

# Ellipse > Properties and Concentric circles method

Learning outcomes:





- I can identify the properties of an ellipse
- I can construct an ellipse

By the end of the lesson I will be able to:

- Identify an ellipse
- Label the different parts of an ellipse
- Draw a horizontal ellipse using the concentric circles method

Before studying this lesson I need to make sure that I know how to:

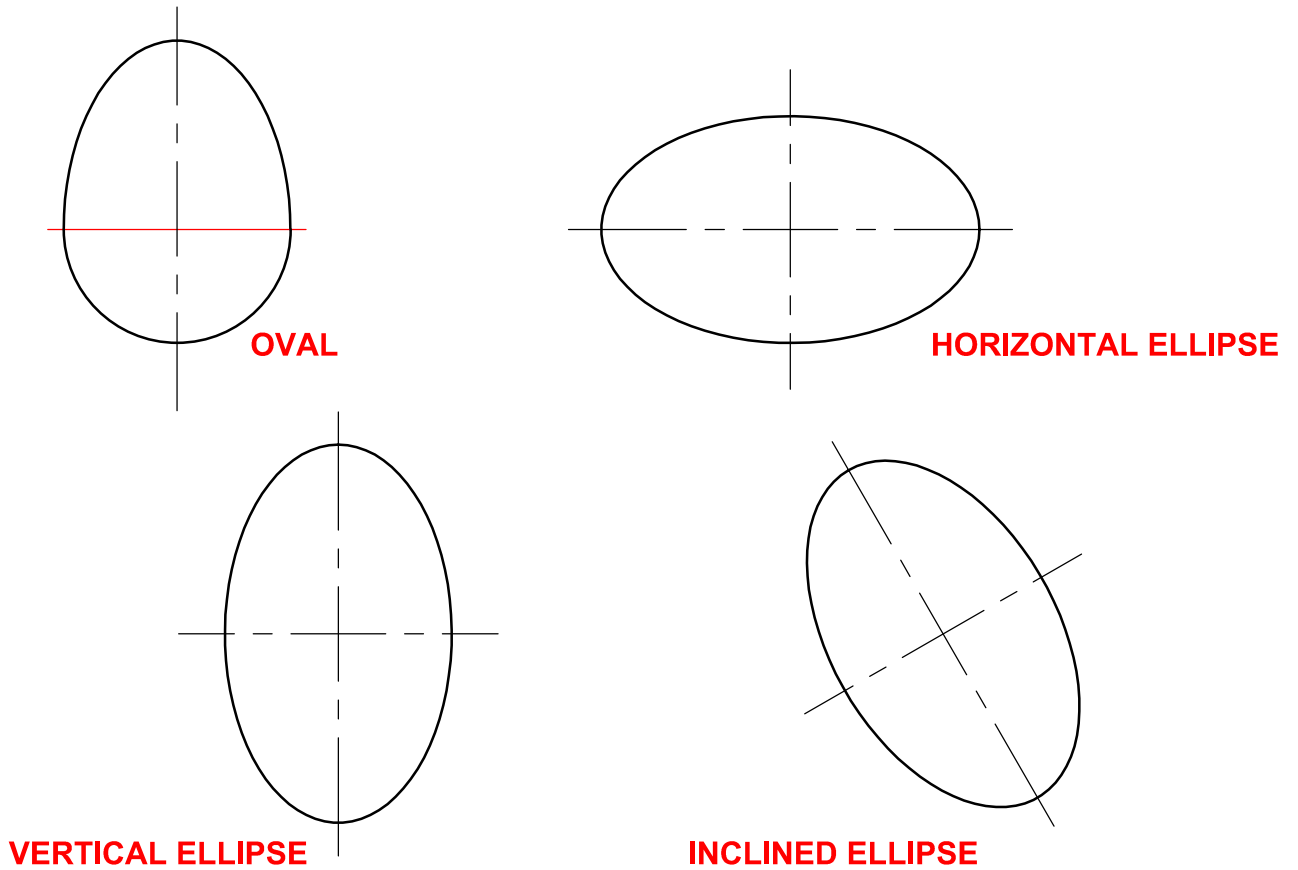
- Notice the difference between the diameter symbol  $\varnothing$  and the radius **R** symbol.
- Draw two lines perpendicular to each other
- Draw circles using the compass
- Use the  $30^\circ$  set-square

Self Assessment (to be done after the lesson)				
	Well Achieved 	Achieved 	Almost There 	Need more Effort 
I can identify an ellipse and label its parts				
I can divide a circle into 12 equal parts				
I can draw an ellipse using the concentric circles method				
My ellipse is neat, bold and standing out from its construction.				

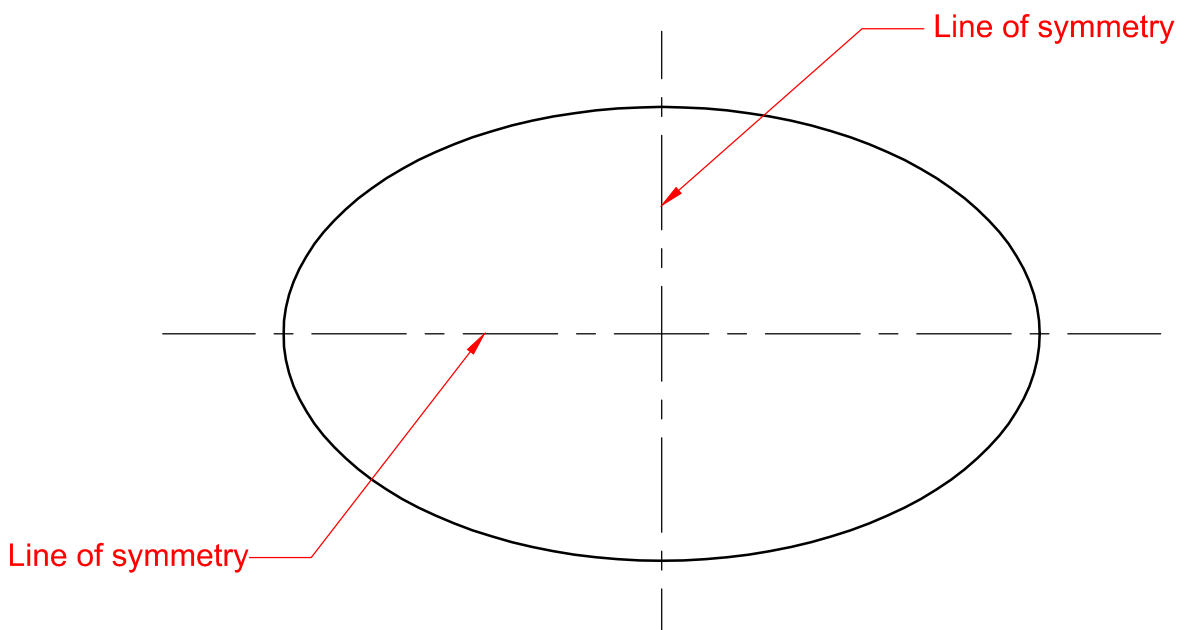
## Ellipse

An **Ellipse** is a squashed circle that has two lines of symmetry. It is important to distinguish the shape of an ellipse from the shape of an oval with one line of symmetry. The following video illustrates the shape of an ellipse and some of its properties:

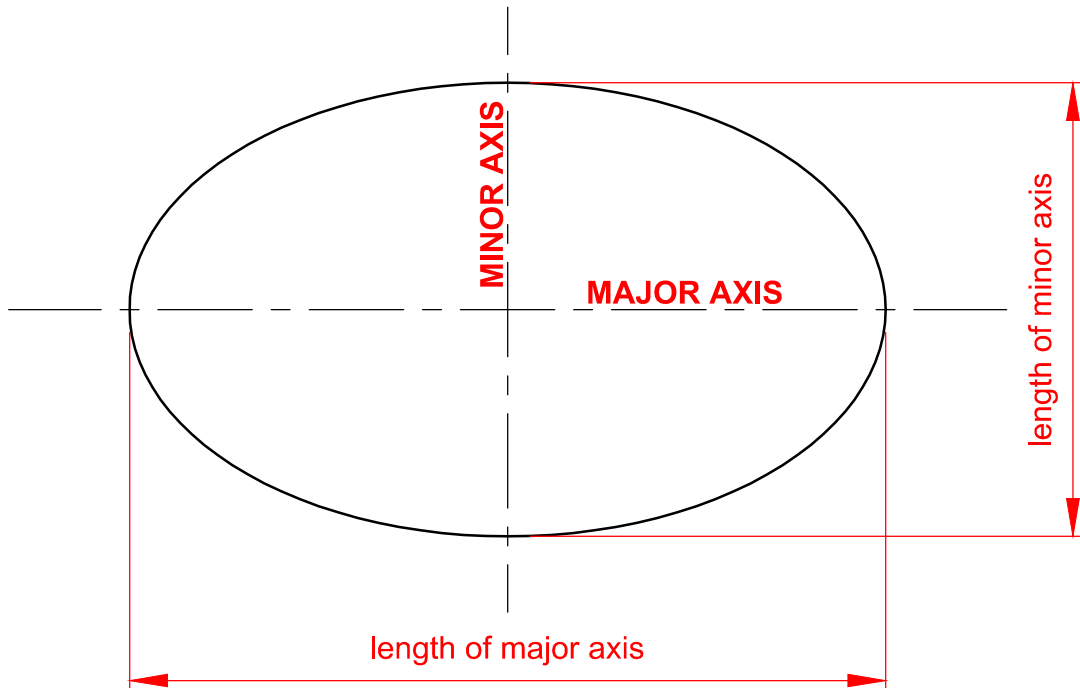
<https://youtu.be/IMWtBbHD4Fc>



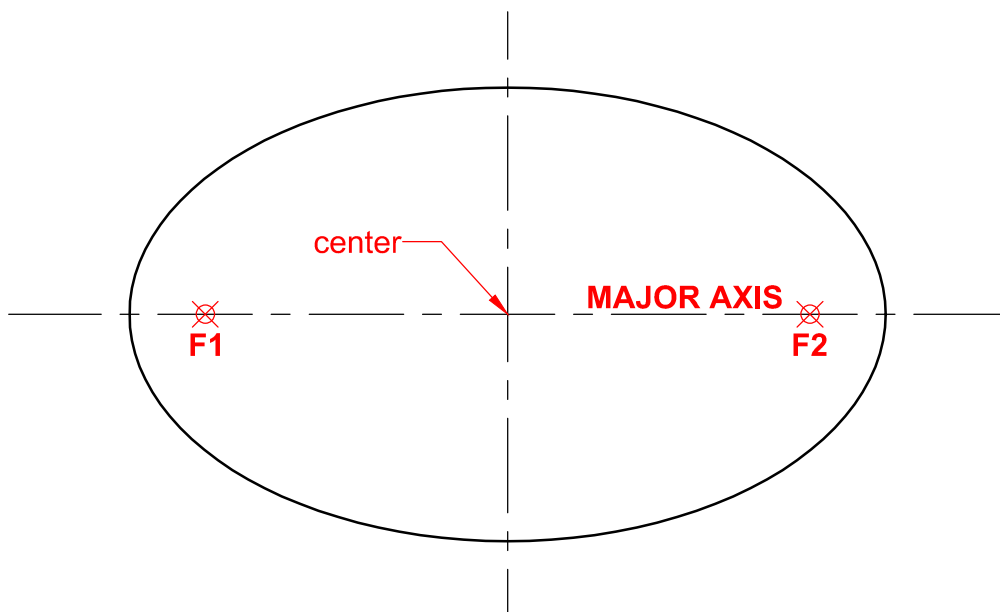
An ellipse will always have two lines of symmetry.



The two lines of symmetry are called the **MAJOR AXIS** and the **MINOR AXIS**.



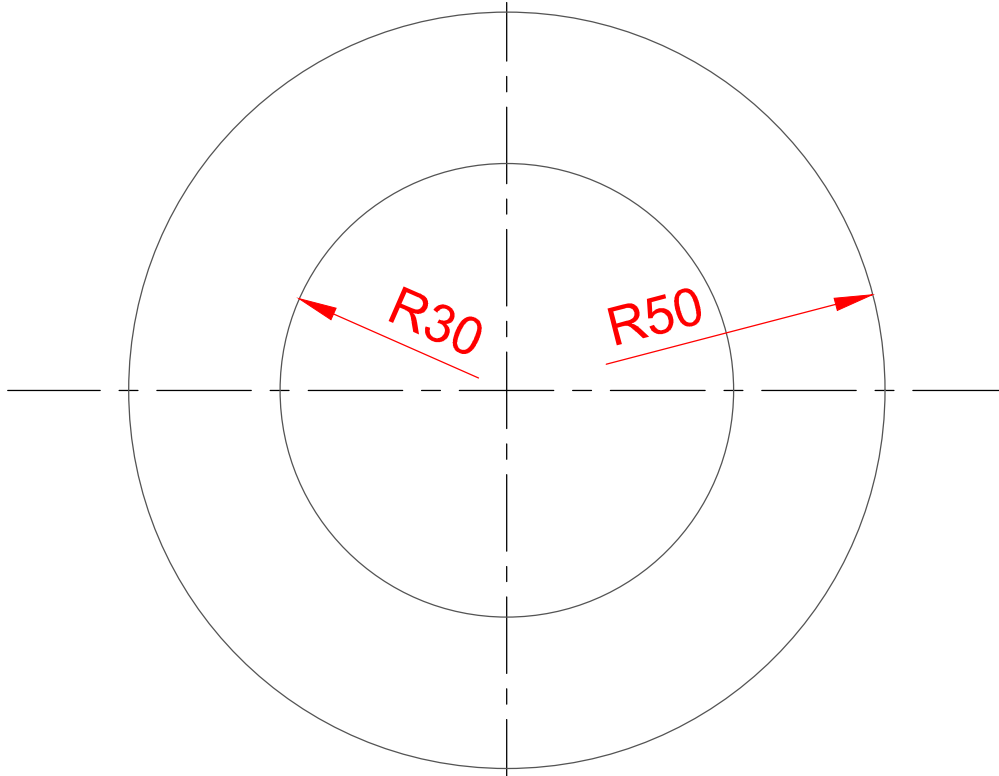
An ellipse has one center and **TWO** focal points. These are always located on the **MAJOR AXIS**.



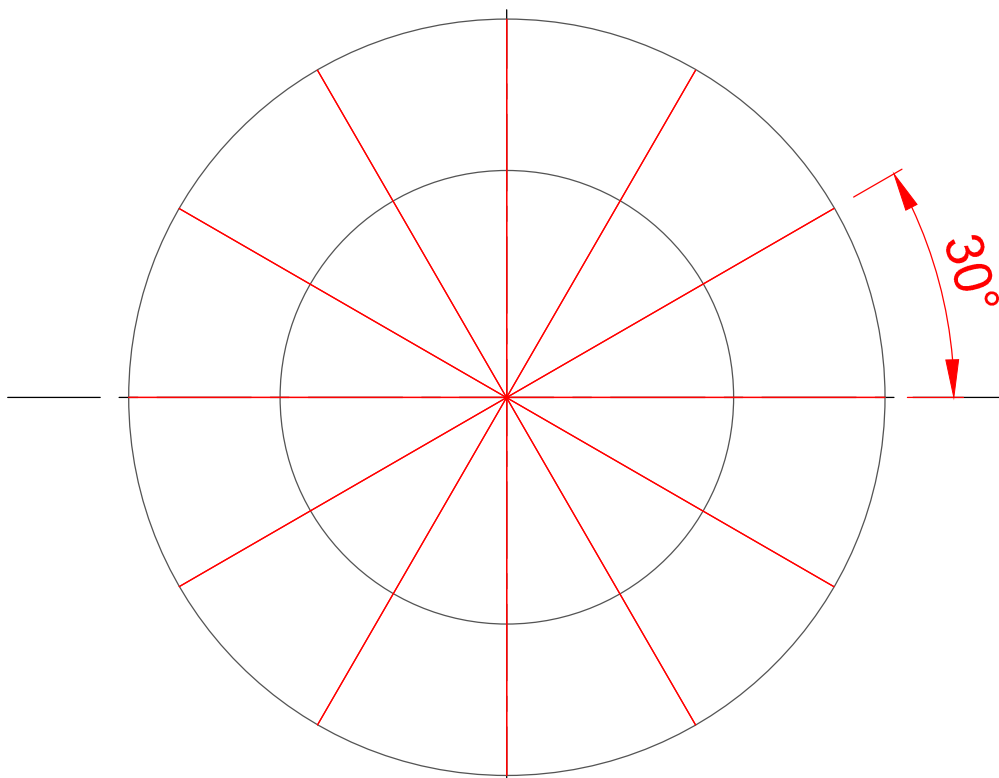
### Worked example

Construct an ellipse having a **MAJOR AXIS** of **100mm** and a **MINOR AXIS** of **60mm** using the concentric circles method.

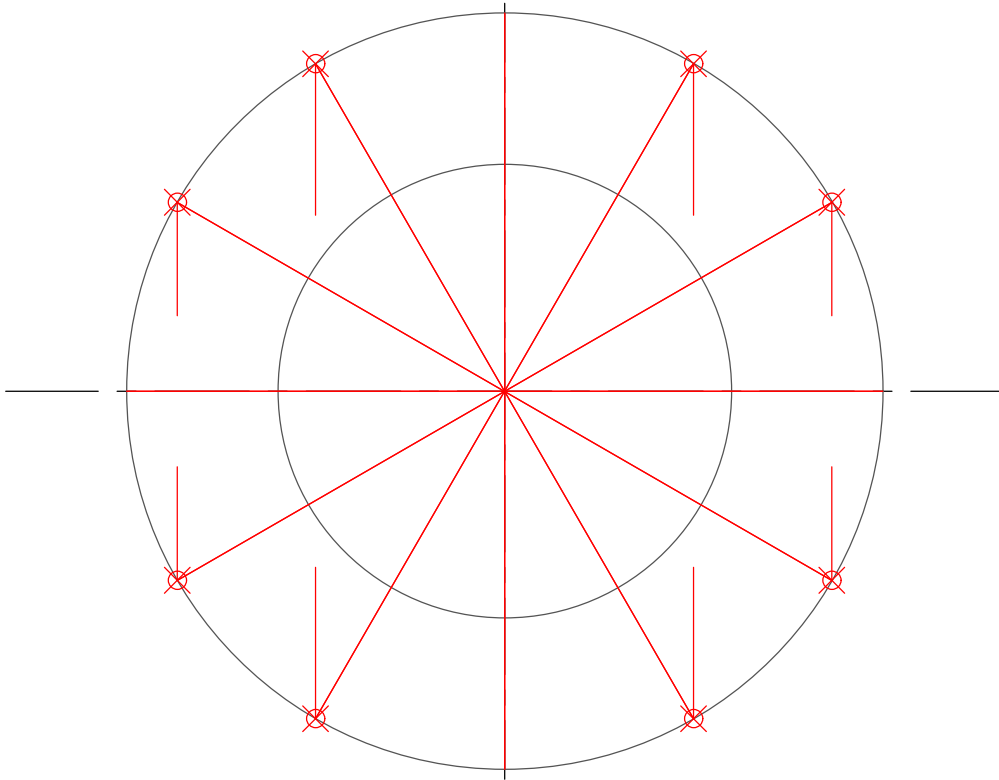
**Step 1:** Draw two circles **R50** and **R30** on the center lines.



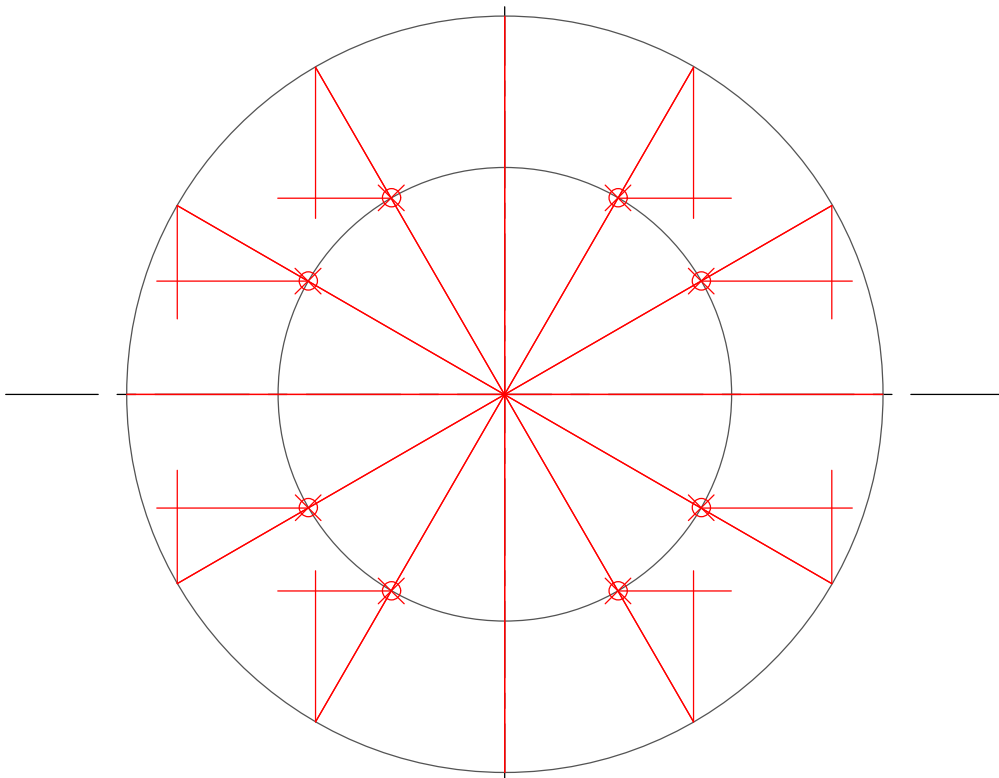
**Step 2:** Divide the circles into a number of equal parts (normally into 12 parts using the 30° set-square)



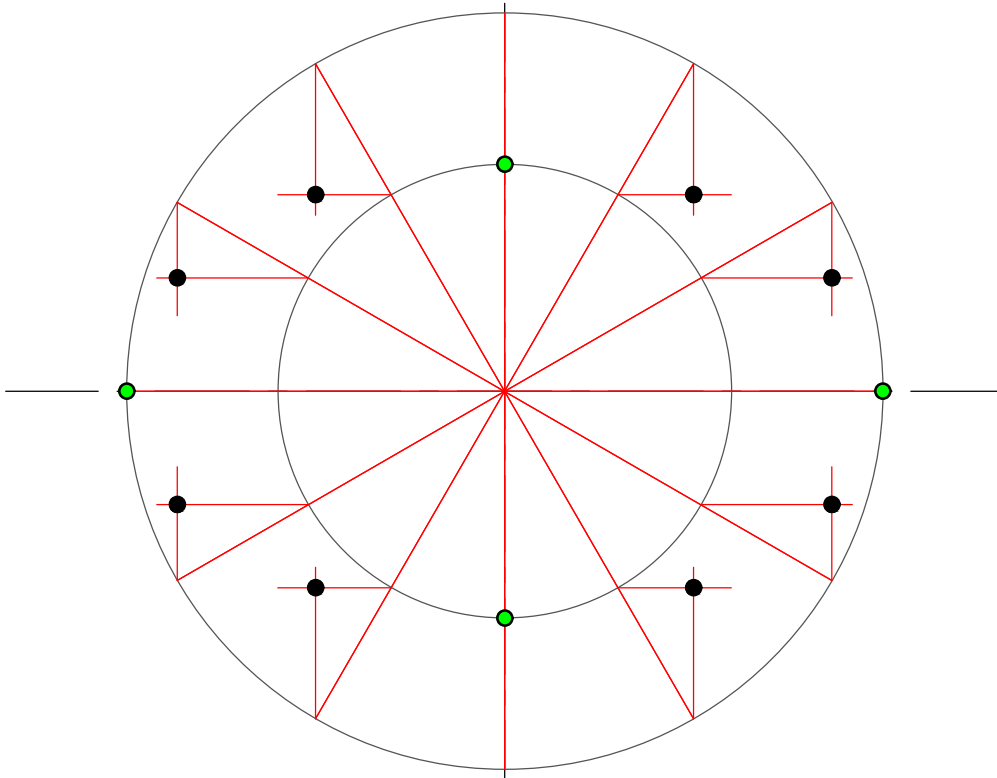
**Step 3:** Draw vertical lines from every intersection on the **larger** circle.



**Step 4:** Draw horizontal lines from every intersection on the **smaller** circle.



**Step 5:** Plot the points of intersection along with the 4 points lying on the **MAJOR** and **MINOR** axis (shown in green).



**Step 6:** Draw the horizontal ellipse by drawing a freehand curve passing through the 12 points. The following video illustrates the construction of an ellipse using the concentric circles method:

<https://youtu.be/OaJw6Yer3zE>

