



# 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.

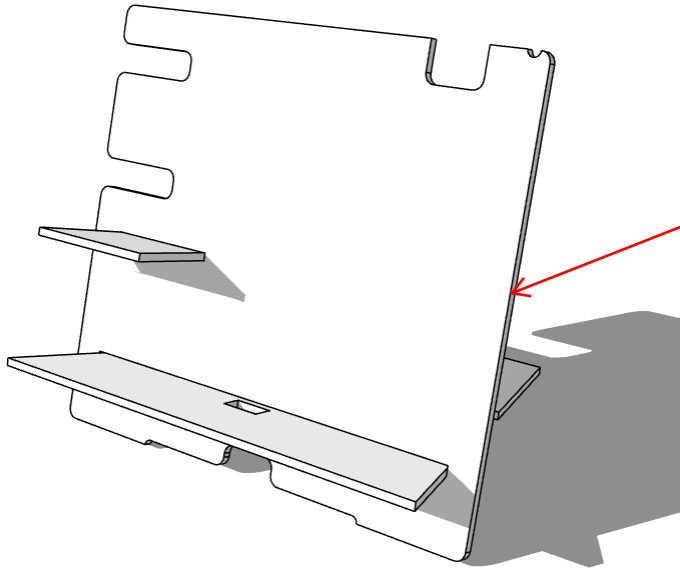
# Skills to be used in this project...

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	

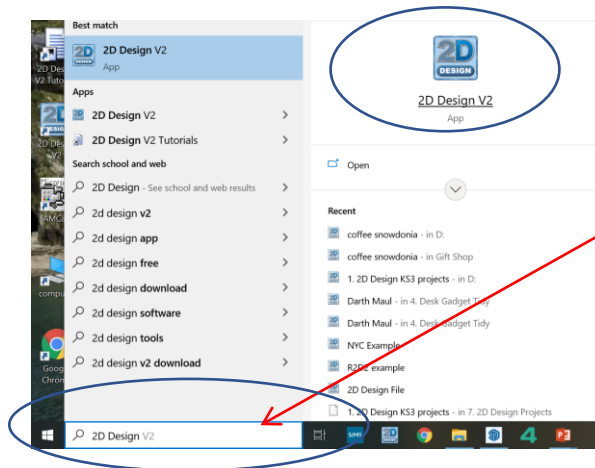
**Basic skills** are those required to do very basic drawings and are detailed as part of this presentation.

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

# 2D Design Phone Holder

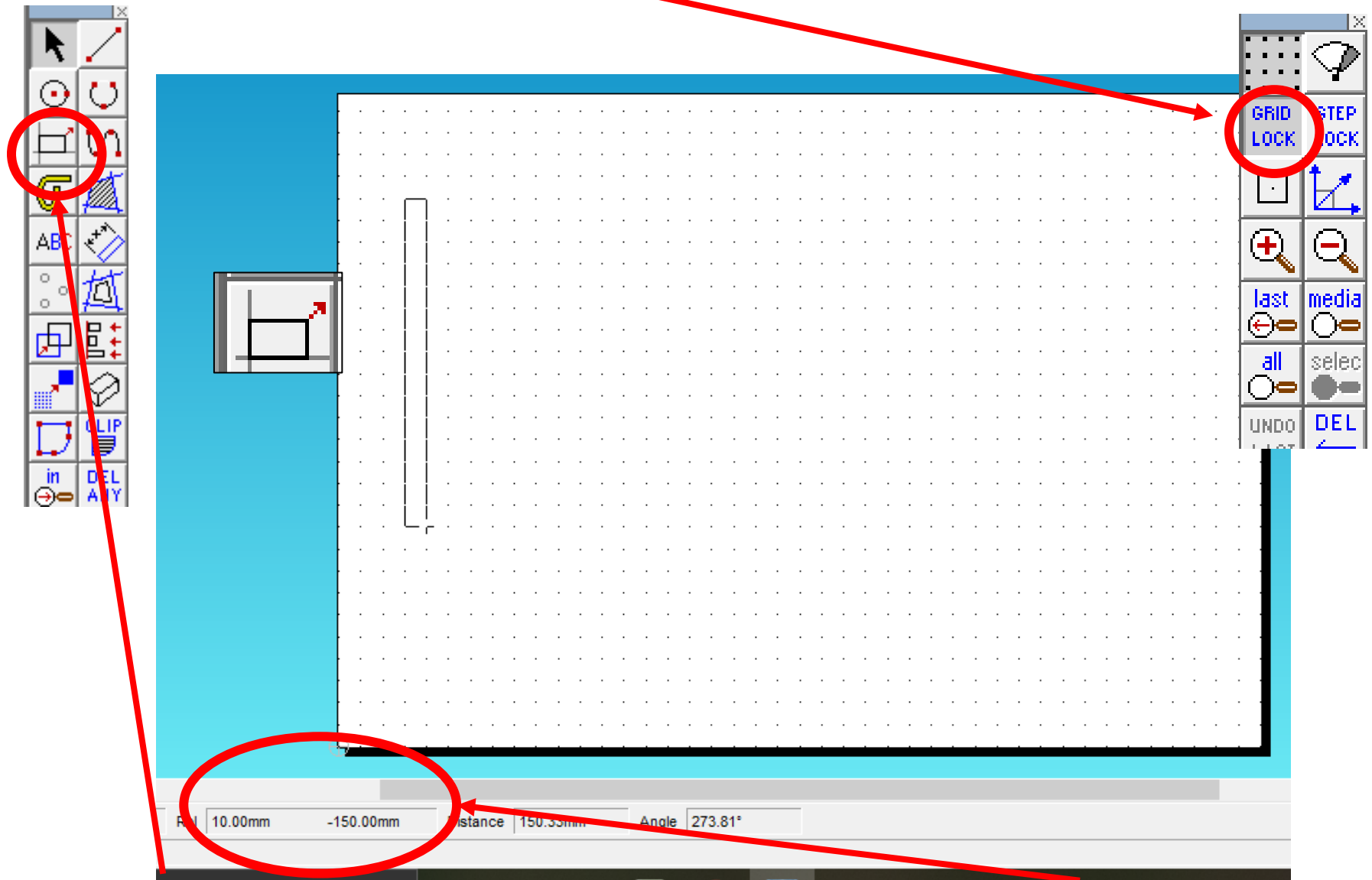


1. In **Sketch up** you have been using **3D** CAD to draw a desk tidy shown opposite. We are now going to use a **2D** piece of software to draw a design on it. First we need to learn the basics of 2D design....

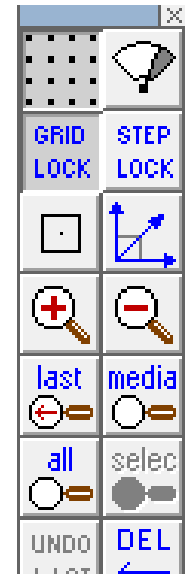
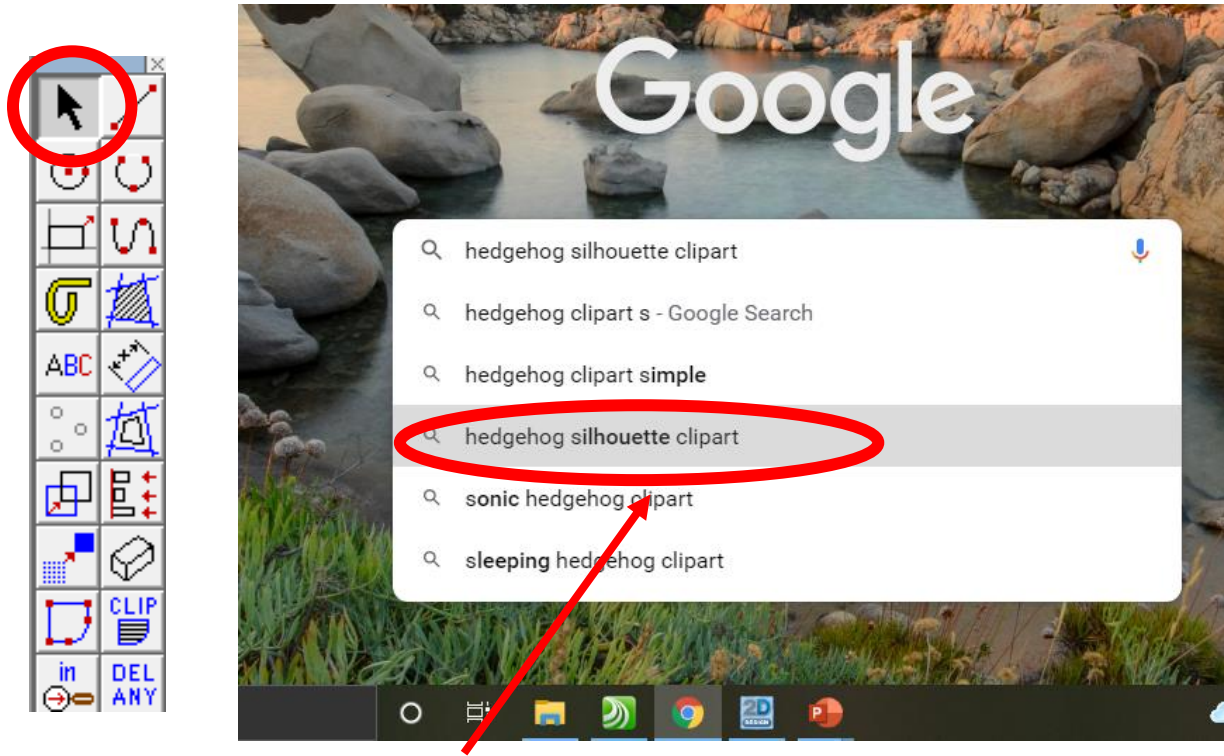


2. Click **Start** and then use the search bar to search for 2D design

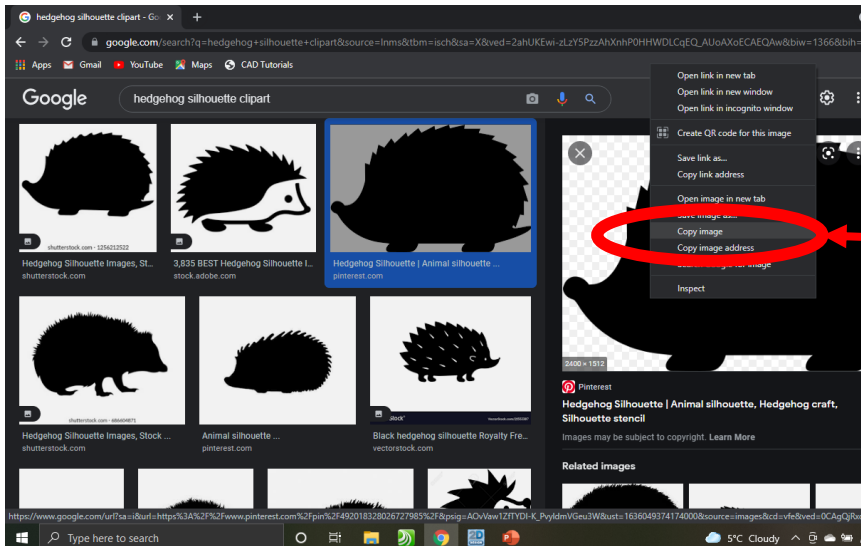
3. Select grid lock shown on the opposite tool bar



4. Select the **rectangle tool** shown. Draw a square the measures **10mm x 150mm**. You have to look at the **Rel tool box** shown at the bottom of the screen to size it correctly. This is the average size of the side of a mobile phone

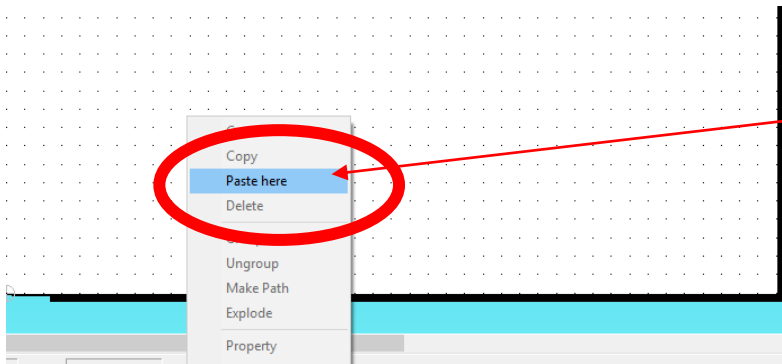


5. Search for a ***hedgehog silhouette*** images on the internet.

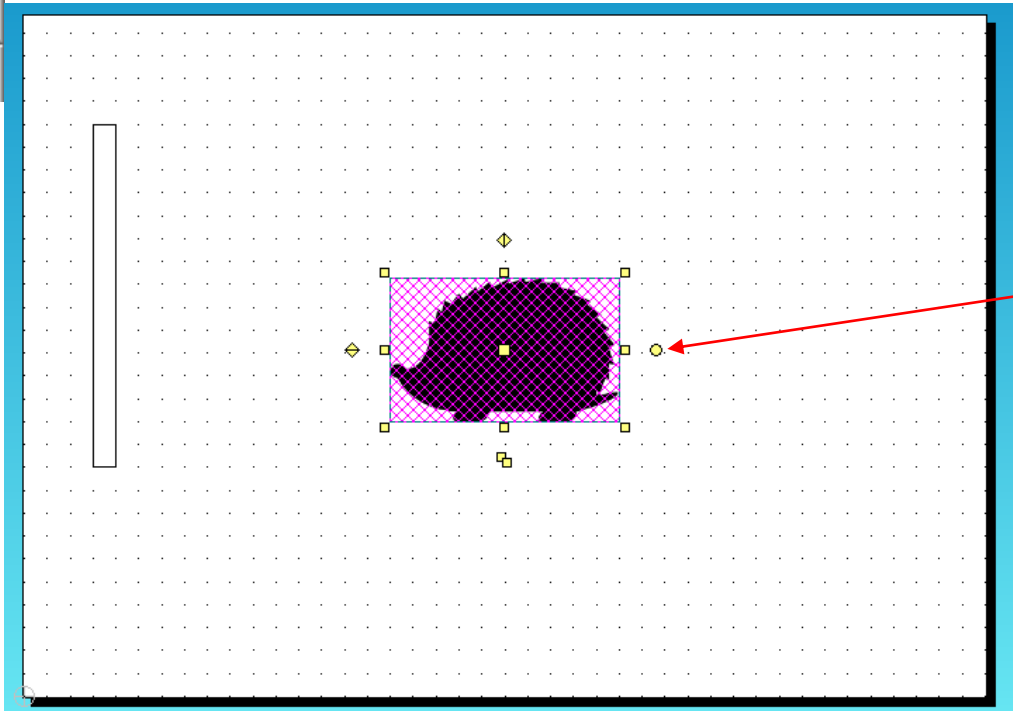
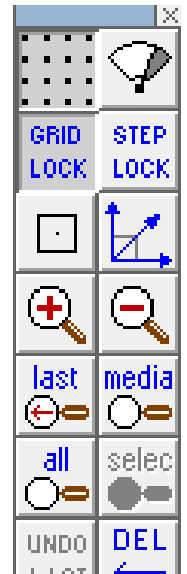


6. Once you have found a ***hedgehog silhouette***. ***Right click*** on the mouse and ***copy*** the image

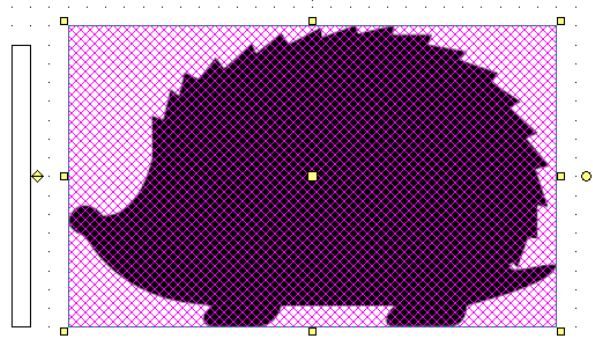
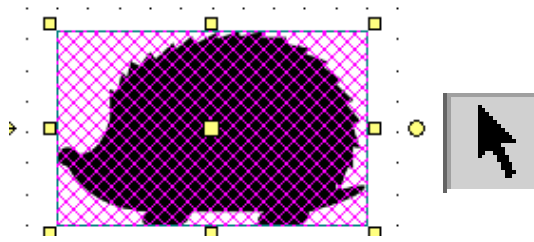




7. Go back to 2D design and **right click** on the mouse and click **paste here**.



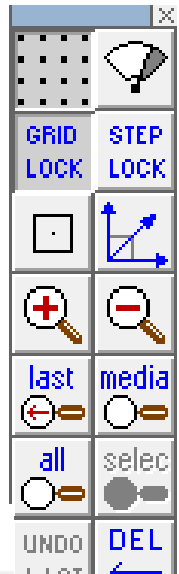
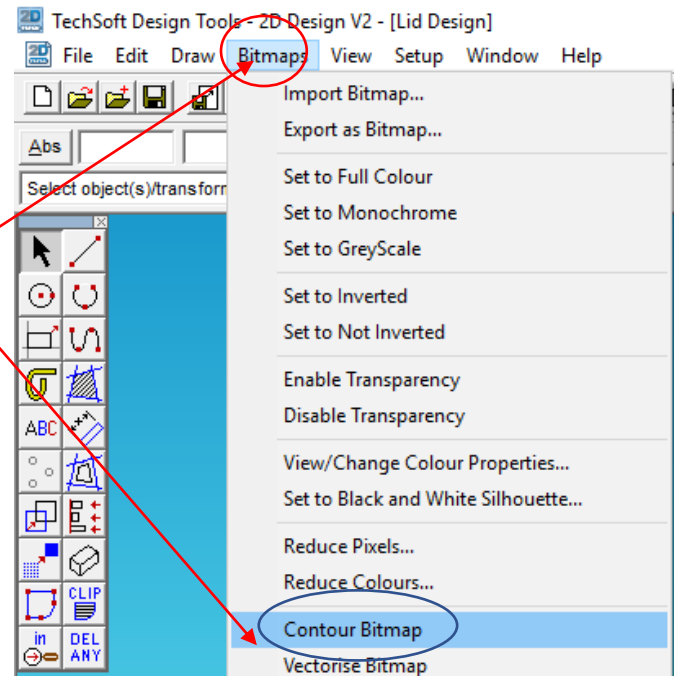
8. **Position** the image next to the mobile phone for now

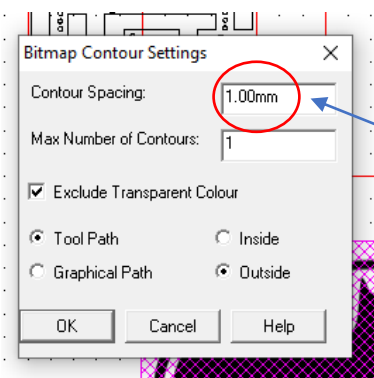


9. Using the ***select tool***, ***highlight*** the ***entire drawing*** by ***clicking*** on it.

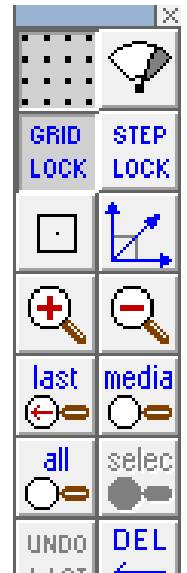
10. Resize so its bigger than the mobile phone.

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

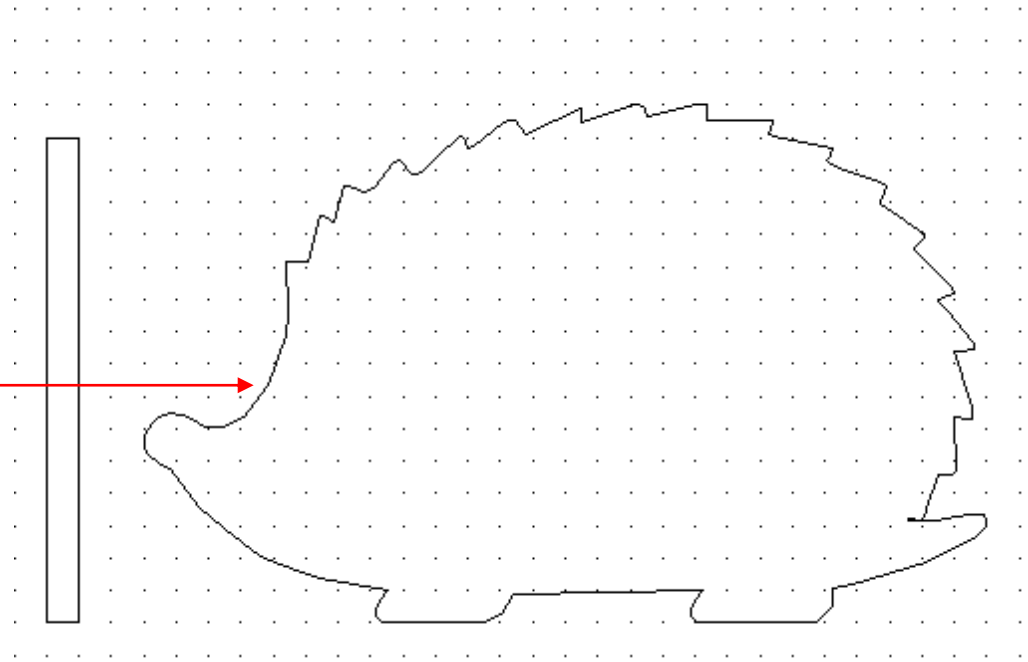


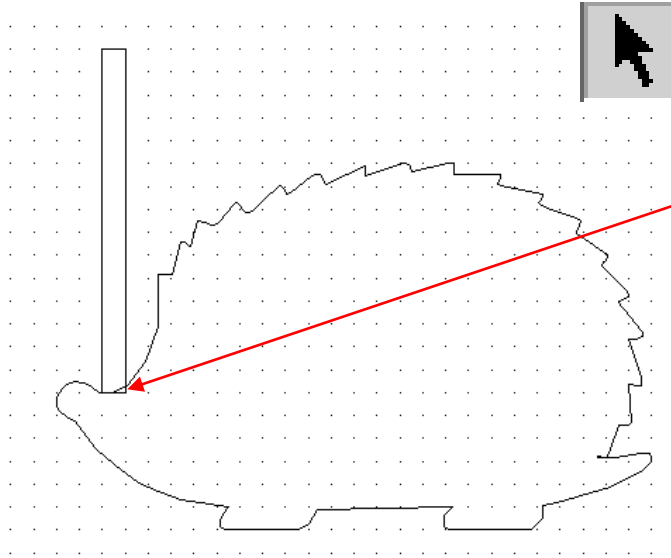


12. A Bitmap contour spacing pop up will appear. This basically traces the image. **Change the contour** from 5.00mm to **0.00mm**.



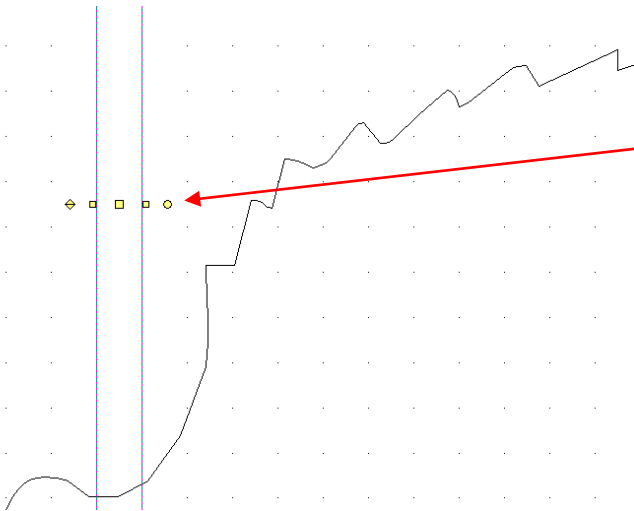
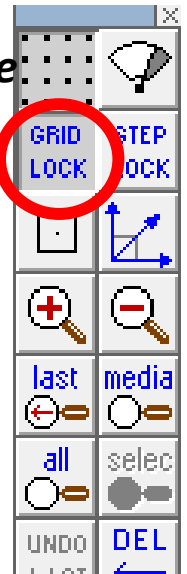
13. A contour or line should appear around your drawing. You need to click and delete the image to see if its worked. You should be left with a line drawing as shown



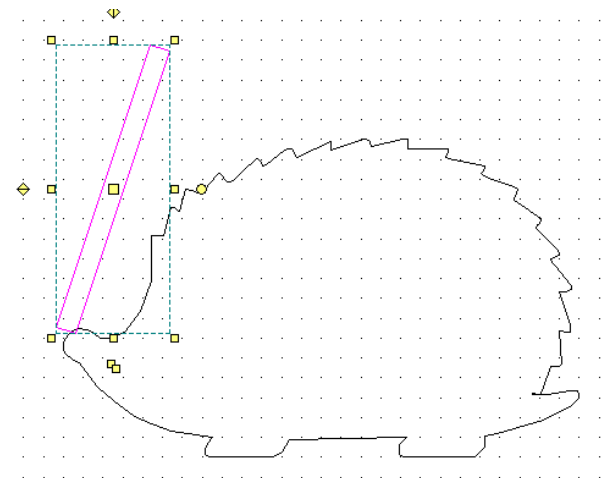


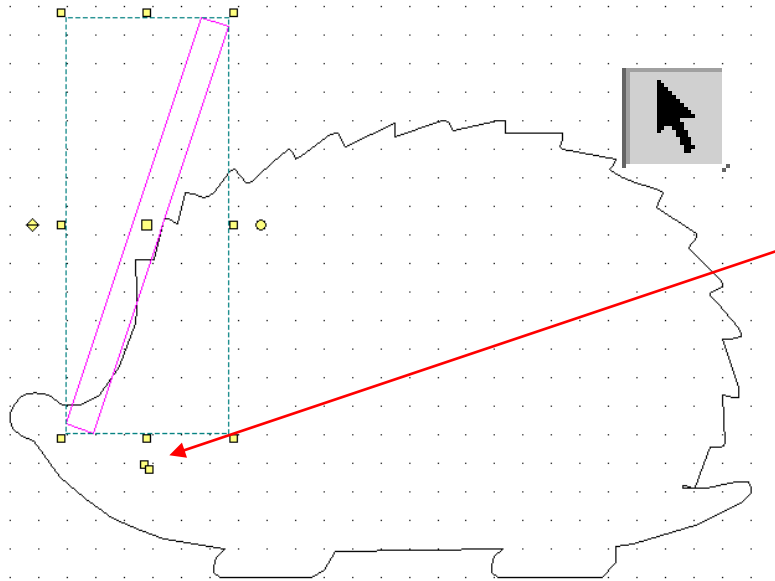
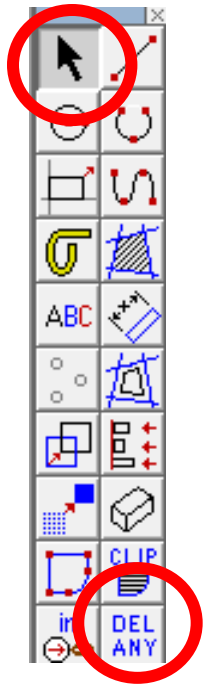
14. Using the **select tool**, move the **entire phone** by **clicking on the square on the middle** so it **overlaps** the hedgehogs nose slightly.

**Hint:** You may need to move both down slightly



15. Using the **select tool**, clicking on the circle half way up the phone top rotate it



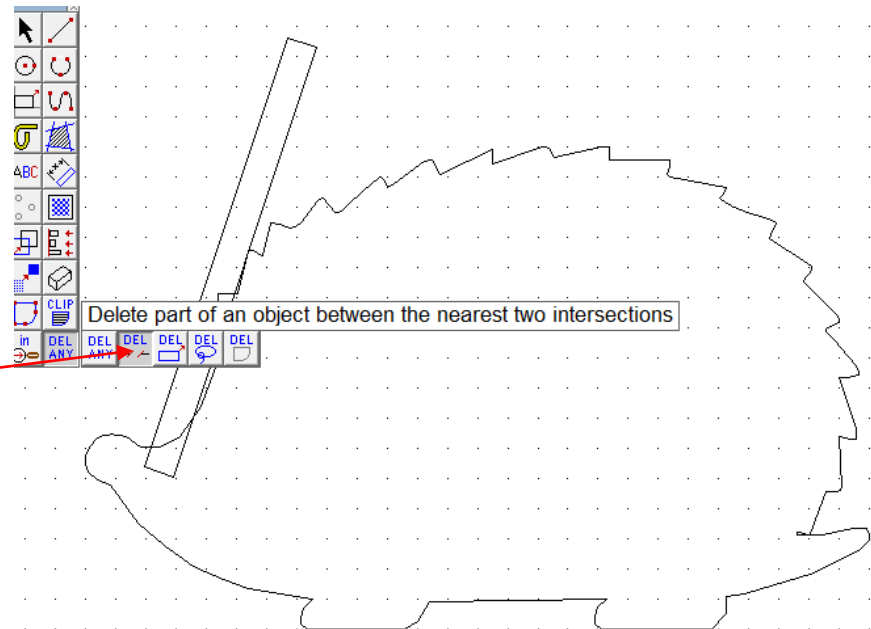


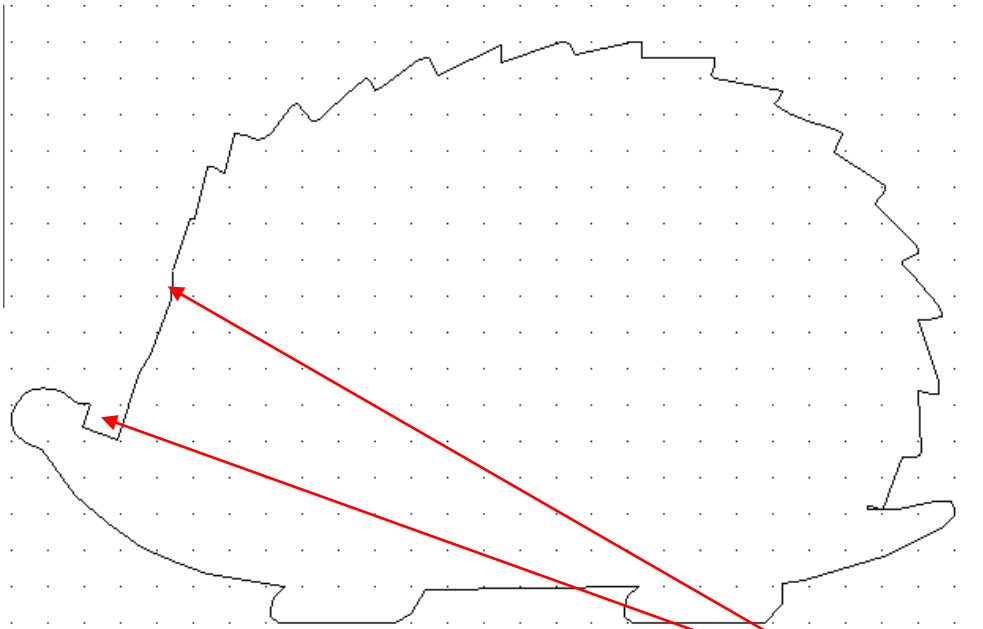
16. Using the ***select tool***, move the ***entire phone*** by ***clicking on the square on the middle*** so it ***overlaps*** the hedgehogs nose slightly and spike slightly.

***Hint:*** You may untick grid lock and rotate again to get perfect positioning

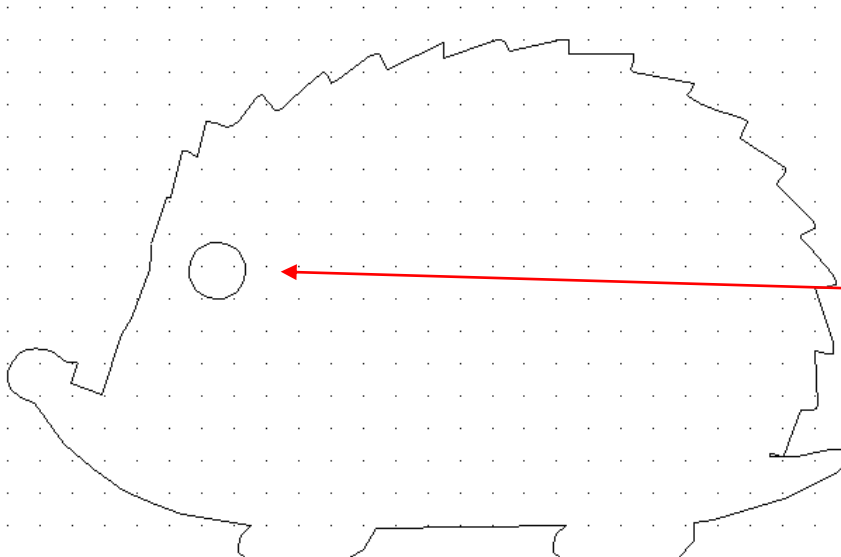


17. Select the ***delete any tool*** and hold down a pop out menu will appear. Select delete part of an object. The second one along.

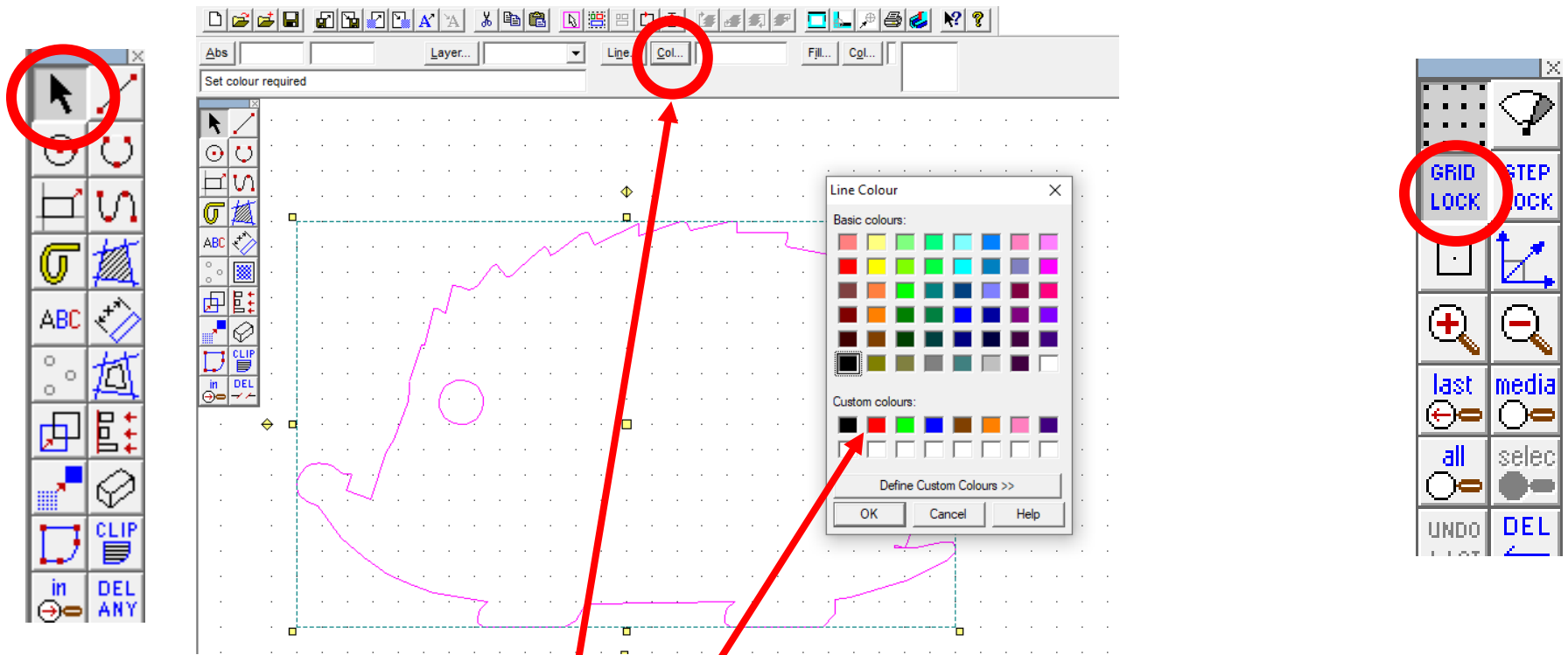




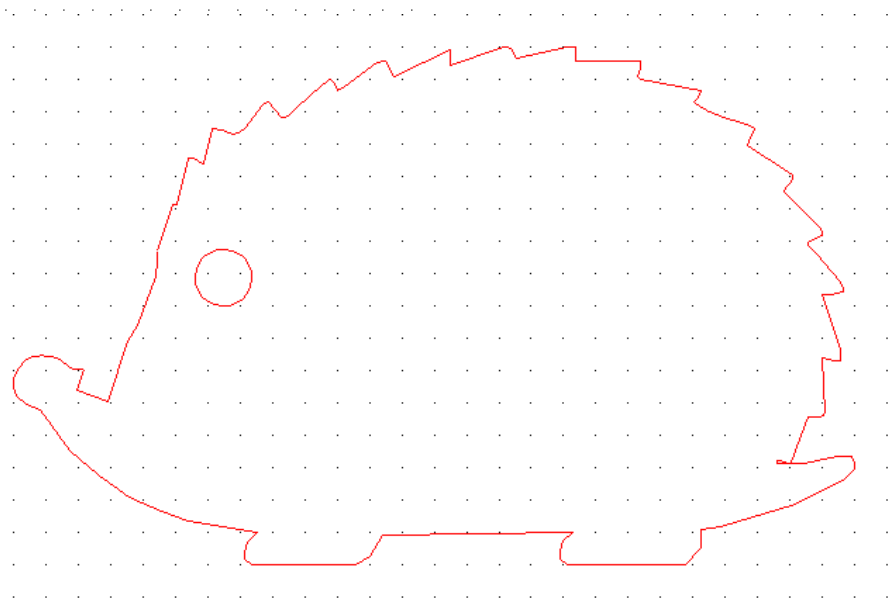
18. **Delete** the parts of the hedgehog that **overlap** the phone and then finally the phone itself...



19. Use the **circle tool** to add draw an eye...



20. 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.





36. Complete your own design using a different animal, movie, film character etc..



