****

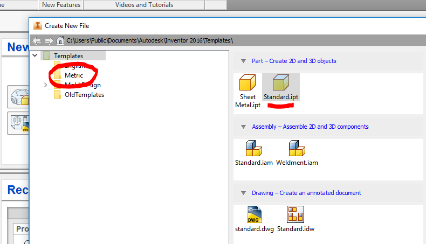
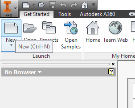
**Heritage College Design and Technology**

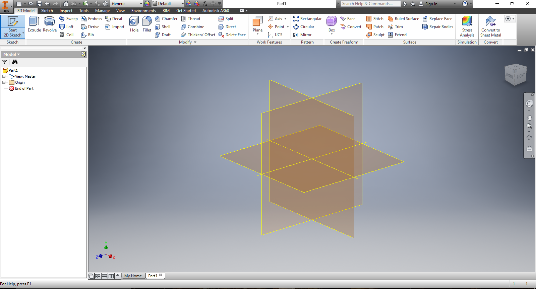
**CAD Tutorial**

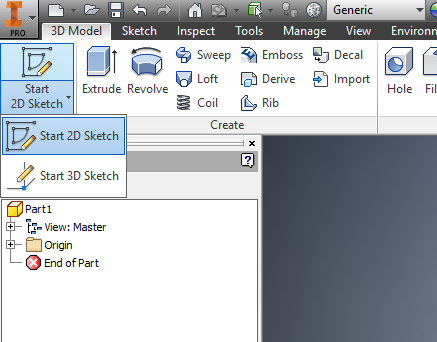
**Make a Mug**

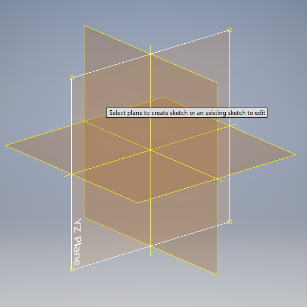
**Learning Intention**

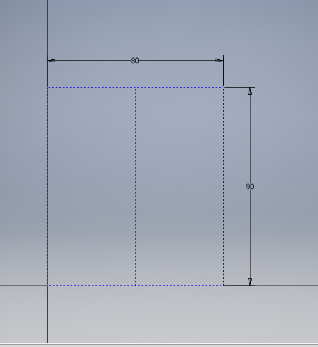
To introduce new skills in using Inventor 2016 and create opportunities for design thinking. The following is a guide and students are encouraged to produce their own version of the mug to suit their individual personalities and needs.

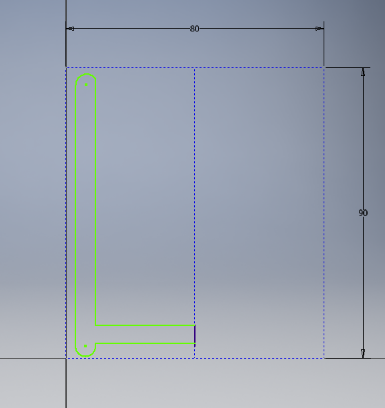
******Step 1**. Open Inventor 2016 and click on **New** and ensure that **Metric** is selected then click on **Standard mm. ipt**

**Step 2.** Your drawing space will appear. In the left hand top corner click on **Start 2D sketch** and a drop down will appear select **Start 2D sketch**. Once you have selected this you will see a set of **Planes** appear.

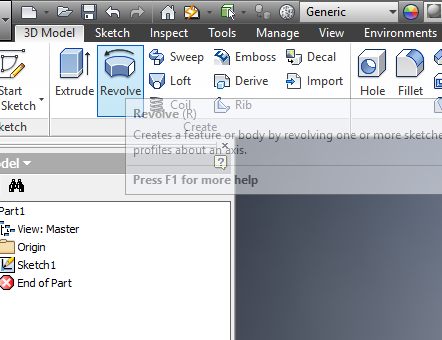


**Step 3. Select** the **YZ** Plane.

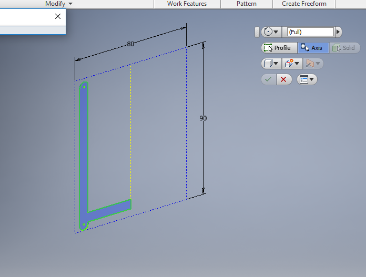
**Step 4.** Select the **Rectangle** tool and draw a rectangle **90mm high by 80mm** wide. This will be a guide for your mugs size, select the **Line tool** and draw a **vertical** line down the centre, you will notice the cursor will turn green and snap to the centre of the **horizontal line** making it easy to create this line. **Turn OFF** the Construction Line.

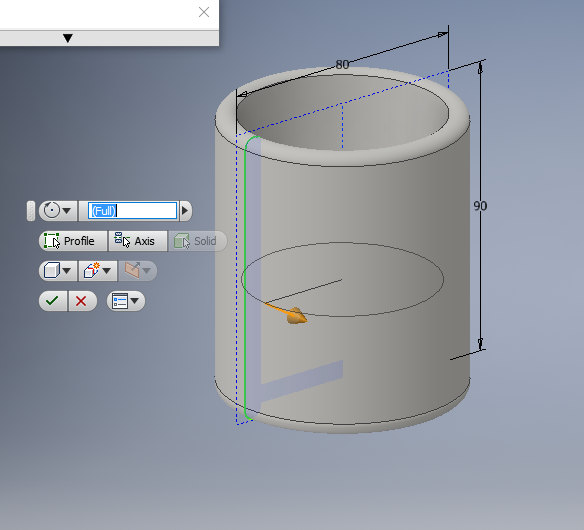
**Step 5.** Using the drawing skills that you have previously learnt **draw a profile** for your mug. This should resemble a mug that has been cut in half on one side of the line. As this diagram shows.

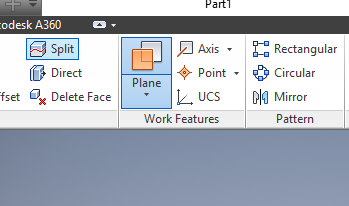
**Step 6.** Click **Finish Sketch** and the **3D Ribbon** will appear giving options for working in 3D. Select **Revolve.**

**** Select your **profile**, the same as when extruding.

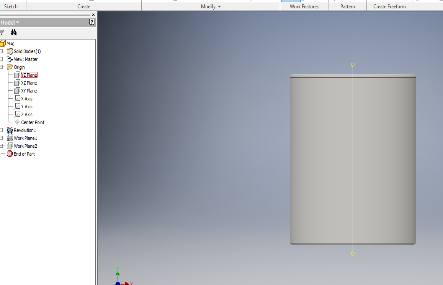
Now select the **axis** which is the centre line making sure that the word Full appears in the box as shown.



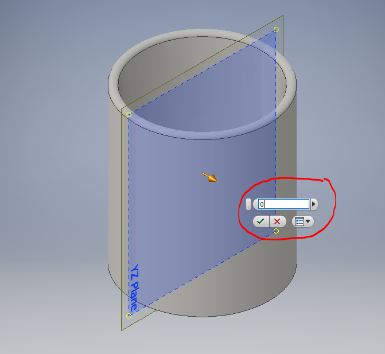
**Step 7.** The rotation should now appear and your mug is almost complete.

**Step 8.** The mug now needs a handle and this is where you design a feature that looks right for your intended use.

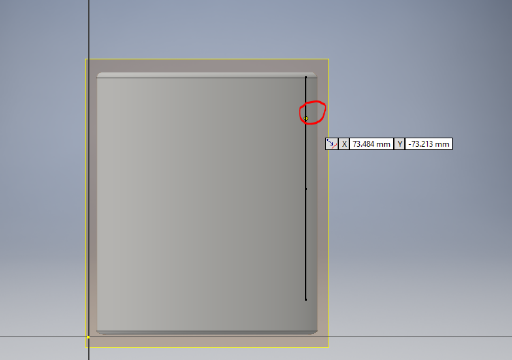
**Select** the **Plane** icon from the ribbon in 3D mode**.**



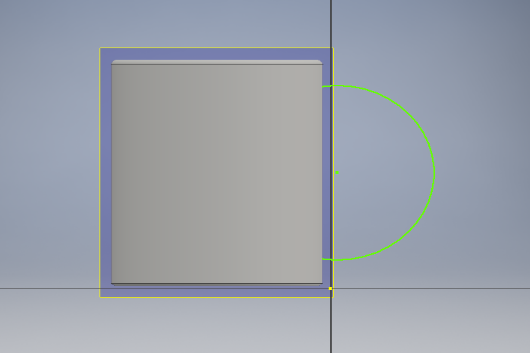
Select the **YZ** **Plane**  and you will note the plane is in the centre of your mug.



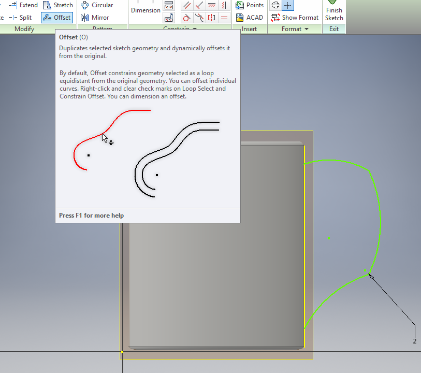
Place your cursor over the **corner** after adjusting the view and **drag the circle on the corner** of the plane forward or back **Type in 0** into the measurement and the plane will remain centred.

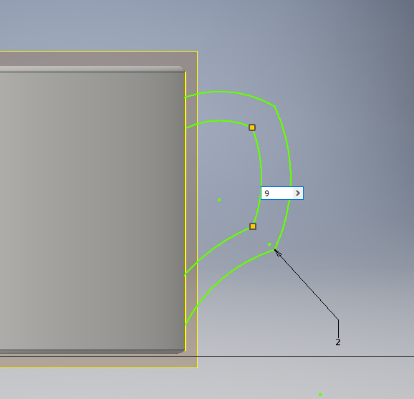
**Step 9.** Now select **sketch** and **2D Sketch** and click on the **Plane**

Draw your handle profile making sure it meets the inner wall of your mug as shown

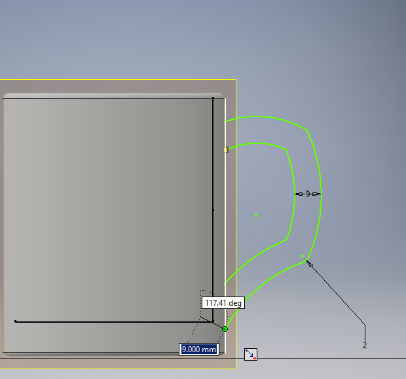
Use the **Line** and **Arc** tools to draw the handle shape.

The shape is up to your imagination, don’t make it too complex!

**Step 10.** The **Offset tool** is now used to create an exact copy of the line by an amount that wecan choose.

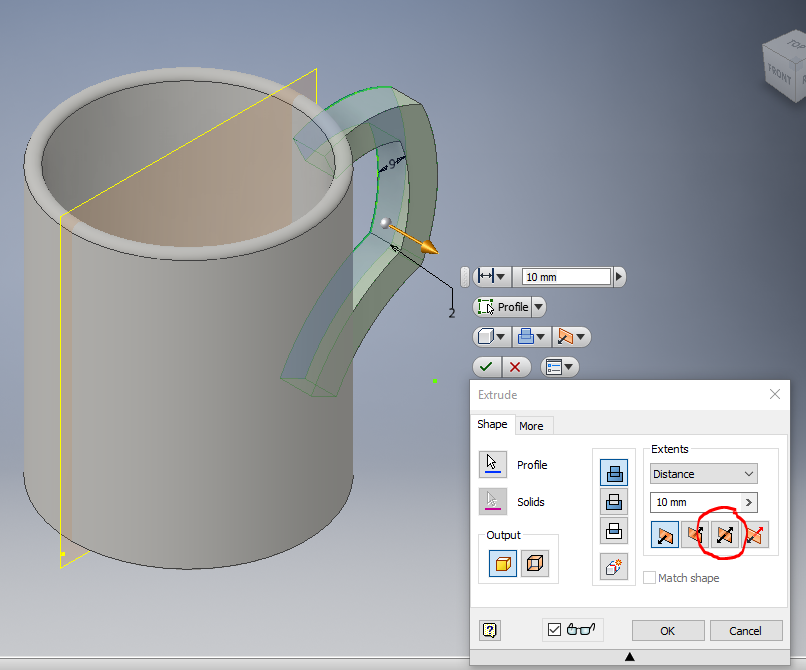


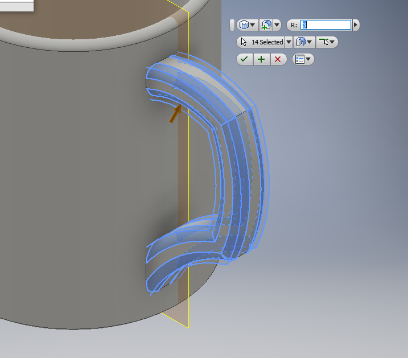
In the case shown we are choosing to **offset** 9mm inside of the first line.



You must **join the ends** of these lines together to allow the next step which is to **extrude** the handle.

**Click Finish Sketch**

**Step 11.** We now **Extrude** the handle but we must use **Symmetrical extrude**. The way we do this is to select the icon as shown. The extrusion here is **10mm** you may choose differently.



**Step 12.** The final touches are to **Fillet** or **Chamfer** the sharp edges on the handle and colour your mug.

If you are really clever you can use the decal command to apply an image to your mug.

If you have come this far you will be able to work it out using inventor help and the tutorials.