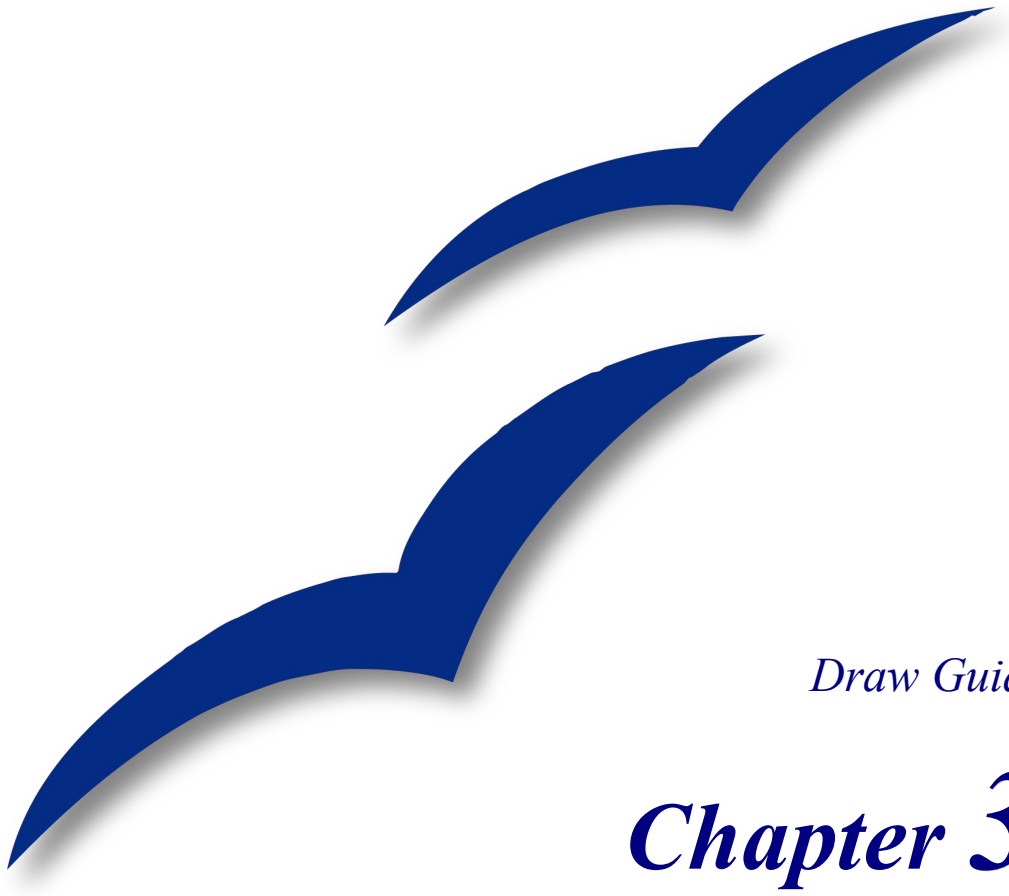

Draw Guide

Chapter 3
Editing Objects Part 1:

Working with Objects and Object Points

OpenOffice.org

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Authors

Linda Worthington
Jean Hollis Weber
John Kane
Agnes Belzunce

Feedback

Maintainer: Agnes Belzunce
Please direct any comments or suggestions about this document to:
authors@user-faq.openoffice.org

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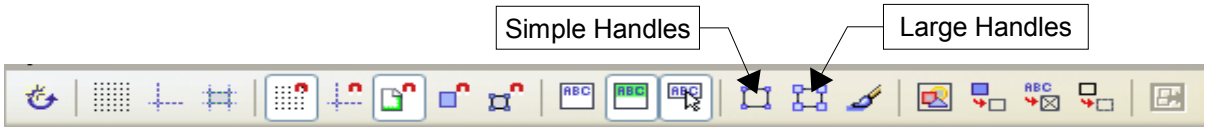
Contents

Introduction

In this chapter, we shall look at the tools and functions that let you modify existing drawings. All of the functions apply to the selected object or group of objects. The selected object differentiates itself from any others by small colored squares or circles located around the object (this is also true when several objects are selected simultaneously). In the rest of this document, we call these points *handles*.

These handles form a rectangular frame that is just big enough to contain the object. Where several objects are selected, the frame around them corresponds to the smallest rectangle that can contain all of the objects. This frame is called the *selection rectangle.*

If the **Options** Bar is displayed, you can change the size of the handles using two buttons: **Simple Handles** shows the handles as flat squares, and **Large Handles** shows the handles in a larger size. You can combine the effects obtained by pressing on both buttons. You can thus have large handles having a 3D shape or small handles having no 3D shape. This illustration shows the location of the handles and other buttons.

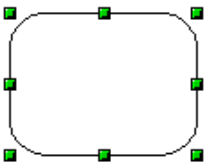


Selection modes

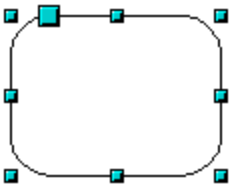
There are three selection modes: moving and changing size, rotating, and editing points.

To set the default mode for selecting objects, click on the **Points** button  on the **Drawing** Toolbar.

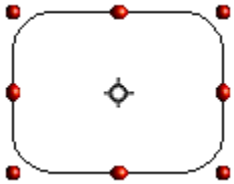
When the **Points** button is not active, the default mode is for selections to be moved or changed in size; these selections are indicated by small green squares.



When the **Points** button is active, the default mode is for selections to be edited; these selections are indicated by blue squares. Some objects will have one or more extra handles, which are larger or colored differently. This is explained in more detail in “Editing object points” on page 6.



Selections for rotating objects are indicated by small red circles and a symbol representing the center of rotation. To choose these selections click on the **Effects** drop-down button from the **Drawing** Toolbar.



Changing the selection mode

To go from one mode to another, you can do one of the following:

Choose the **Points** button from the **Drawing** Toolbar to switch from simple selection mode to Points mode. You can also use the keyboard shortcut *F8*[1] (Points).

Choose the **Effects** drop-down button from the **Drawing** Toolbar to activate the Rotation mode for a selected object.

By choosing the **Rotation Mode after Clicking Object** button from the **Options** bar, you can cycle through normal and rotation modes just by clicking on the object. This can be more convenient than clicking the object, then clicking the **Rotate** button from the **Drawing** Toolbar.

Selecting objects

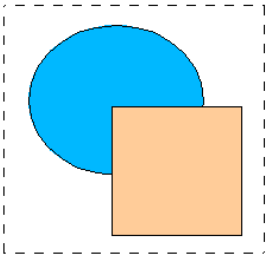
Direct selection

To select an object, the easiest way is to click directly on it. For objects that are not filled, you have to click directly on the object's outline to select it.

Selection by framing

You can select several objects by dragging a large rectangle around the objects with the select button, as shown.

For an object to be selected, it must be entirely within the rectangle.



1 Keyboard shortcuts can be configured by the user (**Tools > Configure > Keyboard**). See Chapter 1 for more information.

Selecting hidden objects

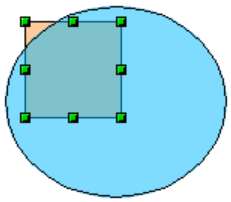
When objects are located behind others, they can still be selected. To select an object that is covered by another object, hold down the *Alt* key and click the object. To select an object that is covered by several objects, hold down the *Alt* key and click through the objects until you reach the required underlying object. To cycle through the objects in reverse order, hold down the *Alt*+*Shift* keys when you click. To help in making accurate selections, you can check the number and type of the selected objects, shown at the left of the status bar.

Note There may be some variation in the use of the *Alt* key on different operating systems.

To select an object that is covered by another object using the keyboard, press *Tab* to cycle through the objects. To cycle through the objects in reverse order, press *Shift*+*Tab*.

The easiest method is to use the *Tab* key to cycle through the objects, stopping at the object you wish to select. (This may not be practical if you have a large number of objects in your drawing). When you click on your selected object, its outline will appear briefly through the objects on top of the selected object.

In the illustration below, the square located beneath the circle was selected in this way (the circle was made transparent in order to see the square).



Arranging objects

In a complex drawing, you may have objects stacked up, one on top of the other. You can rearrange stacked objects by clicking **Modify > Arrange** and selecting the appropriate **Bring Forward** or **Send Backward** options, or by right-clicking the object and selecting **Arrange** from the context menu, then selecting the appropriate **Bring Forward** or **Send Backward** options. A keyboard shortcut is *Shift*+*Ctrl*++ to bring an object to the top, and *Shift*+*Ctrl*+− to send an object to the bottom.

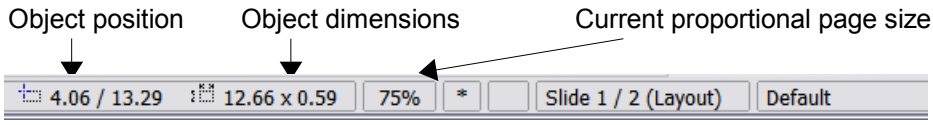
Selecting several objects

To select or deselect several objects one by one, press the *Shift* key and click on the various objects to be selected or deselected.

Moving and dynamically adjusting an object's size

There are several ways of moving or changing the size of an object. The method described here will be called *dynamic* in the sense that it is carried out using the mouse.

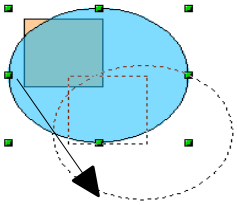
When you dynamically change an object, remember to check the right hand area of the status bar at the bottom of your screen. This shows detailed information about the ongoing manipulation. For example, during a resizing manipulation, you will see the following information displayed.



The information displayed changes when the mouse is moved.

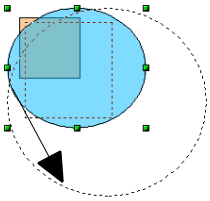
Dynamic movement of objects

To move an object, select it and then click within the object's border and hold down the left mouse button while moving the mouse. To drop the object at its new location, let go of the mouse button. During movement, the shape of the object appears as dotted lines to help with repositioning.



Dynamic size modification of objects

To change the size of an object (or group of selected objects) with the mouse, you need to move one of the handles located around the selection. As shown in the following illustration, the outline of the resulting new object appears as a dotted line.



The results will differ depending on which handle you use. If you choose a corner handle, you will resize the object along two axes at the same time. If you use a side handle, the objects will only be resized along one axis.

Note	If you press the *Shift* key at the same time as you carry out the resizing operation, the size change will be carried out symmetrically with respect to the two axes, which enables you to keep the height/length ratio of the object.

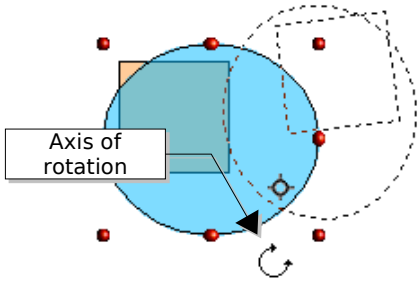
Rotating an object

Rotating an object lets you slant the object along an axis. To do this dynamically, use the red handles, as you do when changing the size of the object.

Note	Rotation works in a slightly different way for 3D objects, since the rotation occurs in 3D space and not in one plane. See also page 11 regarding rotation when Edit Points mode is active.

To rotate an object (or a group of objects), drag the red corner handle points of the selection with the mouse. The mouse cursor takes the shape of an arc of a circle with two arrows at each end. A dotted outline of the object being rotated appears and the current angle of rotation is dynamically shown in the status bar.

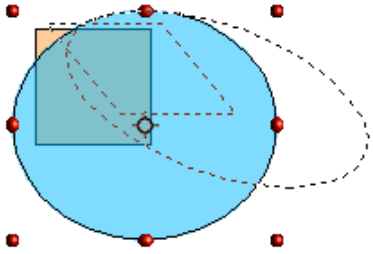
Rotations are made about an axis which is displayed as a small symbol. You can move the axis of rotation with the mouse, as shown below.



If you hold down the *Shift* key during the rotation, the operation will be carried out in increments of 15°.

Inclination

To incline or slant an object, use the red handles located on one of the edges of the selected object. The inclination axis is shown as the nearest handle to the opposite edge.



As with rotation, you can set the inclination to occur as steps of 15° by pressing the *Shift* key while moving the handle.

Editing object points

Draw offers a complete set of tools that let you accurately edit the contour of an object. As we shall see, the functions related to editing points work substantially in the same way as on curves. To make the most of these tools, you need to convert your objects into curves. To do this, select the object, then right-click and choose **Convert > To Curve** or choose **Modify > Convert > To Curve** from the menu bar.

Direct operation

Some objects can be manipulated in Points mode without converting them into curves. When you do this, you act directly on the properties of the object. The objects involved are defined by the presence of one or more extra handle points. When you manipulate this handle (which is generally larger than the other selection handles), you will obtain various effects. The mouse cursor takes the shape of a pointing hand when it passes over one of these points. Here is the complete list of the objects concerned.

Rectangle or square.

You can make the corners more or less rounded.

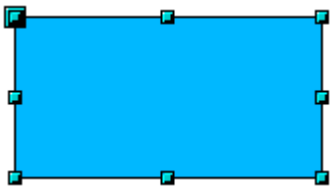


Figure 1 - Simple rectangle

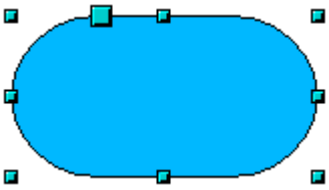


Figure 2 - Rounded rectangle

Arc or ellipse.

You can change the associated angles. Arcs have two control handles.

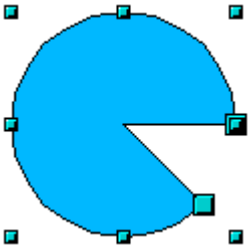


Figure 3 - Pie

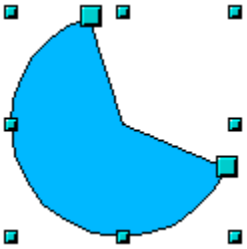


Figure 4 - Moving control points in the pie

Circular or elliptical segments.

You can change the position of the edge of the segment.

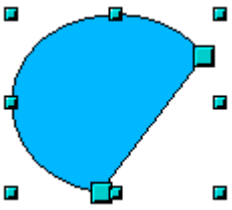


Figure 5 - Circular segment

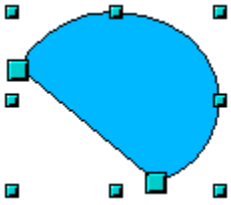


Figure 6 - Moving control points of the segment

How curves work

Editing curves works on the basis of a method called Bezier curves[1]. The complete study of such curves goes beyond this particular work. We shall cover only the basics of this powerful method of editing the contour of an object.

Figure 7 - Definition of a tangent

Editing a point in a Bezier curve uses several mechanisms as represented in the drawing on the left: The main point is called the junction point. Two tangents project from this point, enabling manipulation of the curve that passes through the junction point. The basic idea is that, around the junction point, the two sides of the curve flatten out more or less along the tangent depending upon the size and position of the tangent.

You can create many different shapes by moving either the junction point itself, or one or both of the round handle points at either end of the tangent.

The Bezier Curve Toolbar

When you work in Edit Points mode, use the **Edit Points** Toolbar as shown in Figure 8.

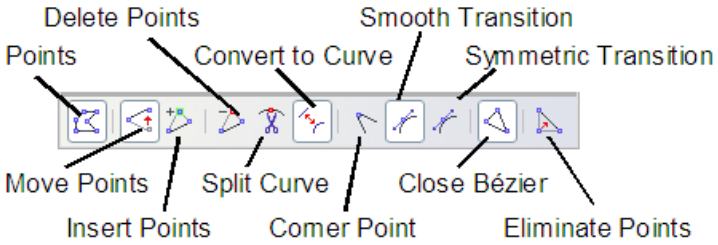


Figure 8 - Edit Points Toolbar

On this toolbar, depending upon the selected object some buttons can be selected or not. When selected, their behavior is different. The role of the three buttons enabling you to choose the type of tangent will be described in the following chapter. The functioning of the other buttons will be described in relation to working examples.

The three kinds of tangent

Three buttons in the **Edit Points** Toolbar let you select the type of tangent and convert from one type to another. Only one of these buttons can be active at any given time.

1 Bezier curves were invented by Pierre Bézier, an engineer working with the Renault car manufacturer, who developed the technique in the 1960s. The technology was intended to make modeling the surface of vehicles easier.

Figure 9 - Symmetrical transition

The **Symmetric Transition** button lets you work with a symmetrical tangent. Any movement of one or the other of the handles will be carried over symmetrically to the other one.

Figure 10 - Asymmetrical tangent

The **Smooth Transition** button lets you separate the lengths of the two parts of a tangent. In the drawing opposite, you can clearly see that the curve is flatter on the longest side of the tangent. This kind of tangent is known as a smooth junction. This button should not to be confused with the preceding one, since their representations are fairly similar.

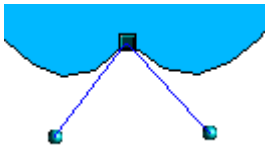


Figure 11 - Inflexion point

It is also possible to completely detach both sides of the tangent. In this case, the central point is known as the *inflexion point*. Using this technique, you can draw spikes and troughs in objects. Use the **Corner Point** button to create an inflexion point around the selected point.

Examples

The following examples start from a filled circle. As mentioned earlier, in order to use Edit Points mode, you first need to convert the object to a curve.

You will notice that after conversion, the handles located in the corners of the rectangle have disappeared. This behavior is normal in that the handles which are used in Edit Points mode are located along the trace of the drawn object.

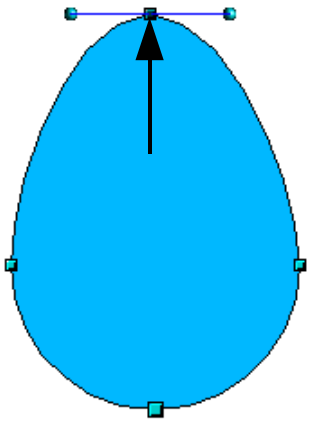
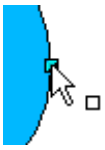


Figure 12 - Moving a junction point

The **Move Points** button is the default mode when editing points. If it has not been activated, click on the button. When this mode is active, the mouse cursor has the following shape when it is hovered over an edit point:



Movement of a point is one of the easiest manipulations to do. Figure 12 illustrates how an egg can be drawn very easily by starting from a circle and dragging the the top point upwards.

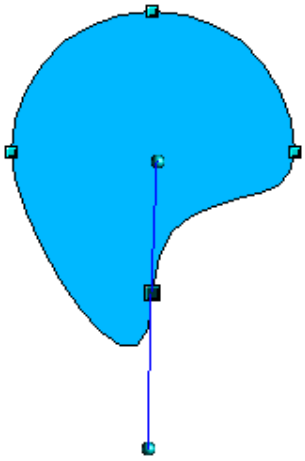
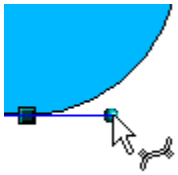


Figure 13 - Rotating a tangent

To change the location of the tangents, just move the circular handles at each end. The mouse cursor then looks like this:



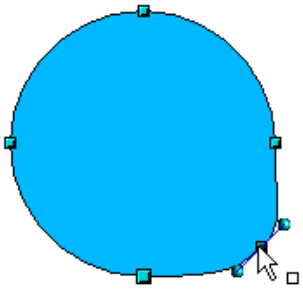


Figure 14 - Adding an edit point to a curve

Use the **Add Points** button to add an extra edit point to an existing curve. Click on the curve at the spot where you want to insert a point and then move the mouse slightly, in any direction, while holding down the button. If you just click, the new point will not be added.

The tangent attributes associated with the new point depend on the buttons that are selected on the toolbar.

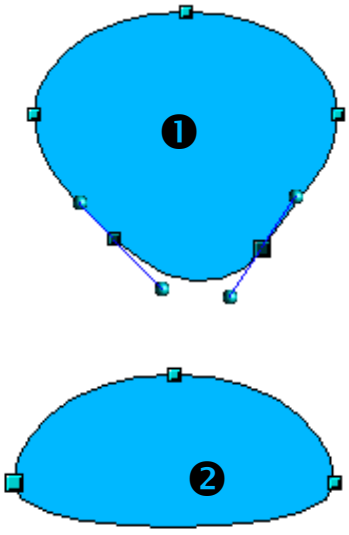


Figure 15 - Deleting points from a curve

The **Delete Points** button has the opposite effect: it subtracts one or more points from the curve. The resulting curve stretches itself automatically around the remaining points after subtraction.

Select one or more points to delete. You can select several points by holding down the *Shift* key (❶).

Then click the **Delete Points** button. The selected points disappear from the curve, which then reforms around the remaining points (❷).

You can also delete the selected points by pressing the *Del* key on the keyboard.

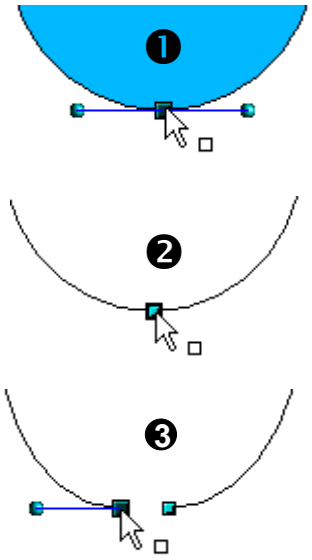


Figure 16 - Cutting a curve

Use the **Split Curve** button to split or cut a curve at the location of the selected handle. If the object is filled, it will be emptied, because the curve that represented the edge is no longer closed.

Check that you have selected the correct handle (❶), click the **Split Curve button** (❷) and notice that the object is no longer filled. You can then check, by moving the point, that the curve has indeed been separated (❸).

If you have an open curve, the start point of the curve is larger than the others.

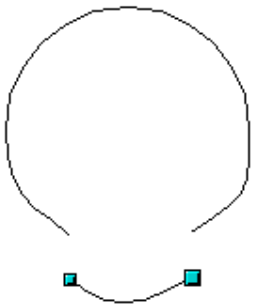


Figure 17 - Moving a segment

You can also separate a curve at several points simultaneously. Just keep the *Shift* key pressed down and select all of the points at which the cut should occur.

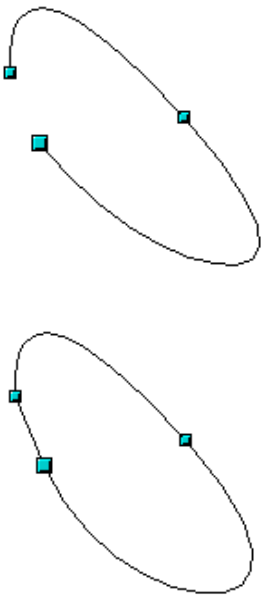


Figure 18 - Closing an open curve

To close an existing curve, select an open curve and click on the **Close Bézier** button .

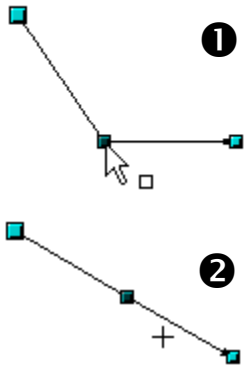


Figure 19 - Using the "select points" switch

The **Select** button on the **Drawing** Toolbar functions as a switch. It works as follows.

If you have two points linked together by a straight line (you do not need to have a curve between the points) and you insert a new point between them that is set at an angle to the initial straight line (and hence the two endpoints), then:

- If the **Select** button is active, you will have a drawing similar to that illustrated in ❶.
- If the **Select** button is not active, and you move the point you have just inserted to bring it back close to its initial position in the straight line, you will have a drawing similar to that illustrated in ❷.

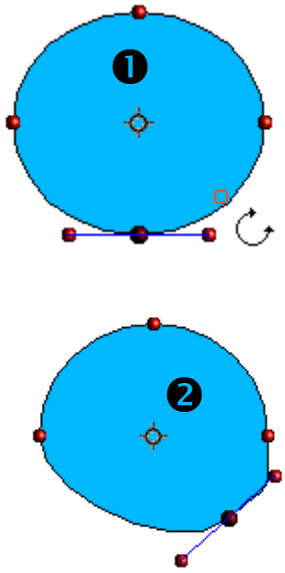


Figure 20 - Moving a point on a curve

The **Effects** drop-down button on the Drawing Toolbar and the **Rotation Mode after Clicking Object** button on the **Options** Toolbar can be used in Edit Point mode. In this case, it can be used to move a point around the contour of an object.

Switch into Rotation mode by clicking on either of the rotation buttons. Notice that in rotation mode, all of the tangent points become red dots.

Select the point to be moved and then drag it around the contour while keeping the left mouse button pressed down (❶). When you let go of the mouse button, the point will be moved to the new position (❷).

If you move one of the handles located at the end of the tangents during rotation, you will make the object rotate in exactly the same way as with the usual rotation operations.