

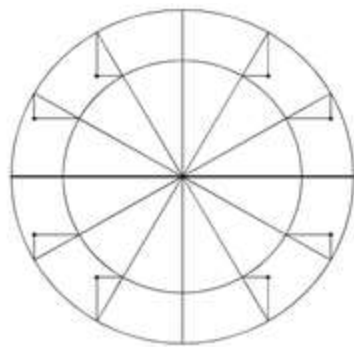
Method of construction ellipse

1- Circle Method

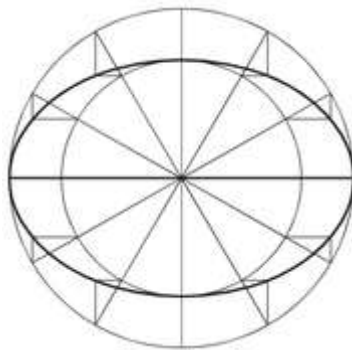
- A. Draw a circle with a diameter equal to the **major axis** and a circle with a diameter equal to the **minor axis** using the **same center**.



- B. Divide the circles into 12 slices using your **30 deg** set square.
- C. Draw a vertical line down from each point where the lines meet the outer circle and draw a horizontal line across where the lines meet the smaller circle. Mark out the points where the horizontal and vertical lines meet.

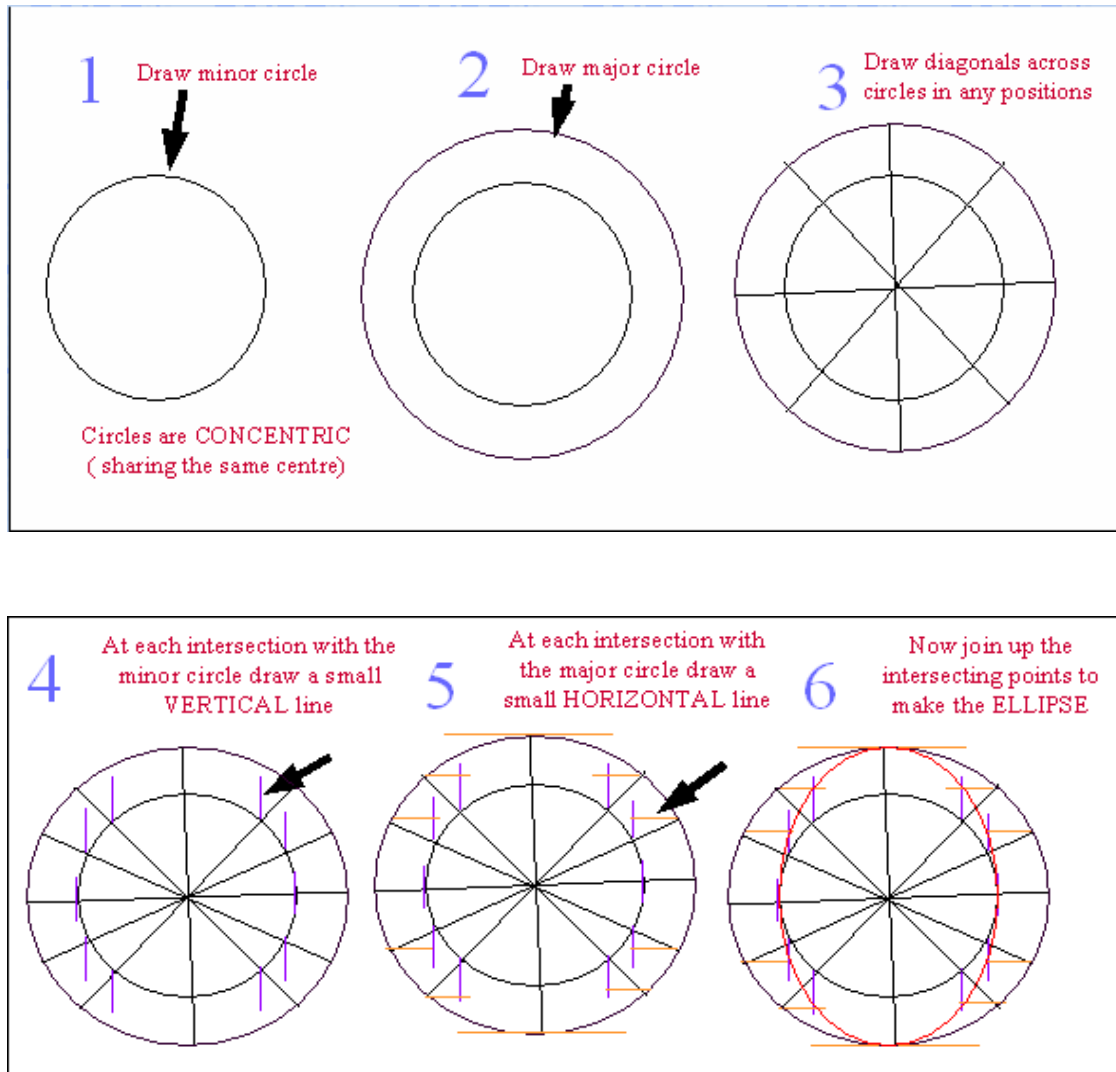


- D. Use these points and curve template to draw the ellipse



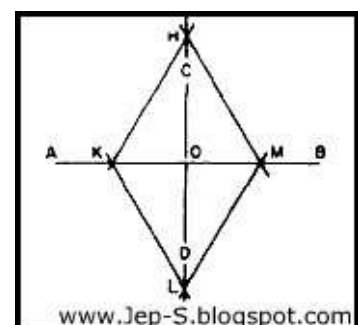
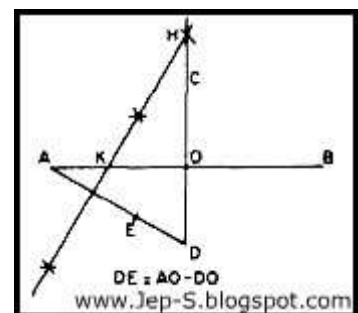
Watch: <https://youtu.be/g68ioPKMZI4>

Another way for drawing:

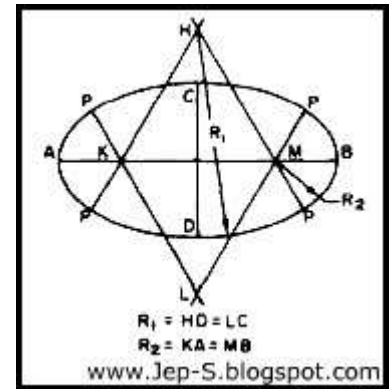


2- Draw an Ellipse by Four-Center Method

- Draw the major axis, **AB**, and the minor axis, **CD**, which are mutually perpendicular at the midpoint, **O**, as shown in the diagram.
- Draw **AD**, that connects the end points of the two axes.
- Using a compass, point the tips of it to **DO** then plot it along **AO** and reset the compass on the remaining distance to **O**.
- With the difference of semi axes thus set on the dividers, mark off **DE** equal to **AO** minus **DO**.
- Draw perpendicular bisector **AE**, and extend it to intersect the major axis at **K** and the minor axis at **H**.
- With the compass, mark off **OM** equal to **OK**, and **OL** equal to **OH**.



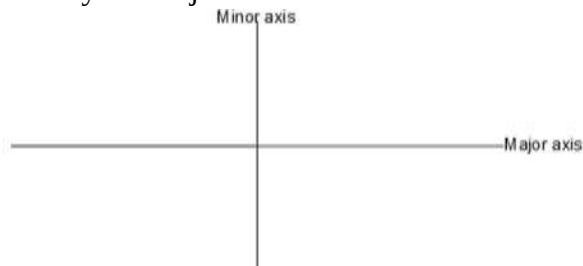
- G. With **H** as a center and radius **R1** equal to **HD**, draw the bottom arc.
- H. With **L** as a center and the same radius as **R1**, draw the top arc.
- I. With **M** as a center and the radius **R2** equal to **MB** draw the end arc.
- J. With **K** as a center and the same radius as **R2**, draw the other end arc.
- K. The four circular arcs thus drawn meet, in common points of tangency, **P**, at the ends of their radii in their lines of centers.



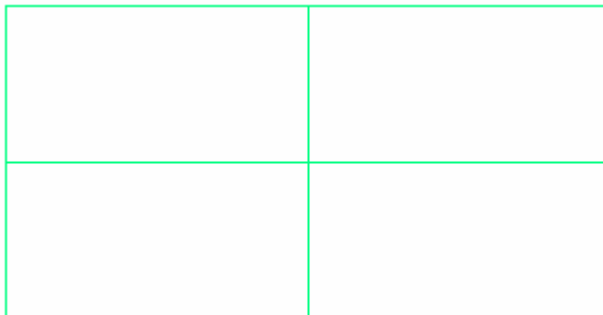
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3- Drawing ellipse by rectangular method

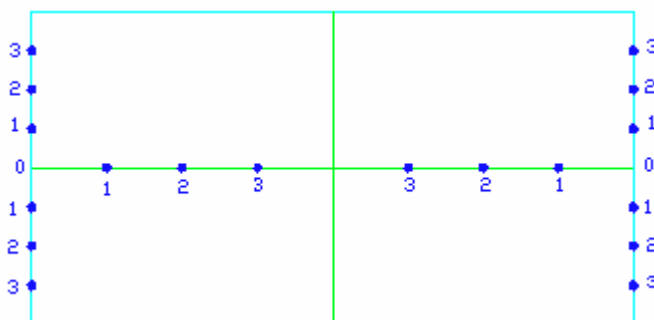
- A. Draw your Major and Minor Axes.



- B. Now draw a rectangle around the Major and Minor Axes as shown.

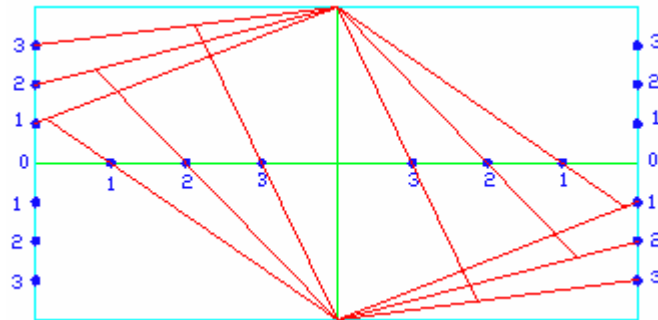


- C. Divide both halves of the Major Axis into an equal number of parts. Here we have used four parts. Now divide each half of the edges of the light blue rectangle, corresponding to the Minor Axis, into the same number of parts. Label all of these points as you see in the diagram.

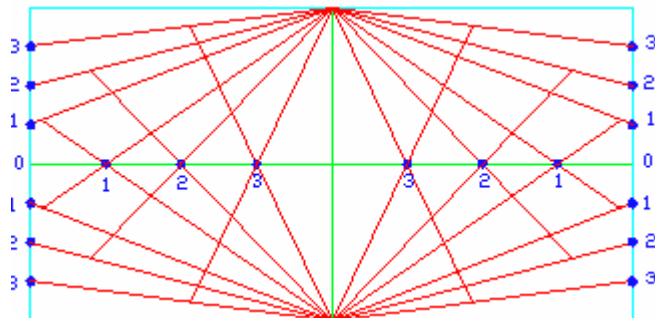


- D. Next you have to join the ends of the Minor Axis to the divisions on the edge on the rectangle. Then from the opposite end of the Minor Axis draw lines through the

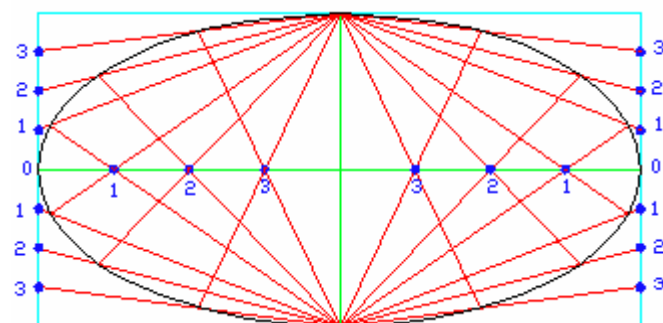
divisions on the Major Axis until they intersect the first set of lines you have drawn. Here we have only shown half of the lines for clarity.



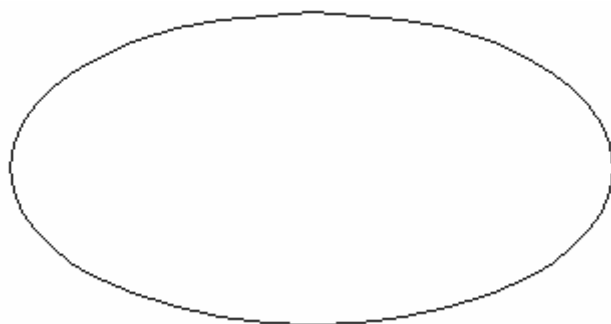
E. Here you can see the completed set up.



F. Join up all of the points of intersection and the points labeled '0' to form your Ellipse.



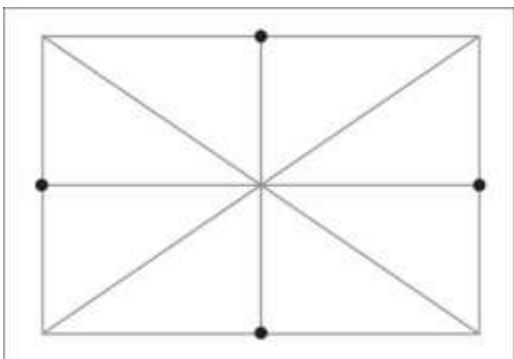
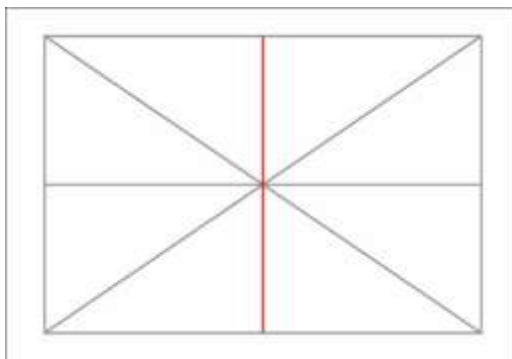
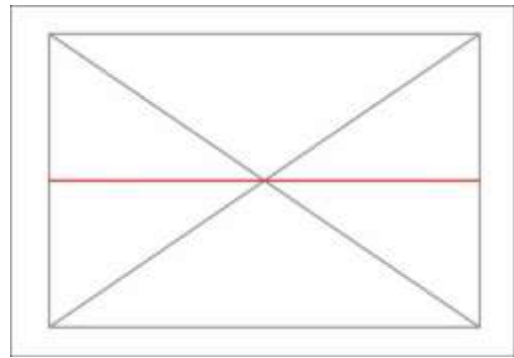
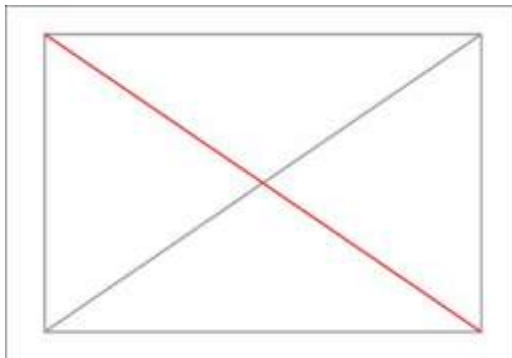
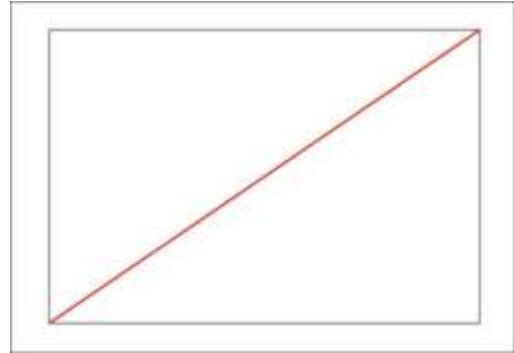
G. And now you are finished. You can draw an Ellipse in any direction with this method, but remember you must know the length of the Major Axis and the Minor Axis, or be able to find them out.



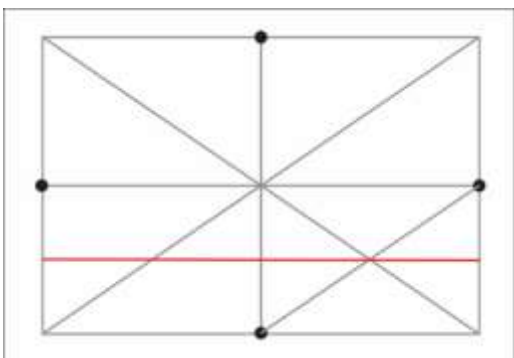
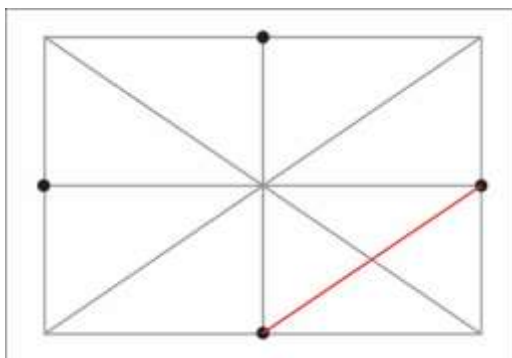
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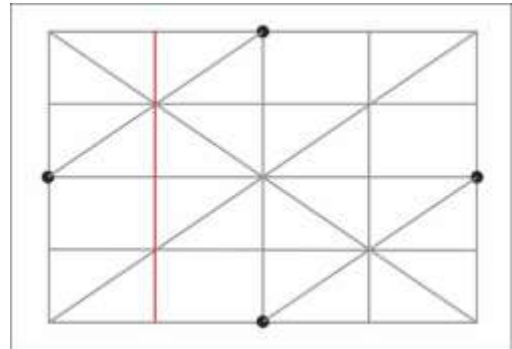
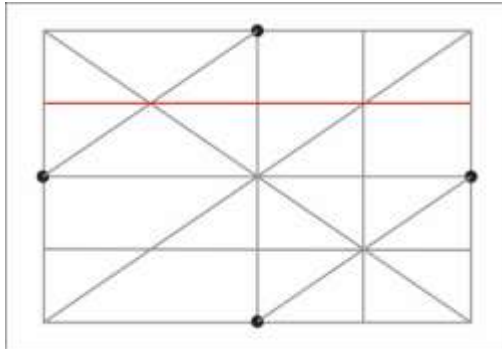
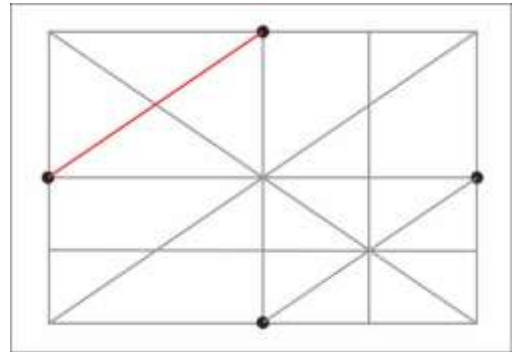
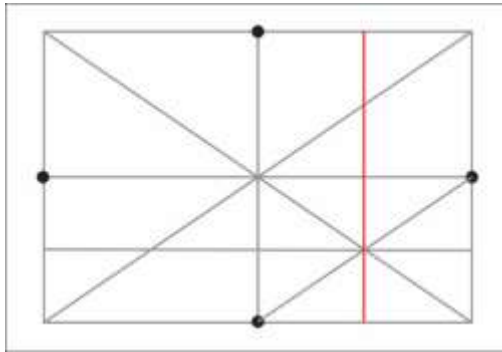
4- Accurate Ellipses

To make the framework, we need to first create a rectangle with the proportions of the major and minor axes of the ellipse. we then need to divide this rectangle into **16** equal sections.



At this point we now know 4 of our points and we have divided our rectangle into 4 equal sections. We now need to divide each of those sections into four more sections.





We now have 16 equal sections. However, before going further let's remove the diagonals used in constructing those sections to keep things from getting too visually confusing.

