



Design out the box

Time 40-50 mins approx

Level of difficulty ★★☆☆☆

- CAD stands for **C**omputer **A**ided **D**esign.
- It is the use of computer technology to aid in the design of something.
- CAD can create 2D and 3D virtual models of goods and products.



Lesson Objectives...

- To understand the basic tools used in 2D Design.
- To understand the advantages of using CAD
- To be able to successfully use CAD independently to complete a range of tutorials in 2D and then in 3D
- To develop advanced skills and problem solving skills when using 2D Design

Skills to be used in this project...

Basic Skills	New and Higher Skills
Zoom tool	Rotate tool
Orbit tool	Move tool
Pan tool	Offset tool
Line tool	Arc tool
Rectangle tool	Text tool
Circle tool	Paint Bucket tool
Eraser tool	Bitmap tool
Delete part tool	Making Components

Basic skills are those required to do very basic drawings and are detailed as part of this presentation.

New and higher skills may be new to the novice and are the focus for learning in this presentation.

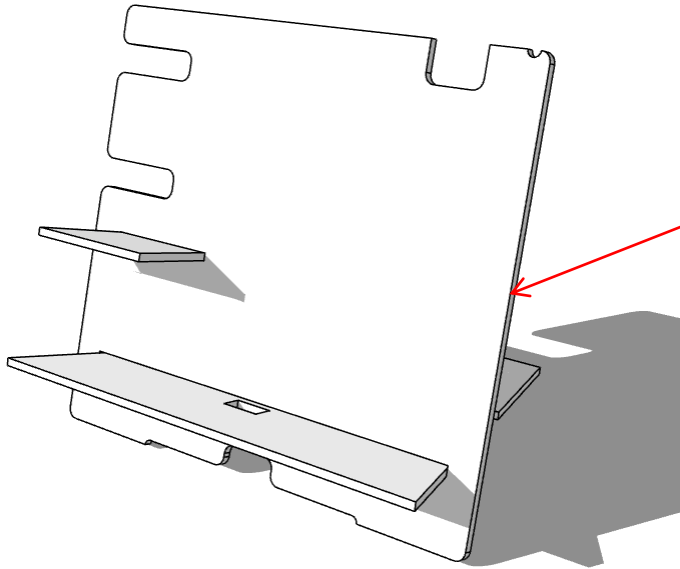
Skills to be used in this project...

Basic Skills	New and Higher Skills
Zoom tool	Construction lines and points
Orbit tool	Tape Measure tool
Pan tool	Arc tool
Line tool	Contour Tool
Rectangle tool	Bitmap Tool
Circle tool	Paint Bucket tool
Eraser tool	
Delete Part tool	

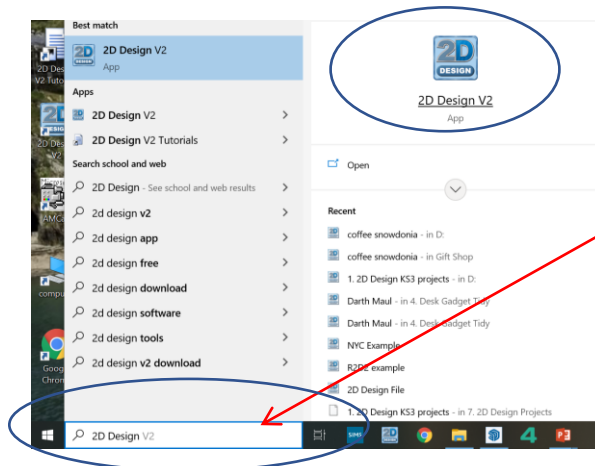
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2D Design Key Ring

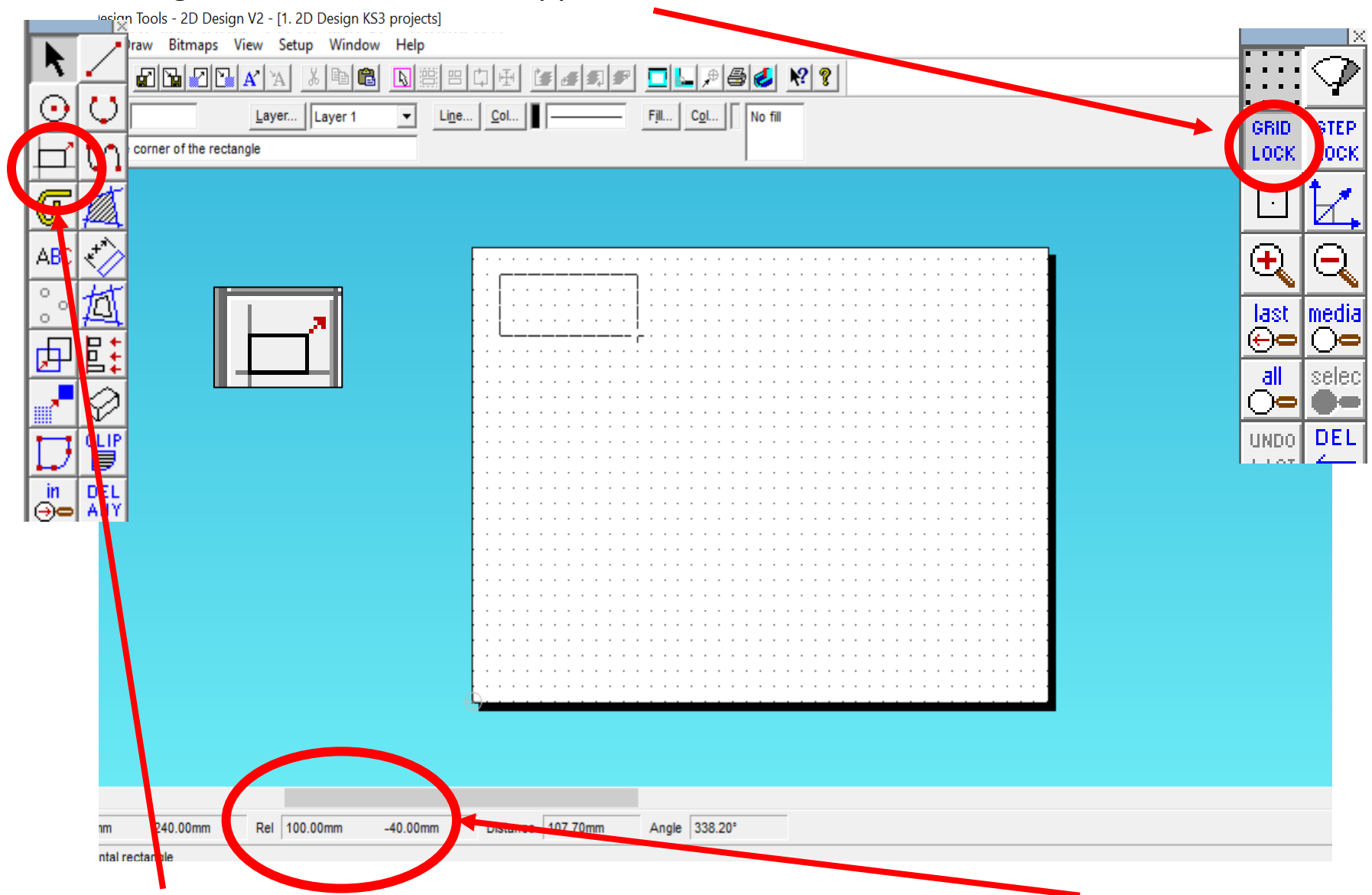


1. In **Sketch up** you have been using **3D** CAD to draw a desk tidy shown opposite. We are now going to use a **2D** piece of software to draw a design on it. First we need to learn the basics of 2D design....

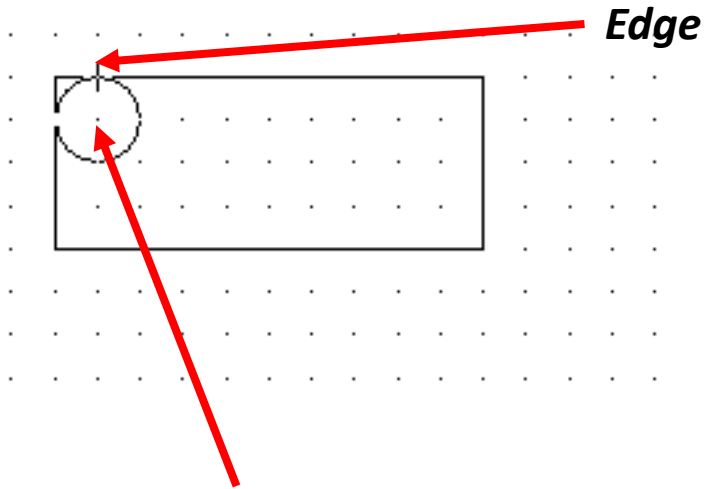


2. Click **Start** and then use the search bar to search for 2D design

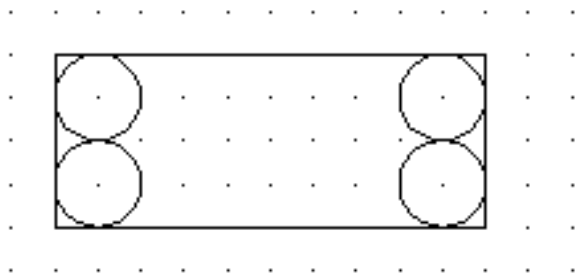
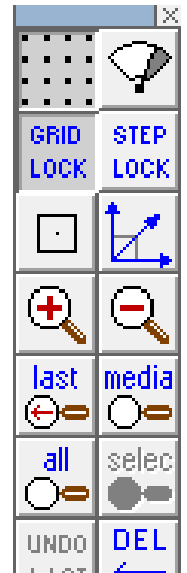
3. Select grid lock shown on the opposite tool bar



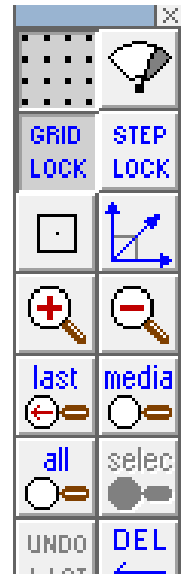
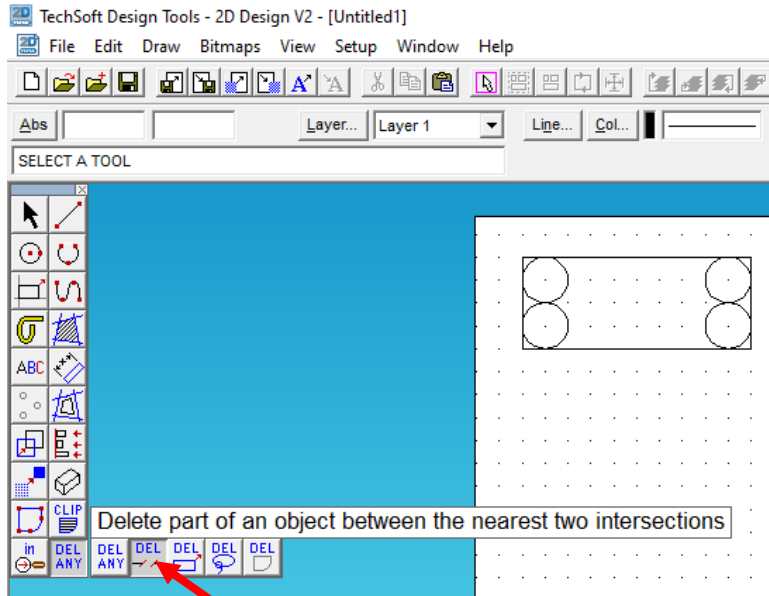
4. Select the **rectangle tool** shown. Draw a square the measures **100mm x 40mm**. You have to look at the **Rel tool box** shown at the bottom of the screen to size it correctly.



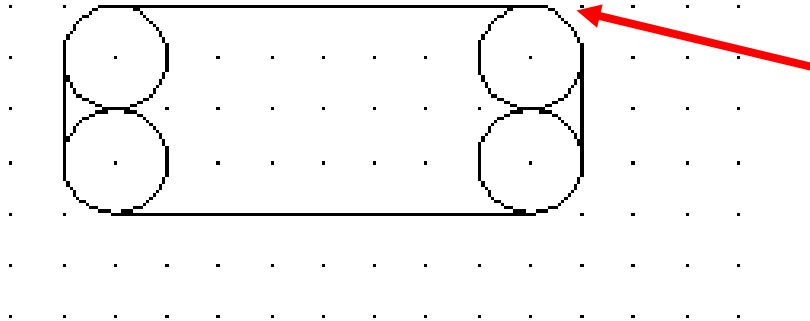
5. Select the **circle tool** shown on the tool bar. Start the centre of the circle on the **point shown**. Pull it to **the edge** of the key ring



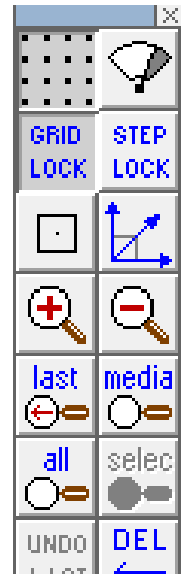
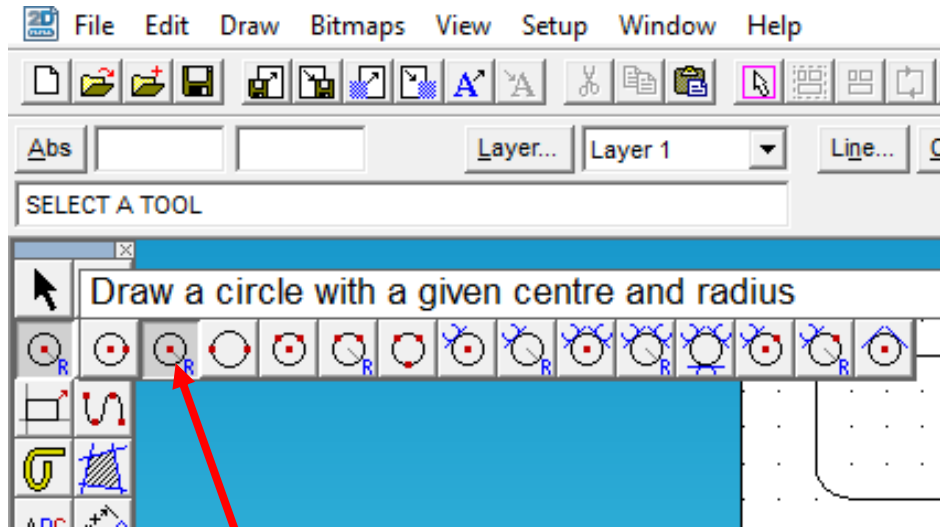
6. Using the **circle tool** repeat for all four corners



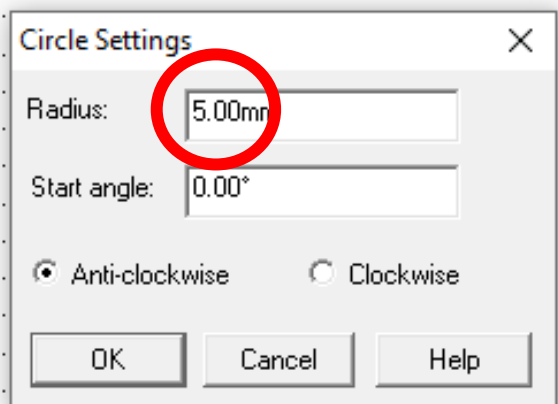
7. Click and **hold** the **DEL ANY** toolbar down so it **extends** as shown. Click on **DEL PART**.



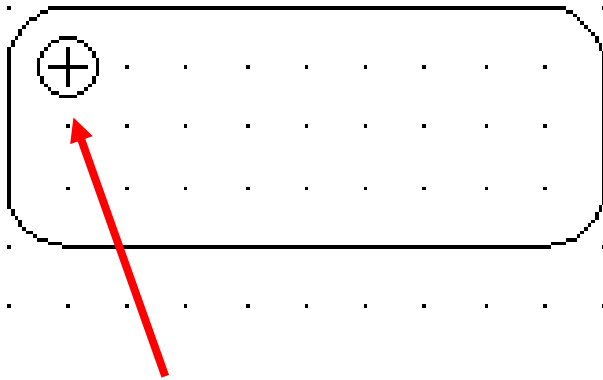
8. Using the **DEL ANY** tool delete the corners of the key ring to round them off as shown opposite .



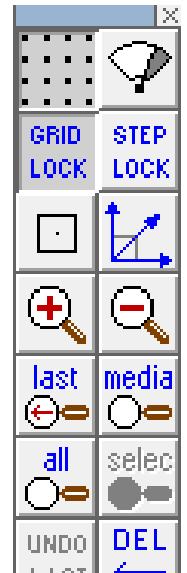
9. Click and **hold** the **Circle** toolbar down so it **extends** as shown. Click on **Draw a circle with a given radius**.



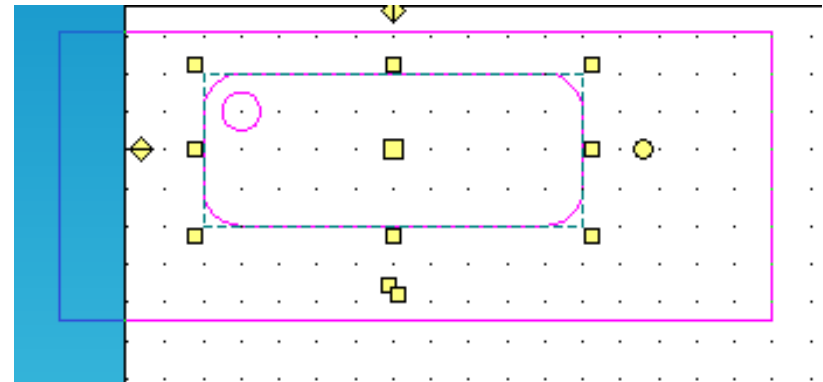
10. Click and **type 5.00mm** in the radius toolbar

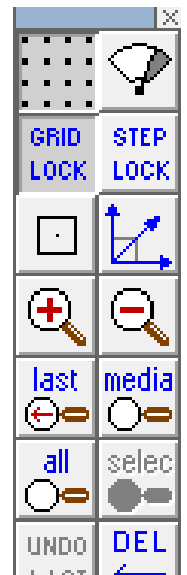
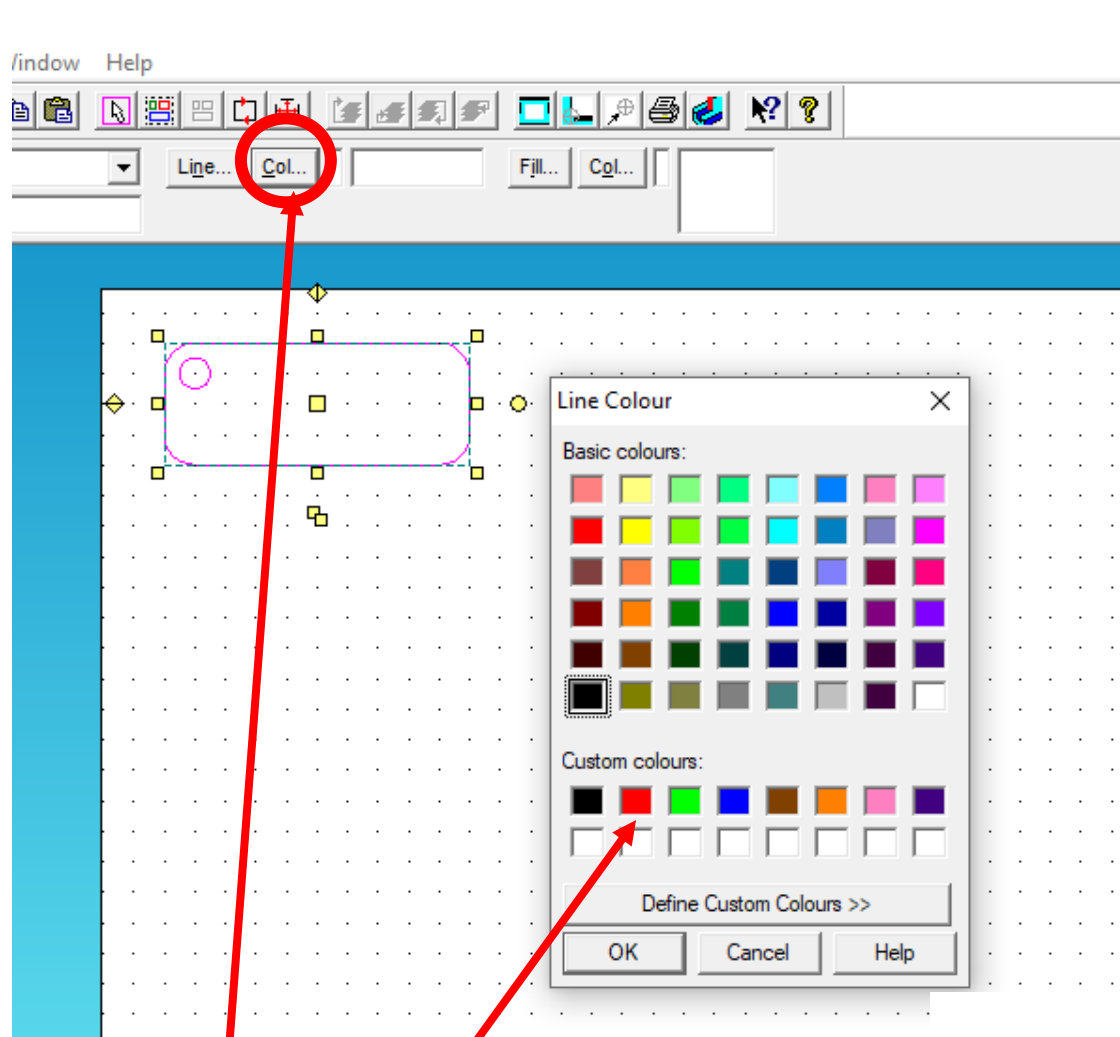


11. Position the **circle** shown on the key ring.
This is the hole for the keyring and has a 1cm diameter

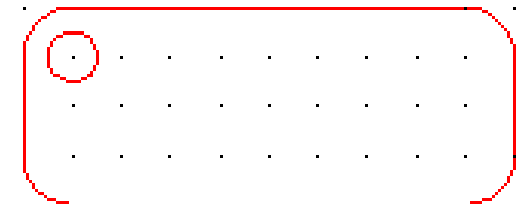


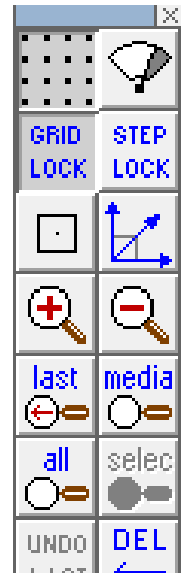
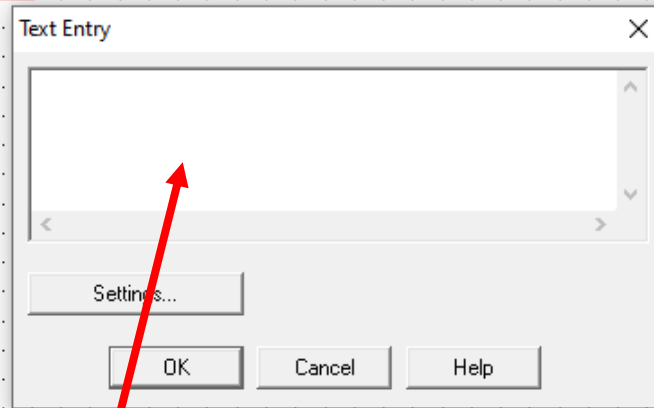
12. Using the **select tool** on the drag it over the keyring to select all the lines. They should be highlighted.



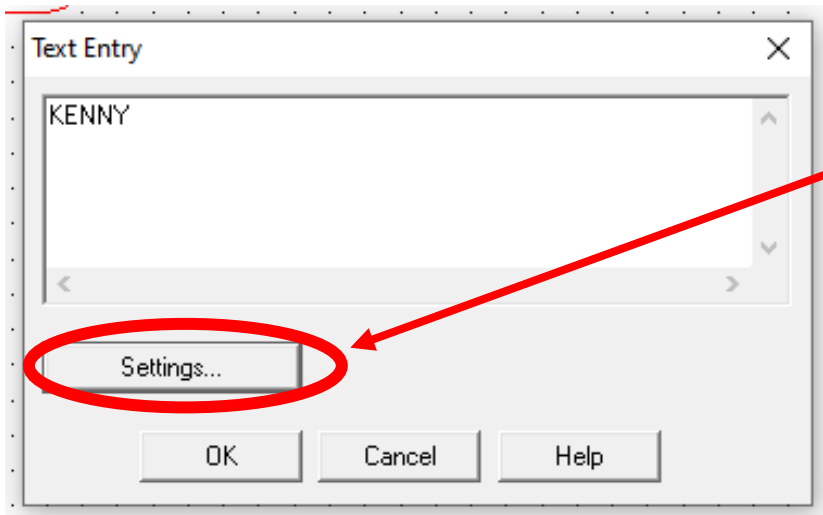


13. Click on the line **Col tool** shown to bring up the line **colour palette** shown. Click on **red** as this is to **cut** on the laser cutter.

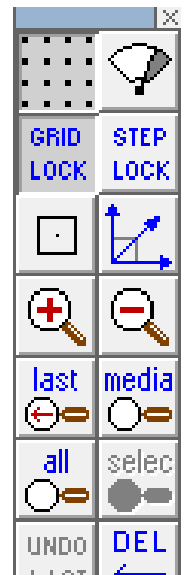
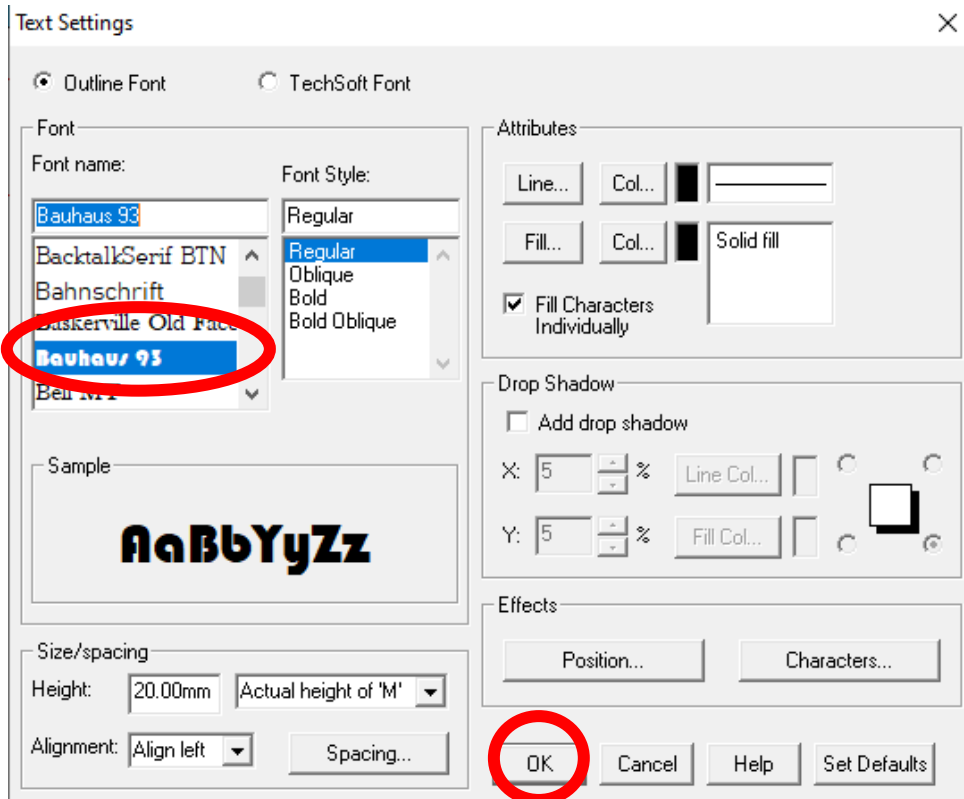




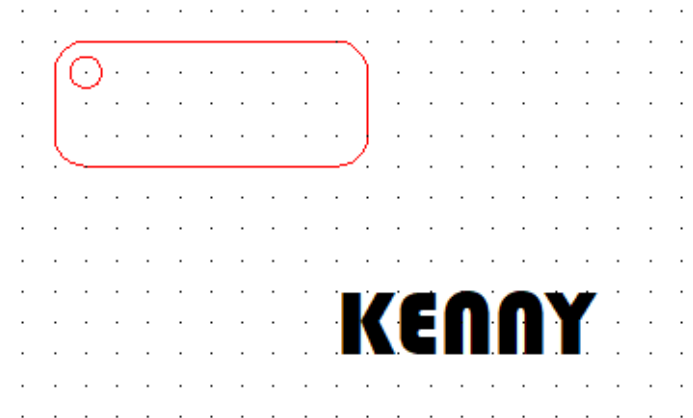
14. Click on the line **ABC (text) tool** shown to bring up the **text entry window** shown.

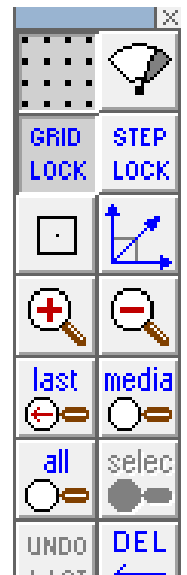
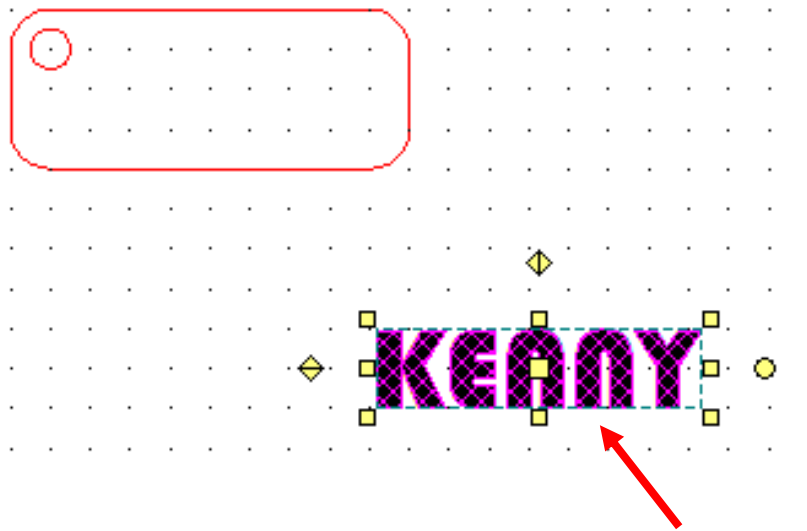


15. Type in your **name**. Then click on settings to choose your favourite font etc.....

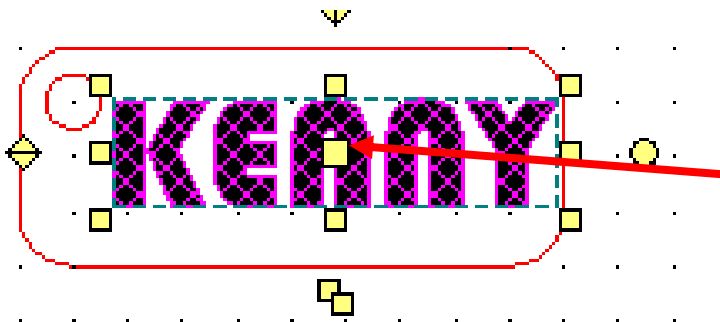


16. Once you have chosen your font click **OK** and then **OK** again..

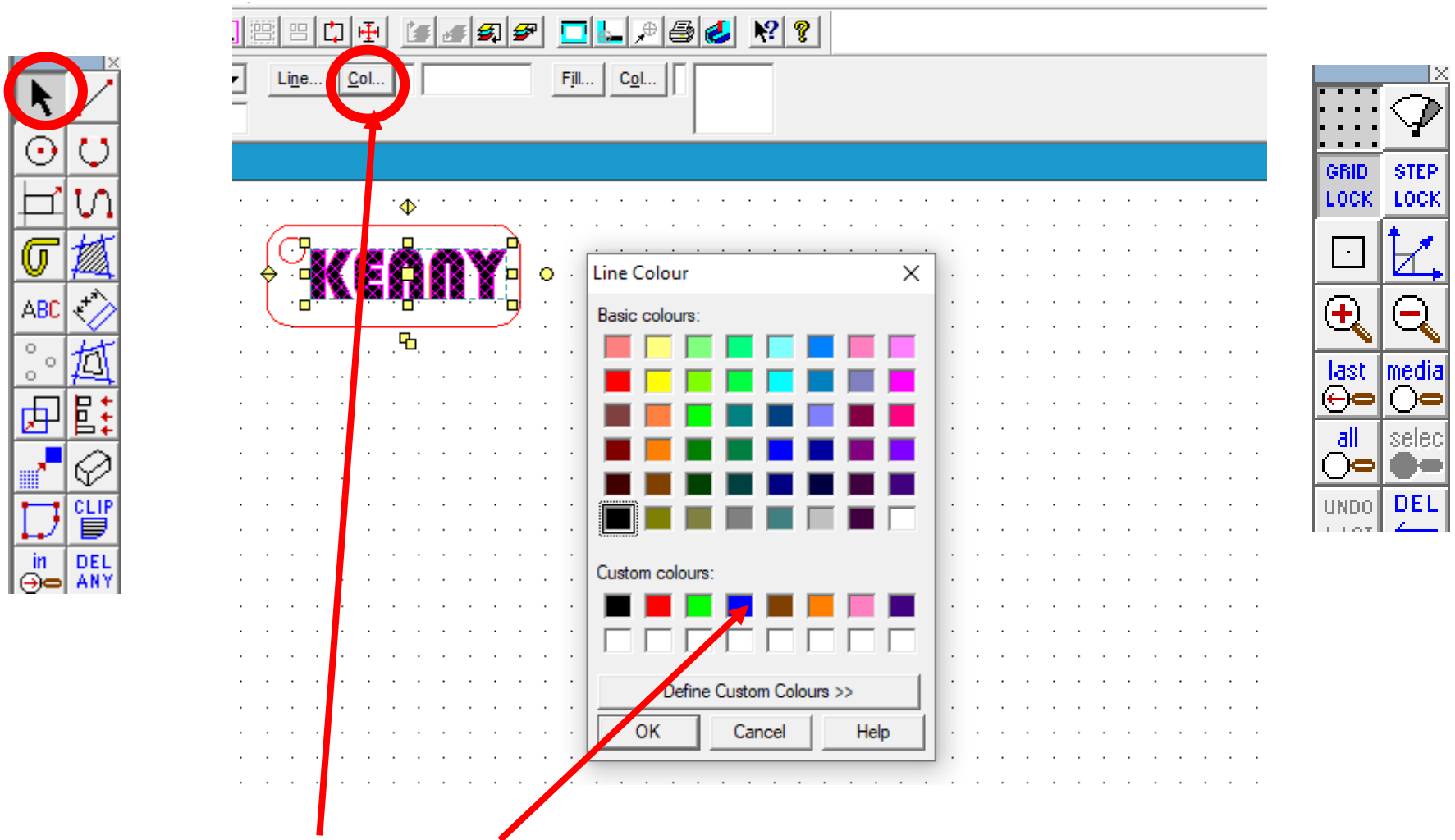




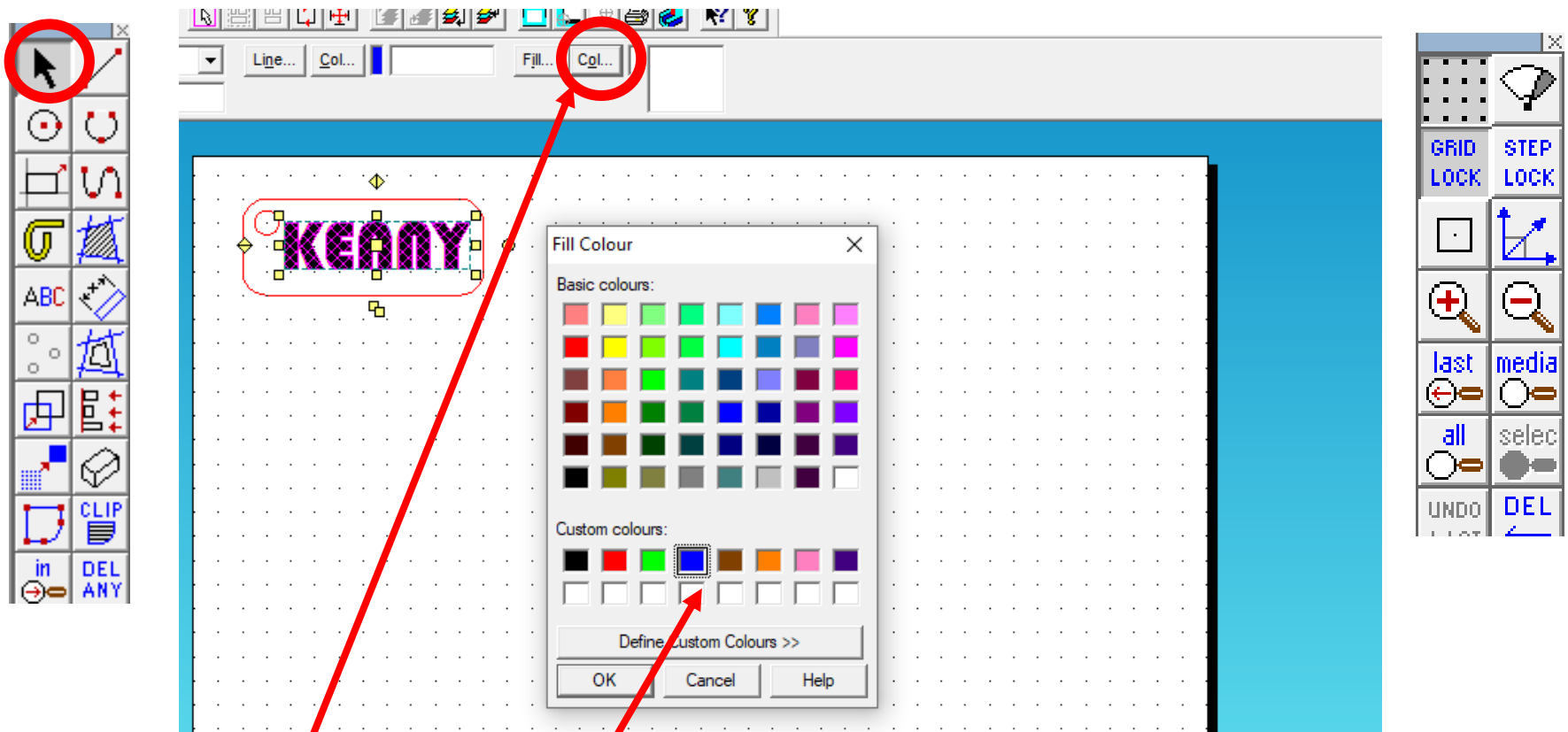
17. Using the *select tool* click on your name. It should then be highlighted



18. Using the *select tool* move it using the centre square shown on to your key ring. Position and resize



19. Whilst your name is highlighted Click on the line **Col tool** shown to bring up the line **colour palette** shown. Click on **blue** as this is to **engrave** on the laser cutter.

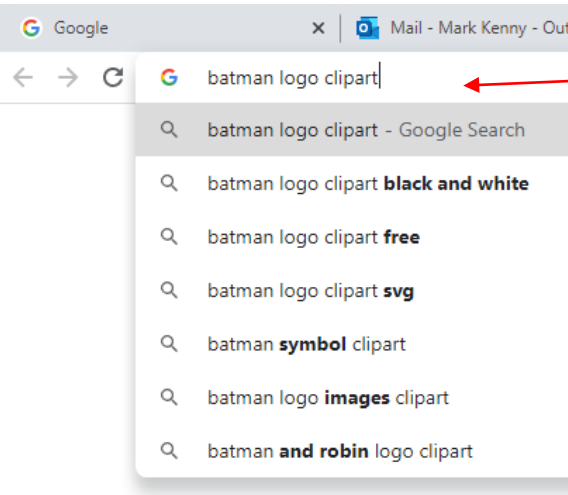


19. Whilst your name is highlighted Click on the fill **Col tool** shown to bring up the fill **colour palette** shown. Click on **blue** as this is to **engrave** on the laser cutter.

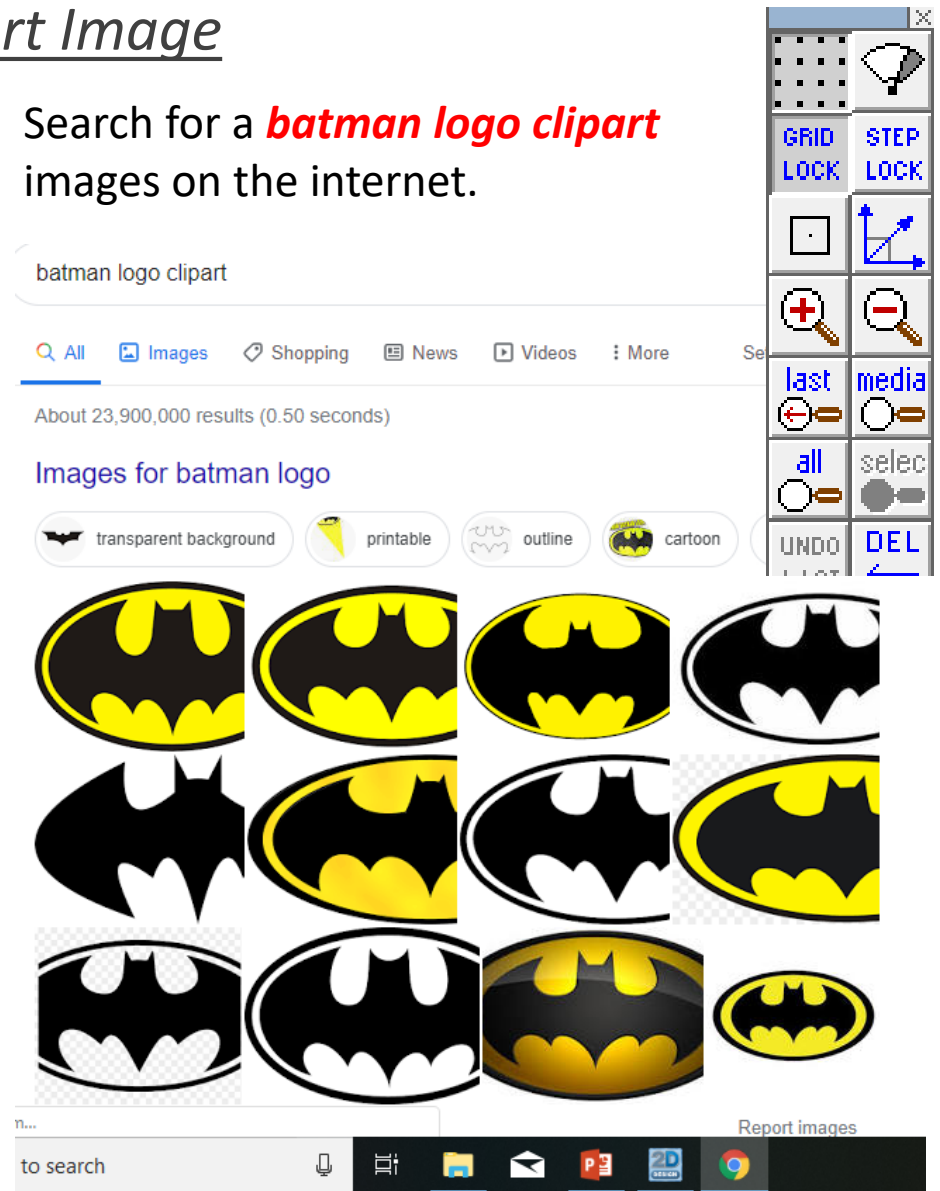




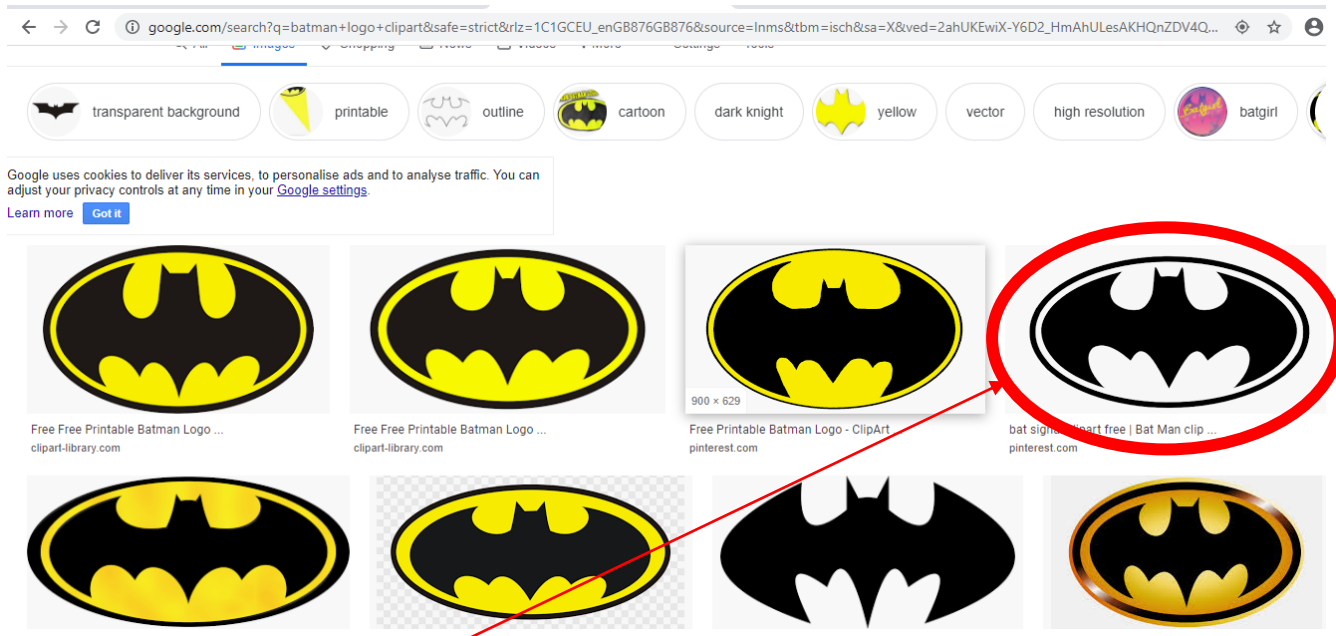
Key Ring Method 2: Clip Art Image



1. Search for a **batman logo clipart** images on the internet.

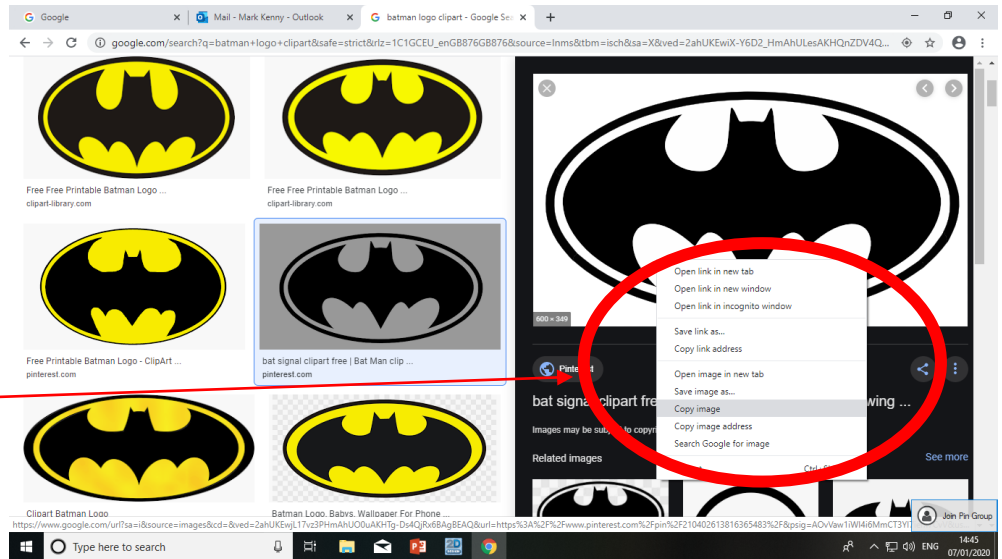


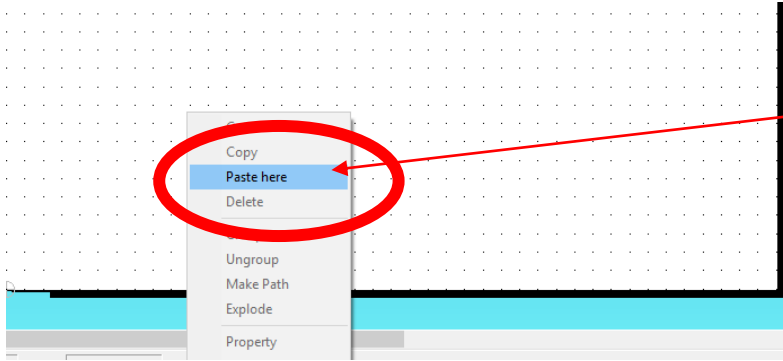
2. Select images for the **batman logo**



3. Choose an appropriate logo.

4. **Right click** on the mouse and **copy** the image.

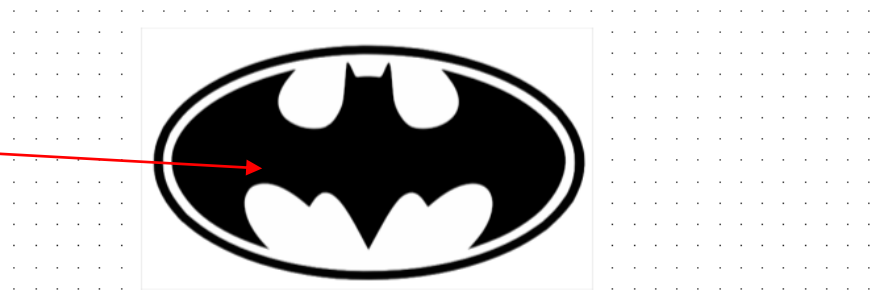




5. Go back to 2D design and **right click** on the mouse and click **paste here**.



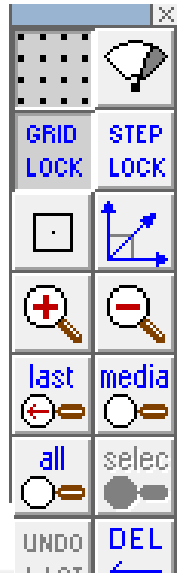
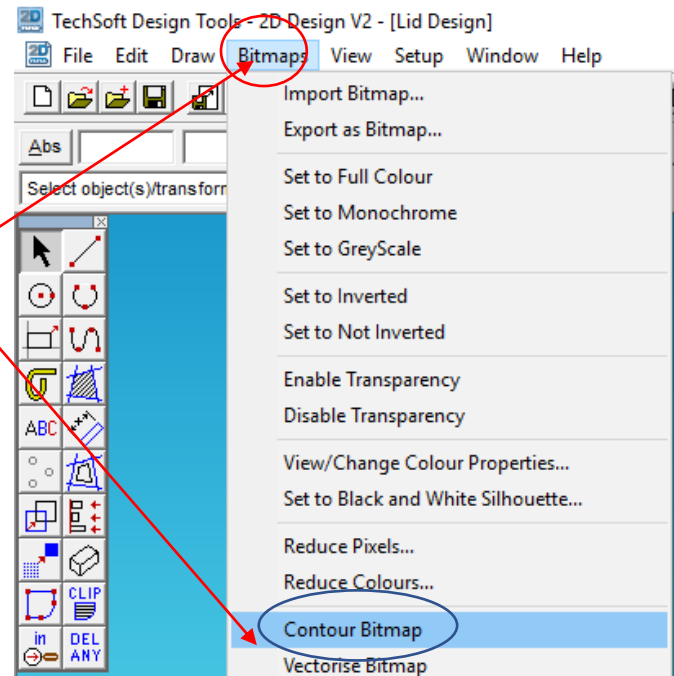
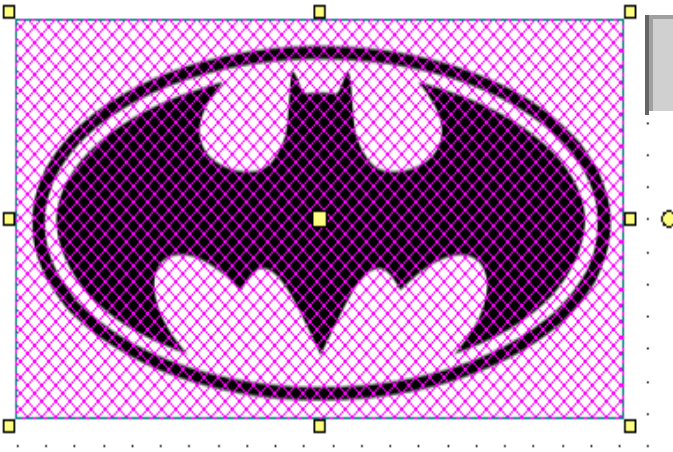
6. The image should now be copied into 2D design

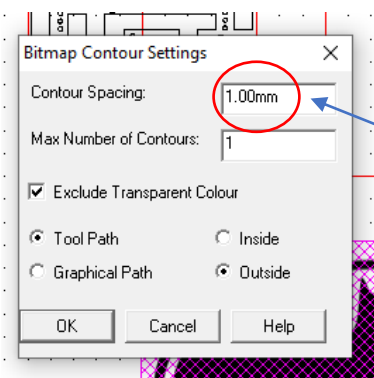




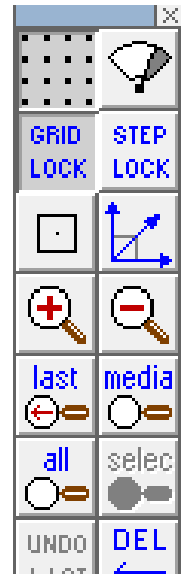
8. Select the **Bitmaps toolbar**, **at the top of the screen** and scroll down until you come to **Contour Bitmap** and click on it.

7. Using the **select tool**, **highlight the entire drawing** by clicking on it.

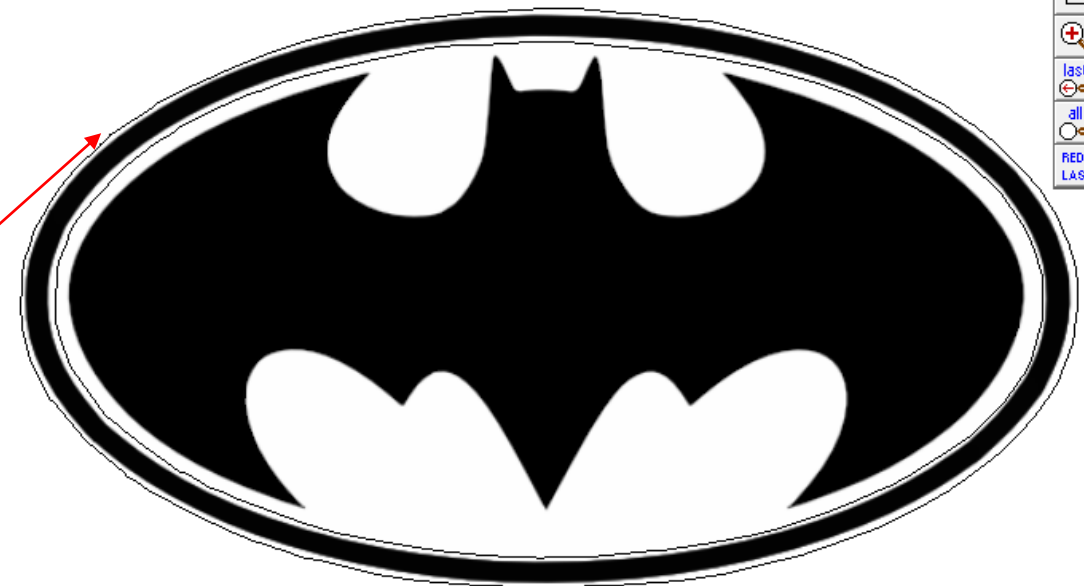


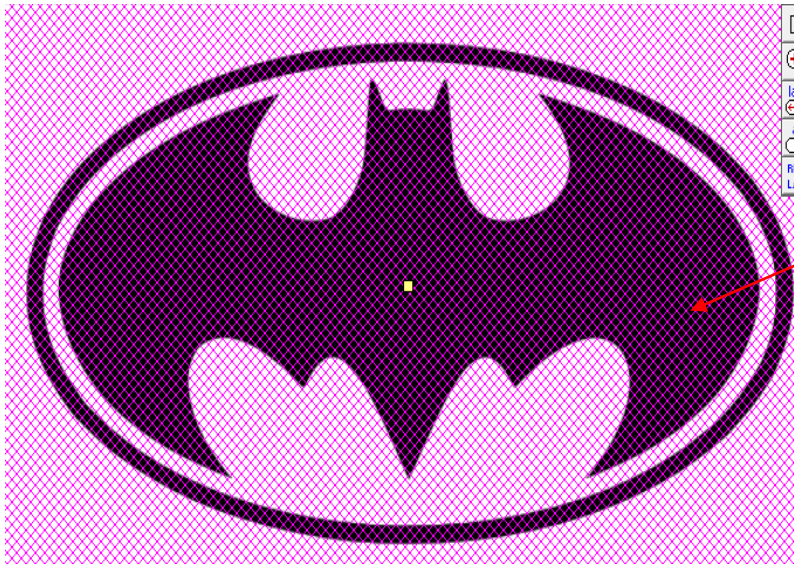


9. A Bitmap contour spacing pop up will appear. This basically traces the image. **Change the contour** from 5.00mm to **1.00mm**.

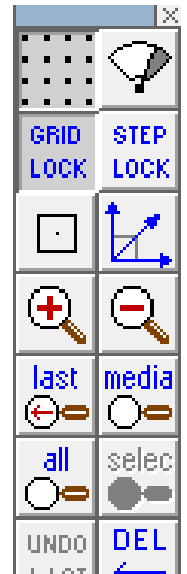


10. A contour or line should appear 1mm around your drawing. You can set the contour spacing to 0.00mm in the future

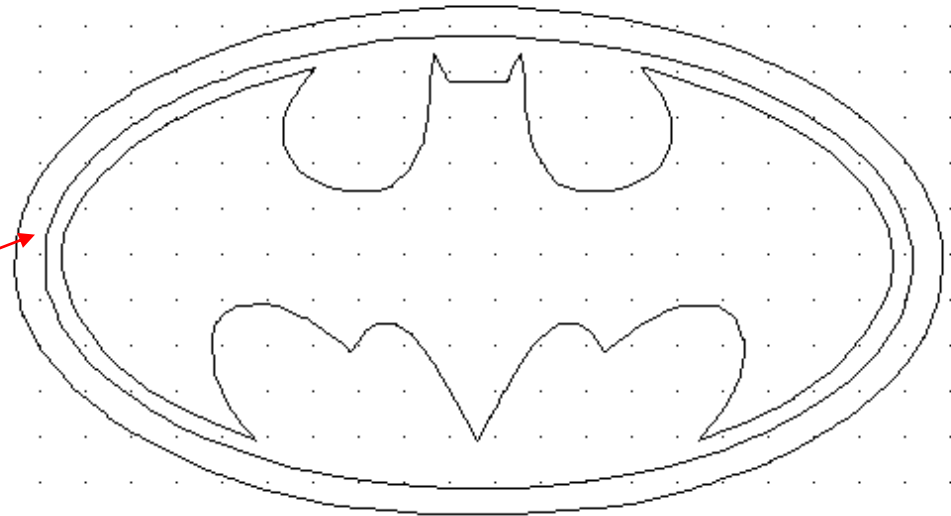




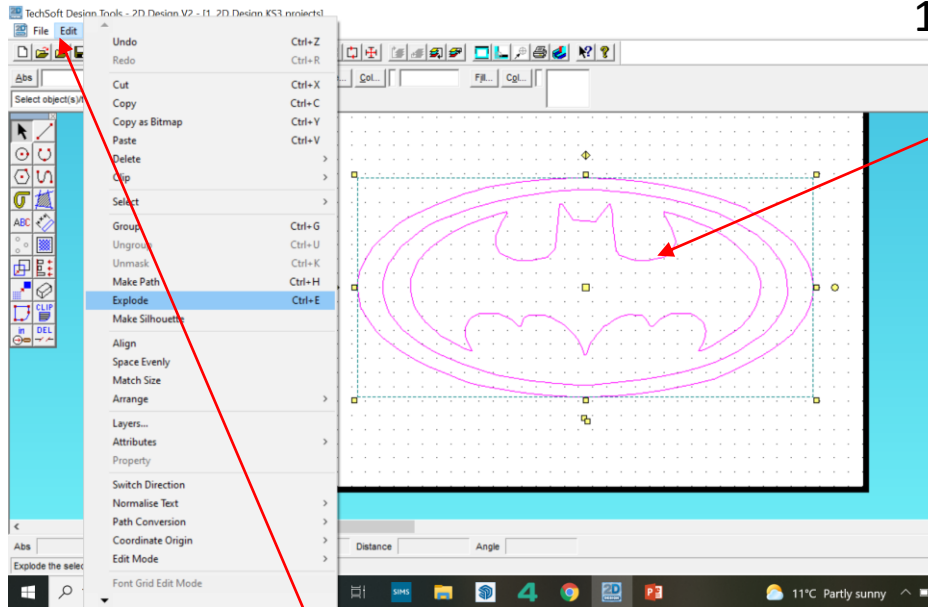
11. Using the **select tool**, highlight the entire drawing by clicking on it.



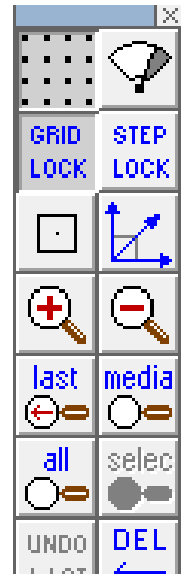
12. Using the **keyboard**, and **delete** the **image** and be left with the **contour lines** shown.



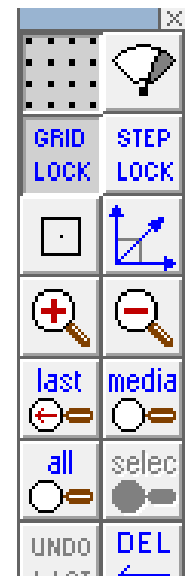
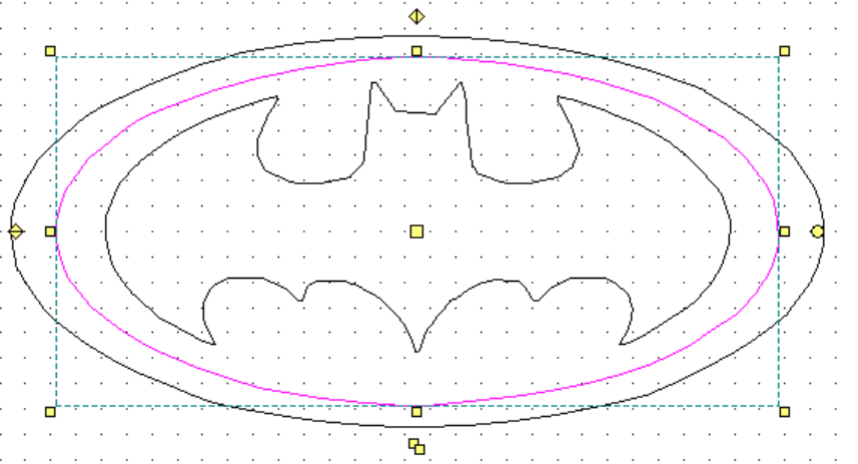
6. Select the rectangle tool shown on the tool bar



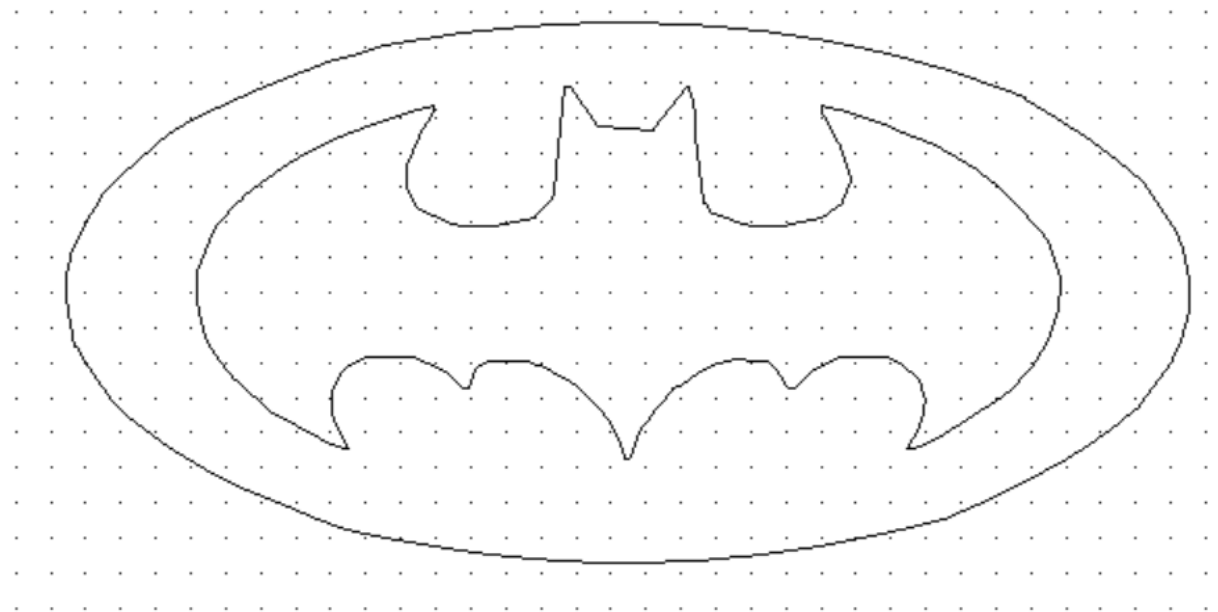
13. Using the **select tool**, highlight the entire drawing by clicking on it.

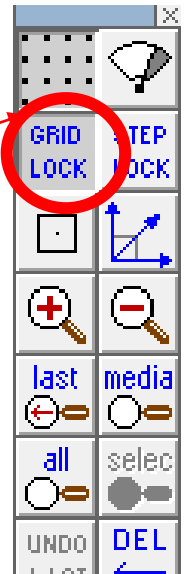
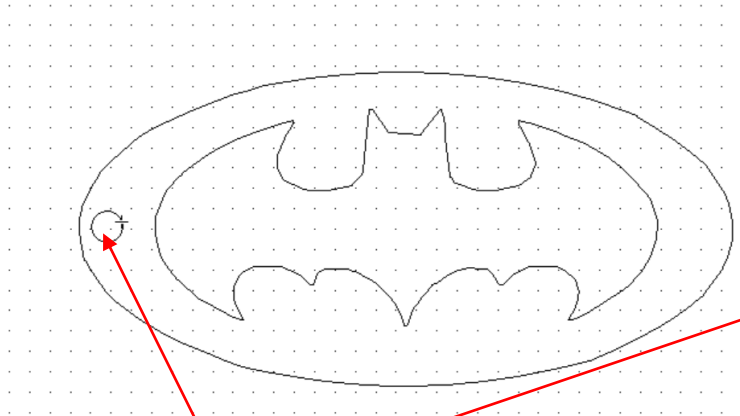


14. Using the **edit tool**, click the **explode** tool to basically ungroup the logo.



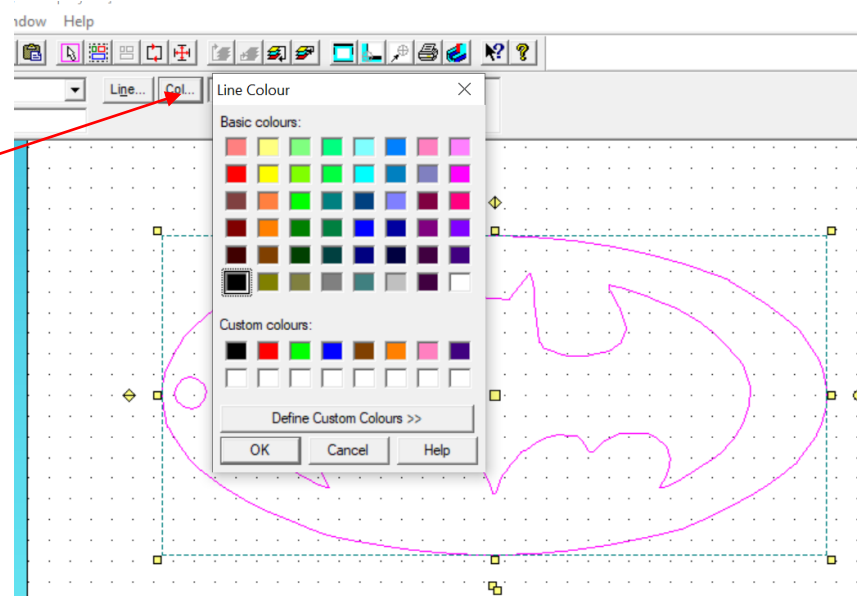
15. Using the **Del Any** tool, click the **inside line** delete.

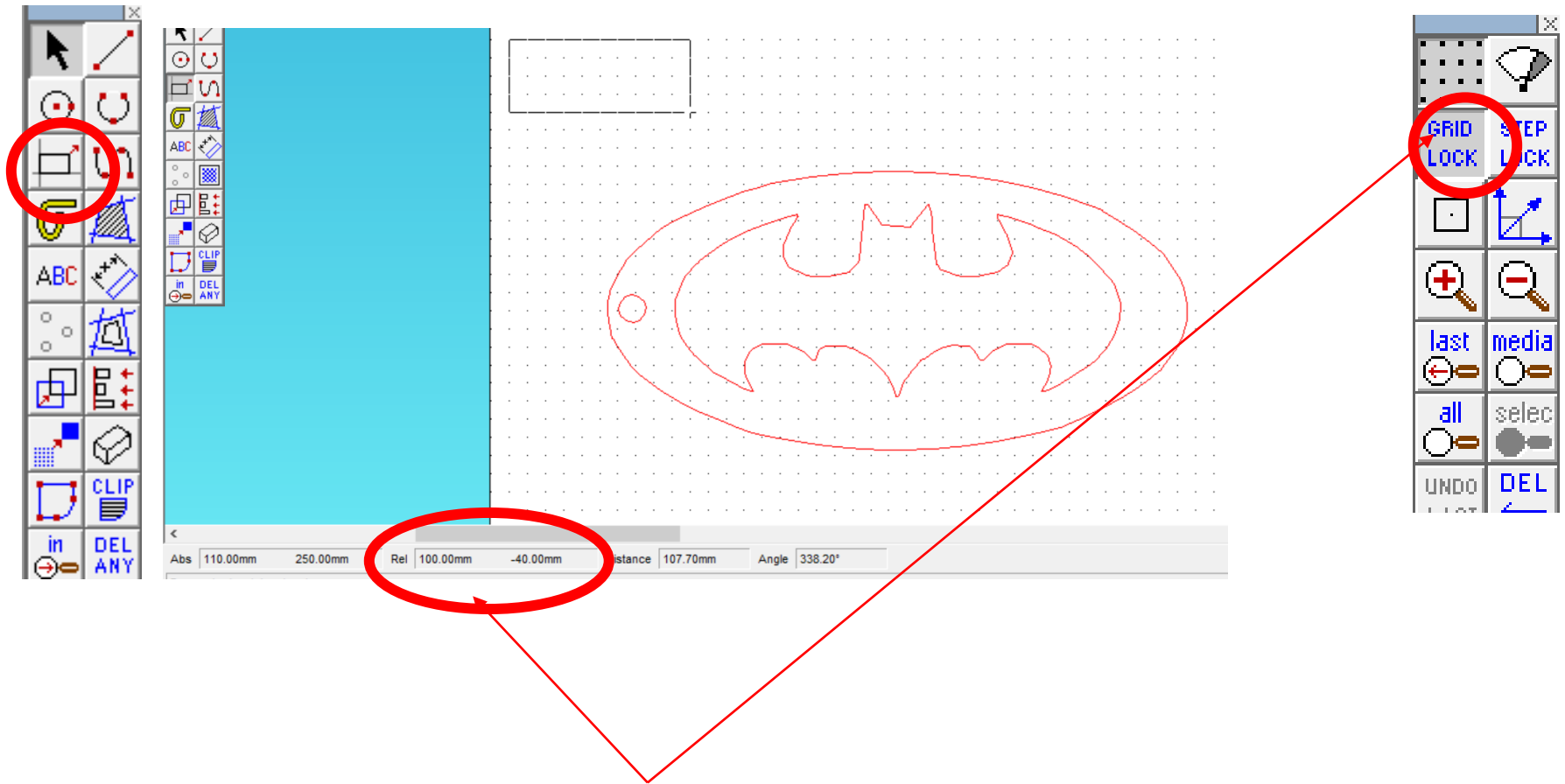




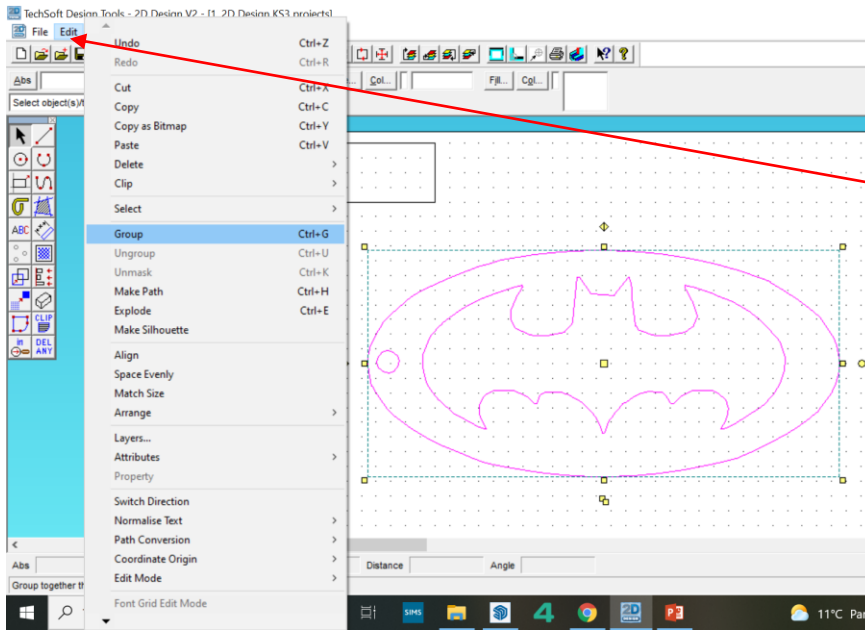
16. Click grid lock off and using the **circle tool**, draw a hold for the key ring.

17. Select the entire shape click colour next to line and then colour the lines red for cut out on the laser cutter.

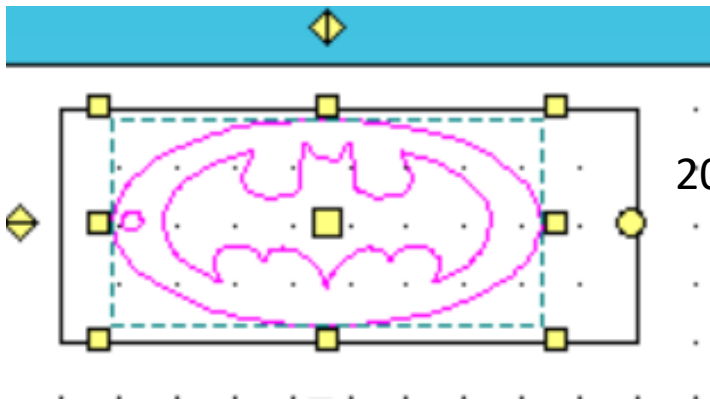
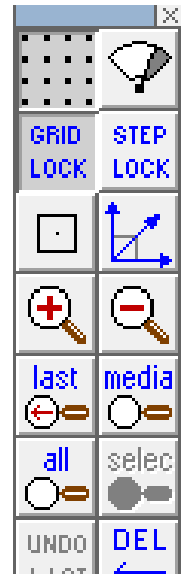




18. Select the **rectangle tool** shown. Draw a square the measures **100mm x 40mm**. You have to look at the **Rel tool box** shown at the bottom of the screen to size it correctly.



19. Using the **edit tool**, click the **group** tool.



20. Using the **select tool**, resize the logo to fit in the rectangle and then delete the rectangle.

