on the spreadsheet is not in numeric order.

### Line type – Straight

Draws straight line segments.

### Line type – Smooth

Draws curves instead of straight line segments. Click **Properties** to set details for the curves.

- **Cubic spline** interpolates the data points with polynomials of degree 3. The transitions between the polynomial pieces are smooth, having the same slope and curvature.
- **Resolution** determines how many line segments are calculated to draw a piece of polynomial between two data points. A value in the range 1 to 100. Click any data point to see the intermediate points.
- **B-spline** uses parametric, interpolating B-spline curves. The curves are built from polynomials. **Degree of polynomials** sets the degree of these polynomials. A value in the range 1 to 15.

### Line type – Stepped

Uses only horizontal and vertical lines. Click **Properties** to set details for the stepped lines.

After a scatter chart is created, its default settings can be changed in ways such as the following. Be sure to first double-click the chart to enter edit mode. Depending on the option, a data point or data series may also need to be double-clicked.

- Line styles and icons – double-click or right-click on a data series in the chart to open the Data Series dialog. See “Lines, areas, and data point icons” on page 28 for further information.
- Error bars – For 2D charts, select **Insert > Y Error Bars** or **X Error Bars** to enable the display of error bars. See “Error bars” on page 50 for further information.
- **Mean Value Lines** and **Trend Line** – Enable the display of mean value lines and trend lines with commands on the Insert menu. See “Trend and mean value lines” on page 45 for further information.

## Examples of XY or scatter charts

By default, the first column or row of data (depending on whether the data is arranged in columns or rows) is represented on the X axis. The rest of the rows of data are then compared against the first row of data.

Scatter charts may surprise those unfamiliar with how they work. This can be seen in examples using the following data (Figure 70), which is organized with data series in rows.

The data range for the chart on the left in Figure 70 includes the cells containing the months. However, the months do not appear on the chart because only values can be used in XY charts and Calc substitutes cardinal numbers for them.

The data range for the chart on the right does not include the cells containing the months. Calc assumes that the first row (or column) of data contains values for the X axis. The Y values of the other data series are paired with each of those X values. This means that there are no data points for the Japanese yen but each of the other currencies are shown in comparison to the yen, since it supplies the X values.

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Yen	102	105	178	165	122	98	134	97
Dollar	56	57	67	90	64	56	78	34
Rupee	209	230	256	231	201	199	230	223
Yuan	69	78	75	76	69	95	69	70

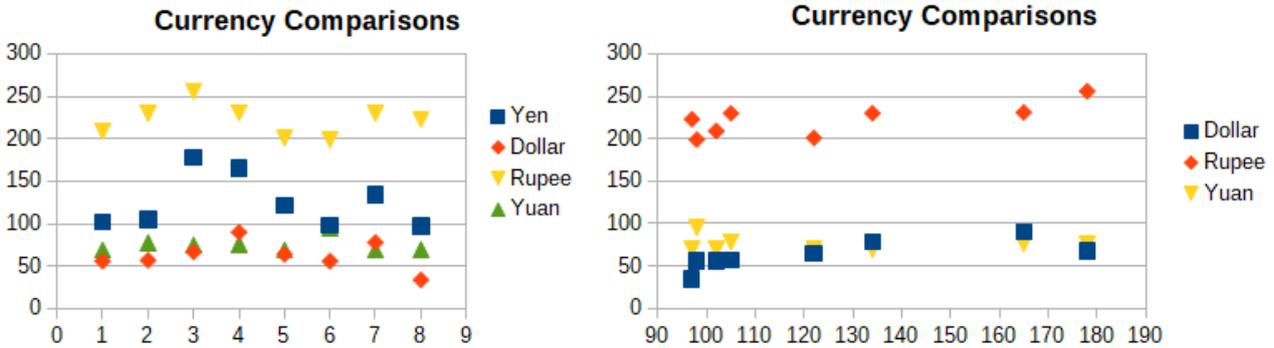


Figure 70: XY (Scatter) chart examples

## Bubble charts

A bubble chart is a variation of a scatter chart that can show three variables in two dimensions. The data points are shown with bubbles. Two variables are plotted along the X and Y axes, while the third variable is represented by the relative size of the bubbles. These charts are often used to present financial data or social/demographic data.

One or more data series can be included in a single chart. The data series dialog for a bubble chart has an entry to define the data range that determines the size of the bubbles.

It may be necessary to build a bubble chart manually in the data series page of the Chart Wizard. Figure 71 shows how the data ranges can be set for a bubble chart.

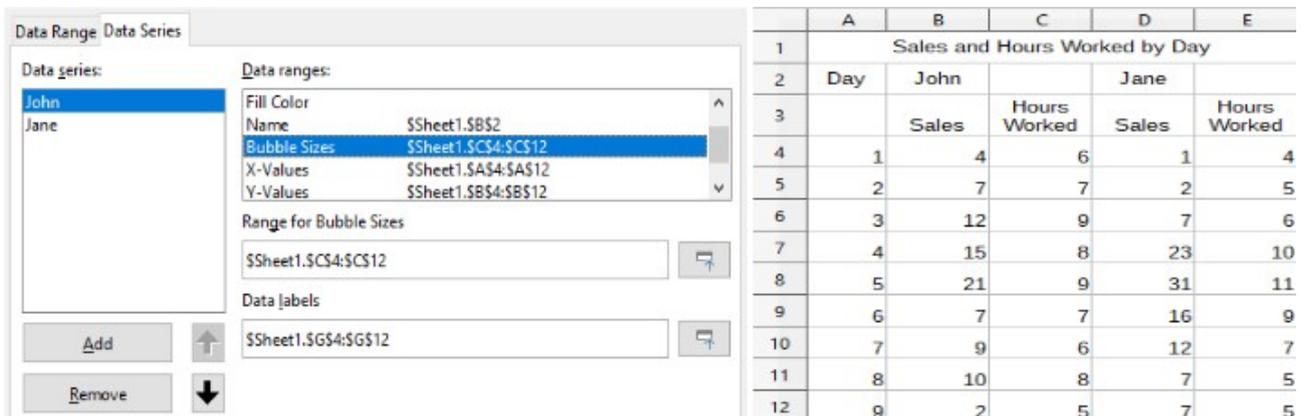


Figure 71: Data series entries for bubble chart

The chart in Figure 72 is based on the data in Figure 71. To format the chart, the data series are 50% transparent with a radial gradient. The data labels are formatted to be numbers in the center of the data points (bubbles).



### Note

Remember that bubble charts require numeric data. If the data series for the X axis contains text (or dates not formatted as numbers) cardinal numbers will be used for axis labels.

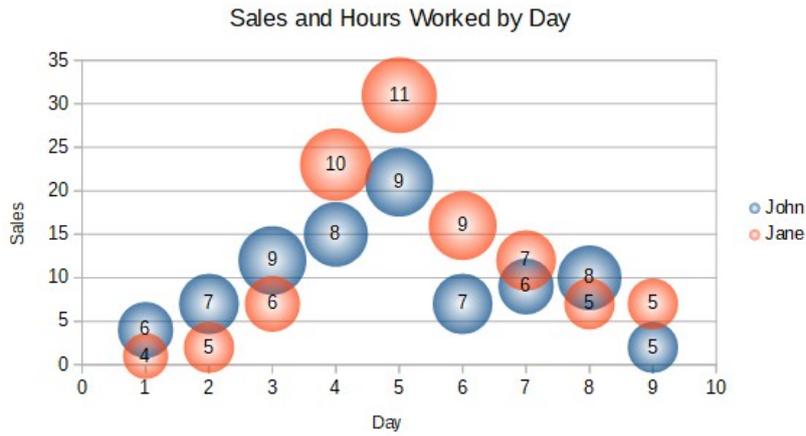


Figure 72: Bubble chart example

## Net charts

Net charts are also known as spider, polar, or radar charts. They display data values as points on radial spokes, with each spoke representing a variable. They compare data that are not time series, but show different circumstances, such as variables in a scientific experiment. They are especially useful for displaying clusters and outliers.

Figure 73 shows an example of a simple net chart. The radial spokes of the net chart are equivalent to the Y-axes of other charts. All data values are shown with the same scale, so all data values should have about the same magnitude.

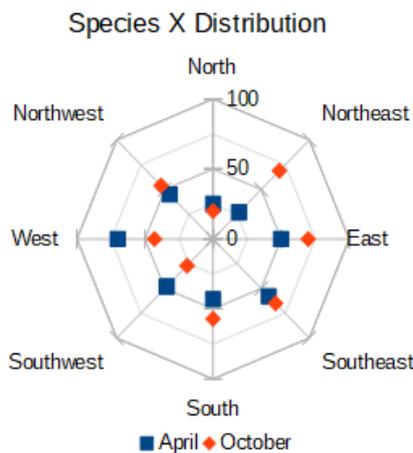


Figure 73: Simple net chart example

Generally, between three and eight axes are best; any more and this type of chart becomes confusing. Before and after values can be plotted on the same chart, or perhaps expected and real results, so that differences can be compared.

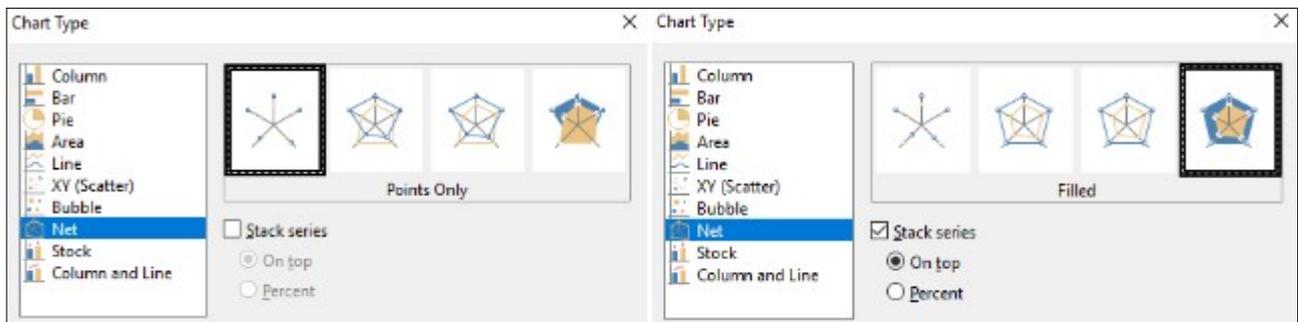


Figure 74: Chart Type dialog - Net

Figure 74 shows the options for creating a net chart. These are similar to those for area and line charts, described above. However, keep in mind that area increases as the square of the distance along the linear spokes. Therefore, net charts can distort the areas representing the data. Be especially careful about choosing to stack data series. In this case, successive data series show increasingly large areas that are not proportional to their values.

Figure 75 shows examples of two types of net charts.

- The example on the left is a filled net chart. The color of one of the data series is 50% transparent. Partial transparency is often best for showing all of the series.
- The example on the right is a net chart with lines and points. The data point icons are taken from the Gallery and have a 3D look.

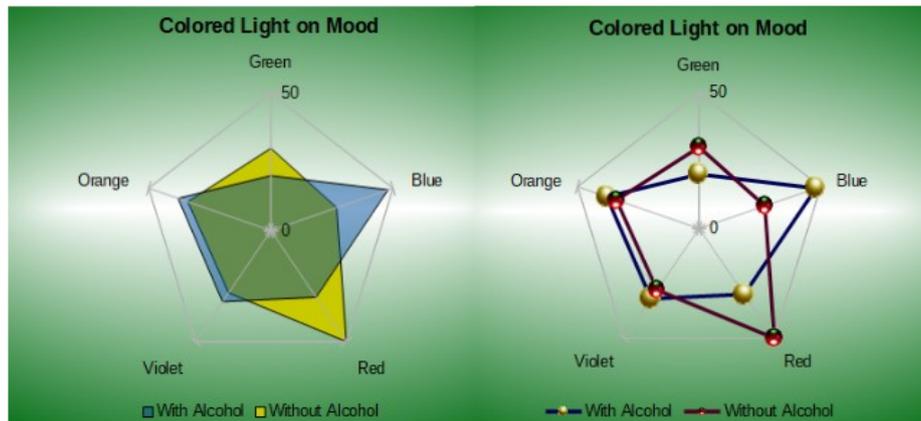


Figure 75: Filled net chart and net chart with 3D data point icons.

## Stock charts

A stock chart illustrates the market trends for stock and shares by giving opening price, bottom price, top price, and closing price. The transaction volume can also be shown and the X axis usually represents a time series.

When setting up a stock chart in the Chart Wizard, the data should be arranged as shown in Figure 76. It specifies which columns should be the opening, low, high, and closing prices of the stock as well as the transaction volume. However, manual adjustments may still be needed when defining the data series.

	Acme					Ajax				
	Volume	Open	Low	High	Close	Volume	Open	Low	High	Close
Monday	2500	20	15	25	17	1700	15	10	20	17
Tuesday	3500	32	22	37	30	2700	25	5	25	16
Wednesday	1000	25	15	17	17	4100	14	7	17	10
Thursday	2200	40	30	47	35	3300	20	12	26	19
Friday	4600	27	20	32	31	3500	28	16	32	21

Figure 76: Example data arrangement for stock charts

A stock chart organizes data series in two basic ways. The first way is not used in other chart types. In this case, the open, low, high, and closing values of a row create one data unit in the chart and one data series consists of several rows containing such data units. The columns containing transaction volumes are the second way used to organize data series. This is the familiar way used in other chart types.

Thus, Figure 76 shows the data for four data series: 1) the price data for Acme, which contains columns for open, low, high, and closing prices, 2) the price data for Ajax, which contains columns for open, low, high, and closing prices, 3) the Acme transaction volume, which is one column, and 4) the Ajax transaction volume, which is one column.

## Stock chart variants

The Chart Wizard offers four stock chart variants, as shown in Figure 77. Note that some of them do not use all of the data columns.

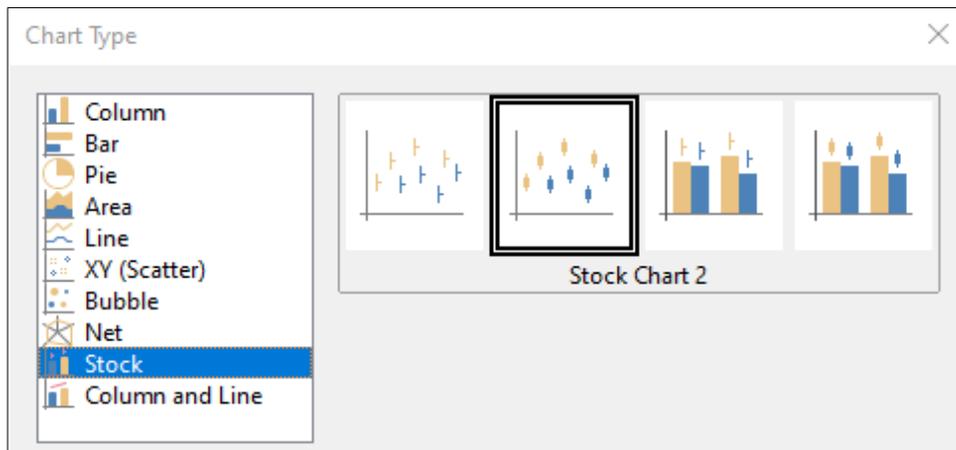


Figure 77: Chart Type dialog - Stock

The data table in Figure 76 is used to illustrate the variants, which are as follows:

### Stock Chart 1

When based only on data in the low and high columns, this variant shows the distance between bottom price (low) and top price (high) with a vertical line. When the closing column is also included (Figure 78), it shows an additional horizontal mark for the closing price.

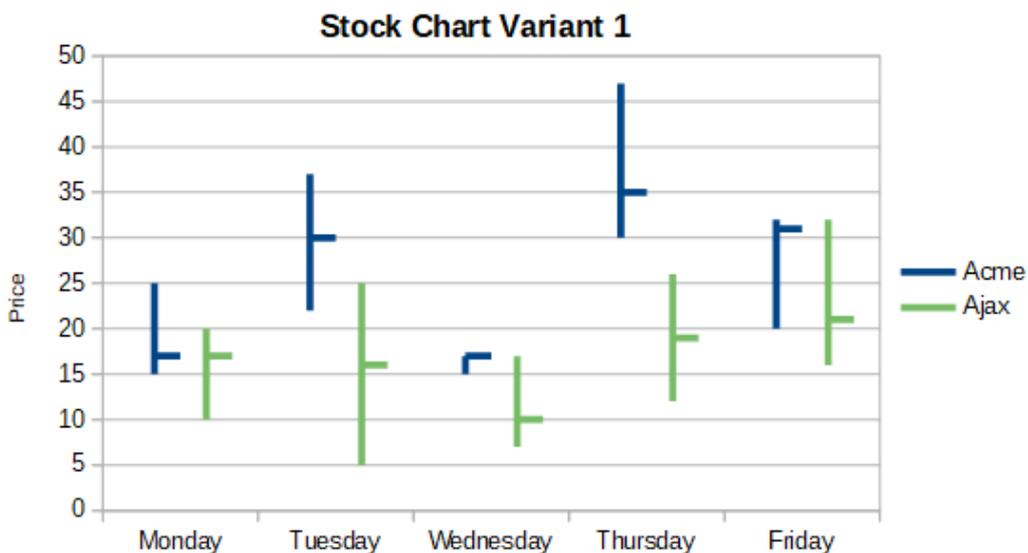


Figure 78: Stock chart variant 1 showing low, high, and closing prices

### Stock Chart 2

Based on the open, low, high, and close columns, this variant generates the traditional candlestick chart (Figure 79). It shows a vertical line between the bottom and top prices and adds a rectangle in front that shows the range between the opening and closing prices. For rising values (the opening price is lower than the closing price), the fill color is white. For falling values, the fill color is black.

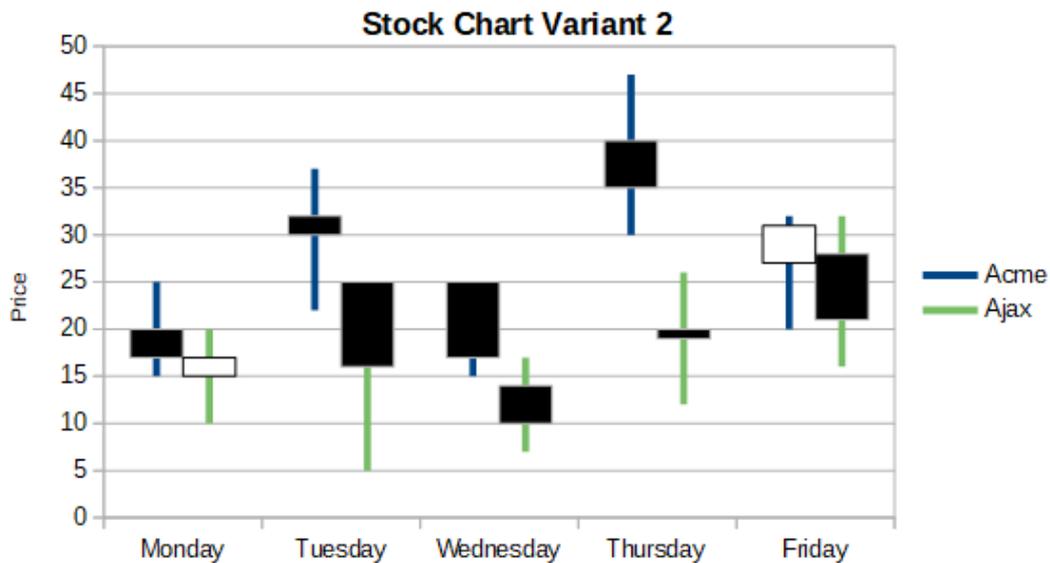


Figure 79: Stock chart variant 2 showing low and high prices as well as the range between opening and closing prices

### Stock Chart 3

Using the low, high, and close columns, draws a chart similar to Stock Chart 1 but with additional columns for transaction volume. As shown in Figure 80, a secondary Y axis enables both transaction volume and price to be shown on vertical axes.

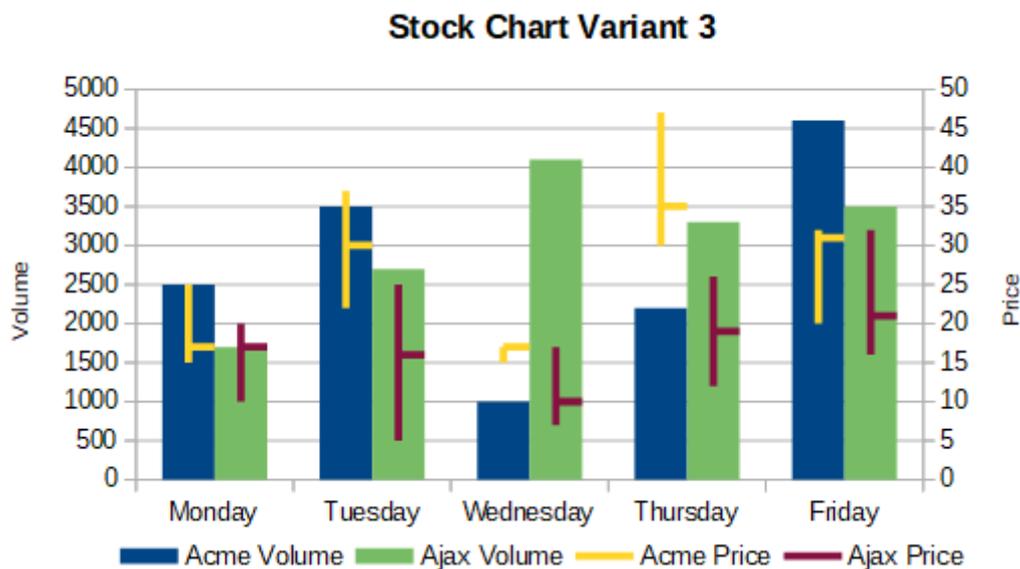


Figure 80: Stock chart variant 3 showing low, high, and closing prices as well as transaction volumes



### Note

Variants 3 and 4 automatically align data to the secondary Y axis. For more information about a secondary Y axis, see "Aligning data to secondary Y axis" on page 25.

### Stock Chart 4

Based on all five data columns (volume, open, low, high, and close), this variant combines Stock Chart 2 with a column chart for the transaction volume (Figure 81).

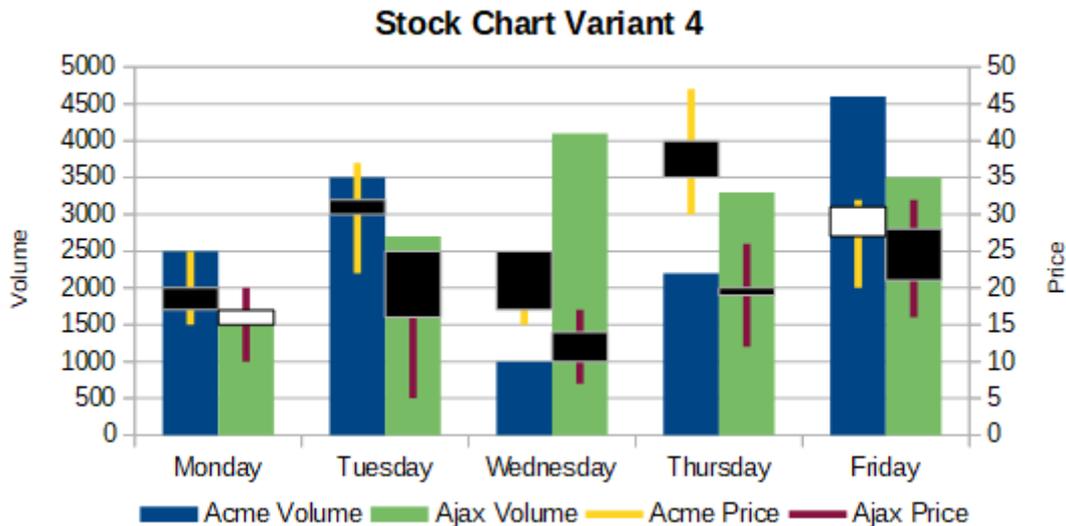


Figure 81: Stock chart variant 4 showing opening, low, high, and closing prices as well as transaction volumes.

## Column and line charts

A column and line chart is useful for displaying two or more distinct but related data series, such as sales over time (columns) and profit margin trends (lines). It could also show constant minimum and maximum lines, such as used in medical testing or quality control.

Specify in the Chart Type dialog whether there will be 1 or 2 lines. By default, the first column or row of data is categories and the last columns or rows of data are lines.

Choose between two variants:

### Columns and Lines

As seen in Figure 82, the columns are drawn side by side to easily compare their values.



Figure 82: Column and line chart with secondary Y axis

### Stacked Columns and Lines

The columns are stacked above each other, so that the height of a column shows the sum of the data values.

The charts in Figures 82 and 83 show sales and profit data for two firms over a period of time. Note that when first created, the lines were different colors than the columns for the same company. To reflect the company relationships, change the line colors individually by clicking on a line, right-clicking, selecting **Format Data Series**, and formatting the line color and size on the Line page.

For the background, right-click the chart wall, select **Format Wall**, and select desired options on the *Gradient* page of the *Area* tab. To align the two data series to the secondary Y axis, see “Aligning data to secondary Y axis” on page 25.



Figure 83: Column and line chart with stacked columns

## Pivot charts

Pivot tables are special types of data tables that simplify the manipulation and analysis of data. They are widely used, especially for processing large amounts of data. Pivot charts are based on pivot tables and are created by selecting **Insert > Chart**, or clicking the **Insert Chart** icon in the Standard toolbar, after left-clicking a cell inside a pivot table. Pivot charts inherit many properties of the other chart types described in this chapter but also have other characteristics that are described in Chapter 8, Using Pivot Tables.