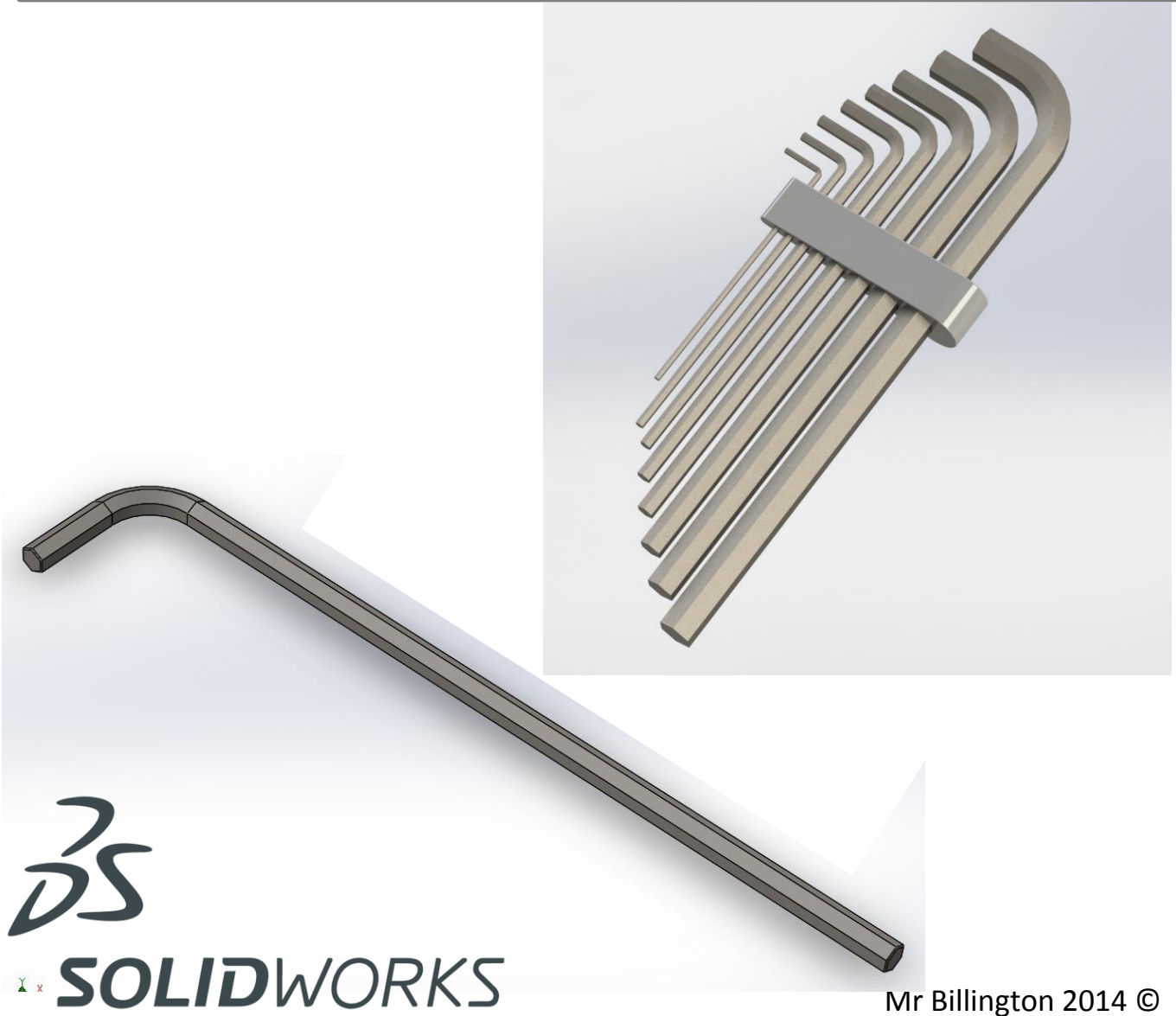


Solidworks/2014

3D Modelling Practice

L2



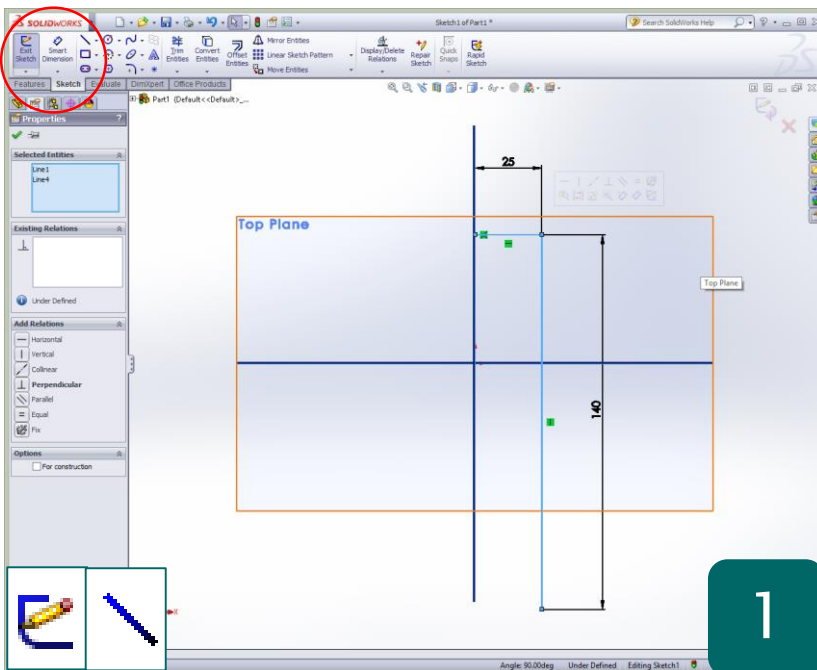
Learning Outcome; M4 Hex Key

Skill Level; 2 Intermediate

3D; *Swept Boss, Chamfer, Fillet, Render, Assembly, mate*

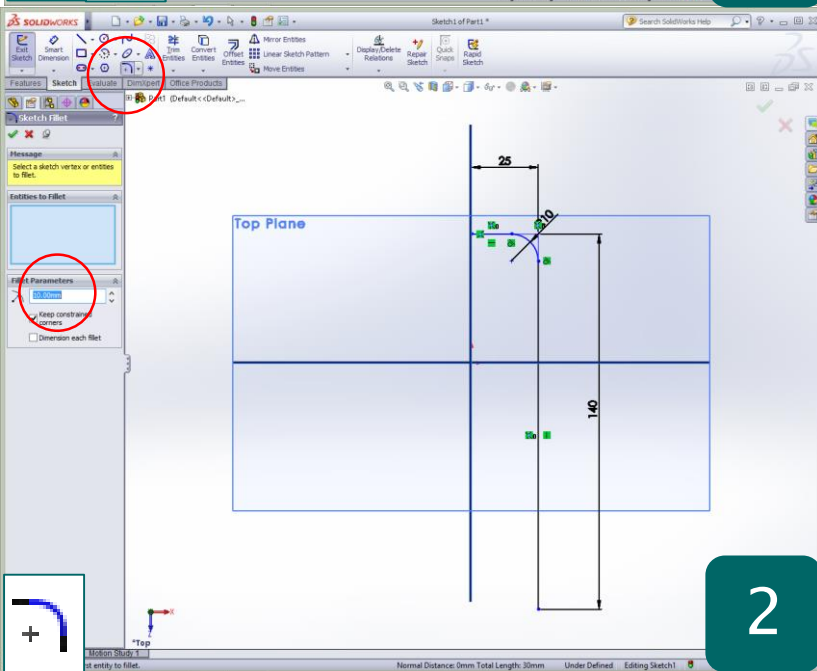
2D; *Polygon, Sketch, Sketch Fillet, Smart Dimension*





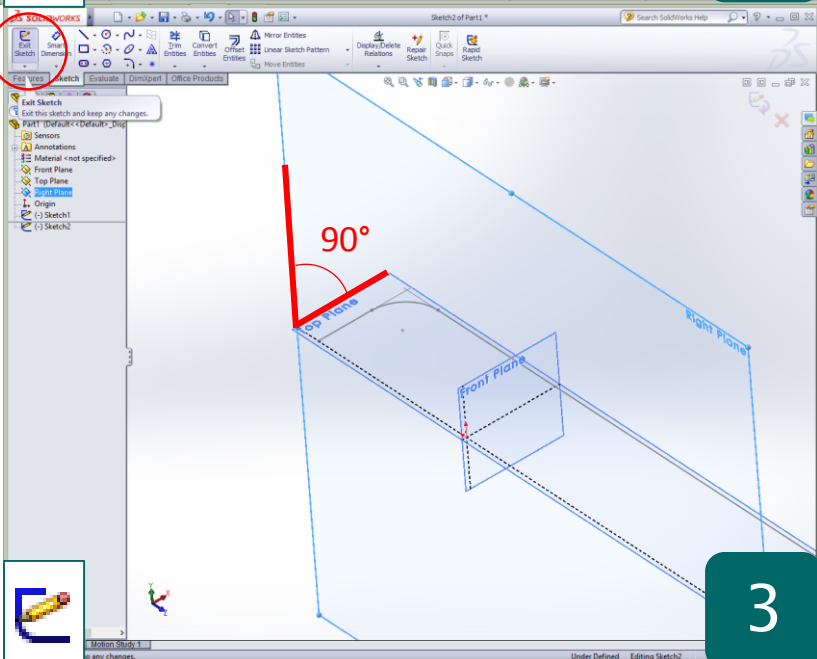
- This tutorial introduces a new Feature; **'Swept Boss'** which requires a 2D profile and a 2D path to follow
- Ensure are planes are **'shown'** as before
- Select any plane and click **'Sketch'**
- Line tool to create one line snapped to the vertical plane
- Another line down from this at **90°**
- **'Modify Dimension'** to set to **25mm** and **140mm** in length

Why? – A Swept Boss is an extruded boss that follows a set path allowing for greater complexity and flexibility in the model. Therefore two sketches are required; *Path and Profile*



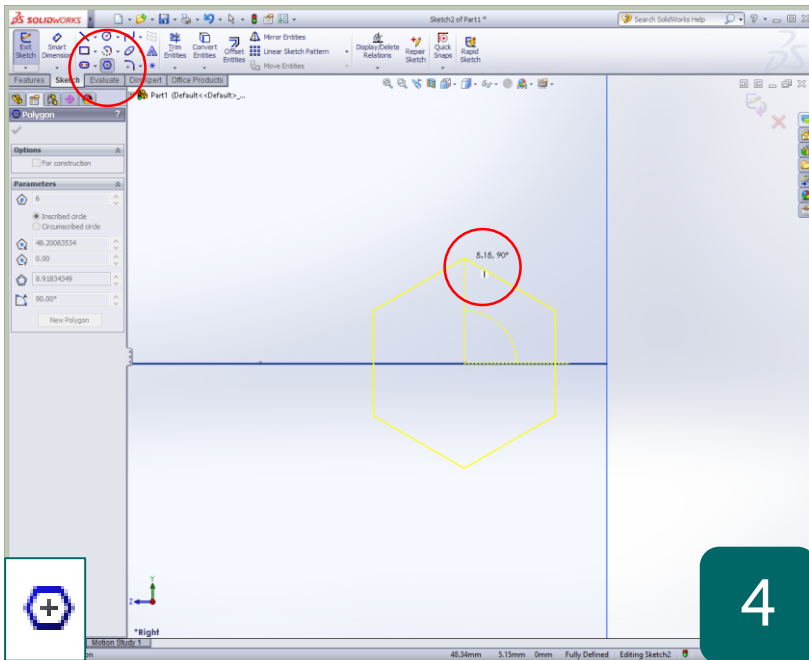
- Access the **'Sketch toolbar'** and click on **'Sketch Fillet'** (Curved icon)
- Select the two line you have just sketched
- Type the fillet radius to **10mm** in the left feature menu
- Confirm with the green tick

Why? – A sketch fillet will apply a radius between two lines ensuring the end of the curve is normal to the lines. If you intend to make the whole set change the radius to; **6mm**



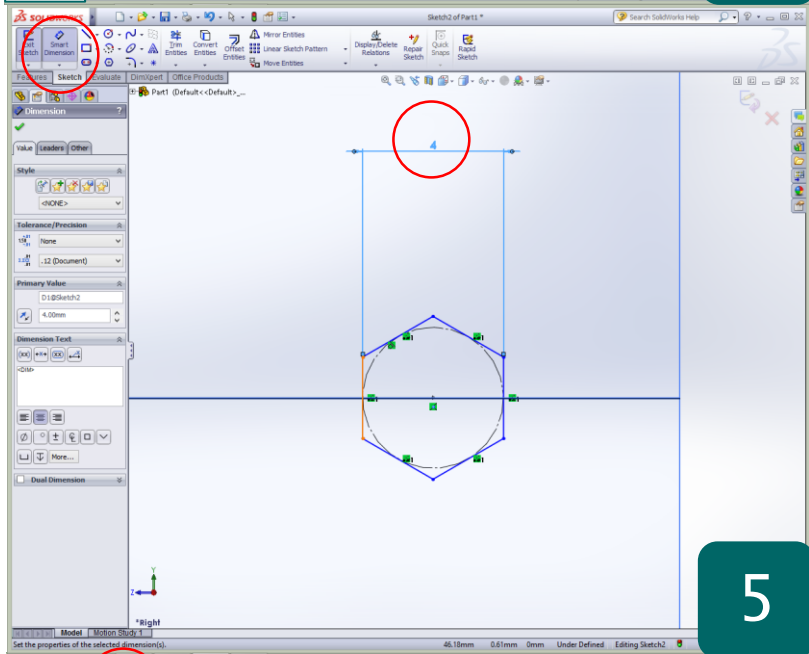
- **'Exit Sketch'**
- Use the middle mouse button to orientate the workspace so that the sketch is roughly horizontal
- Select the work **'plane'** that is at **90°** to the plane you completed the sketch on
- Click **'Sketch'**
- Use **CTRL + 8** to bring the workspace view 'normal to'

Why? – The profile for the **'Swept Boss'** but be at a **90°** angle to the path. The sketch profile should always be linked to the end of the path to ensure accurate results



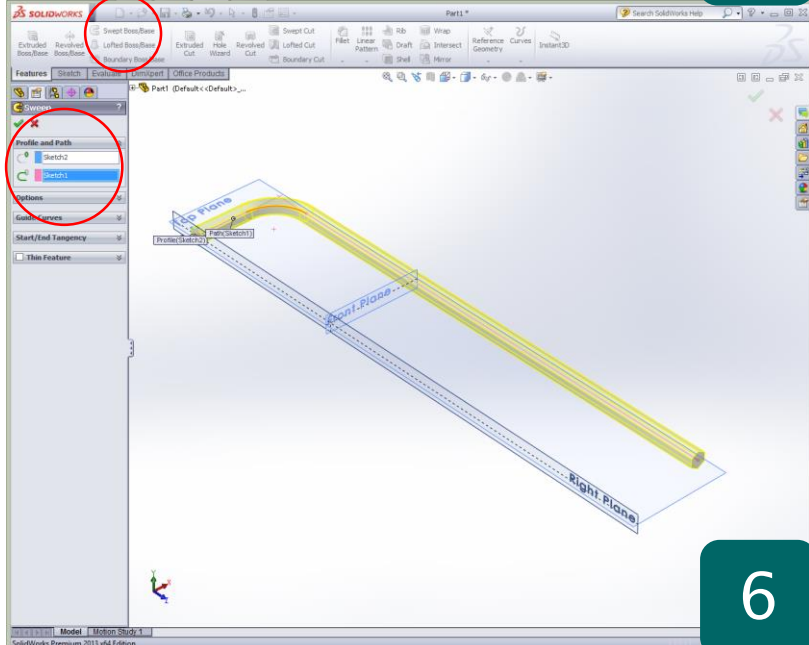
- Find the **'end point'** of the path. It should appear along the middle plane as an orange snap dot > far right
- Access the **'sketch toolbar'** and click on the **'Polygon'** tool (hexagon shape)
- Click on the **'end point'** of the path and snap the centre of the polygon to it
- Fan the shape out so that there is **90°** and between the yellow preview lines
- Confirm with the green tick
- Do not worry about its dimension

Why? – The polygon tool quickly allows you to draw polygons with any number of sides using a circumscribed circle to set the overall size. This will be altered in the next step for the Hex key



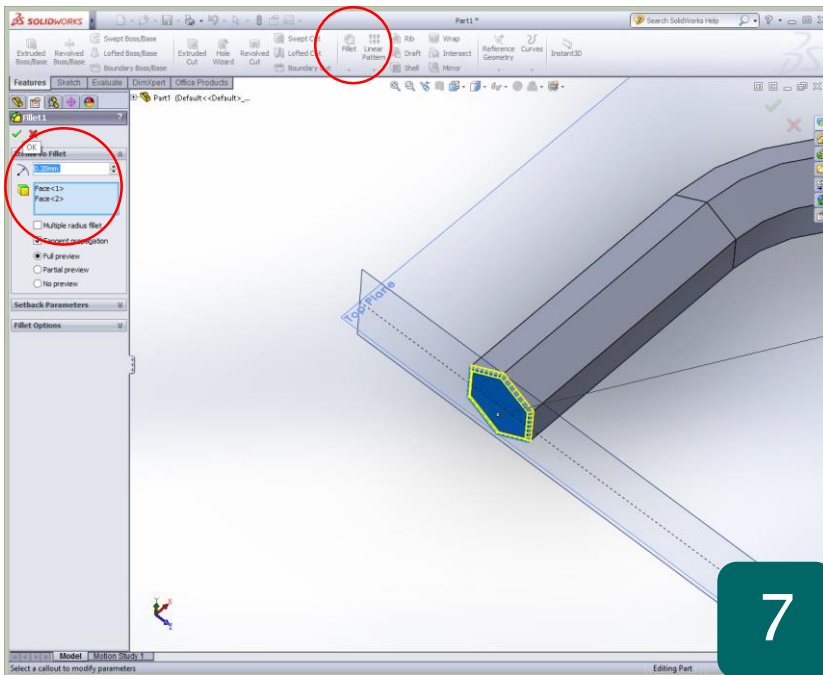
- Select the **'Modify Dimension'** tool from the **'sketch toolbar'**
- Dimension the two parallel edges to 4mm
- This will can be edited later if you decide to make the full set of hex keys
- Confirm with the green tick

Why? – Using the modify dimension tool allows you change the width of the polygon which is how Hex Keys are measured not the circumscribed circle



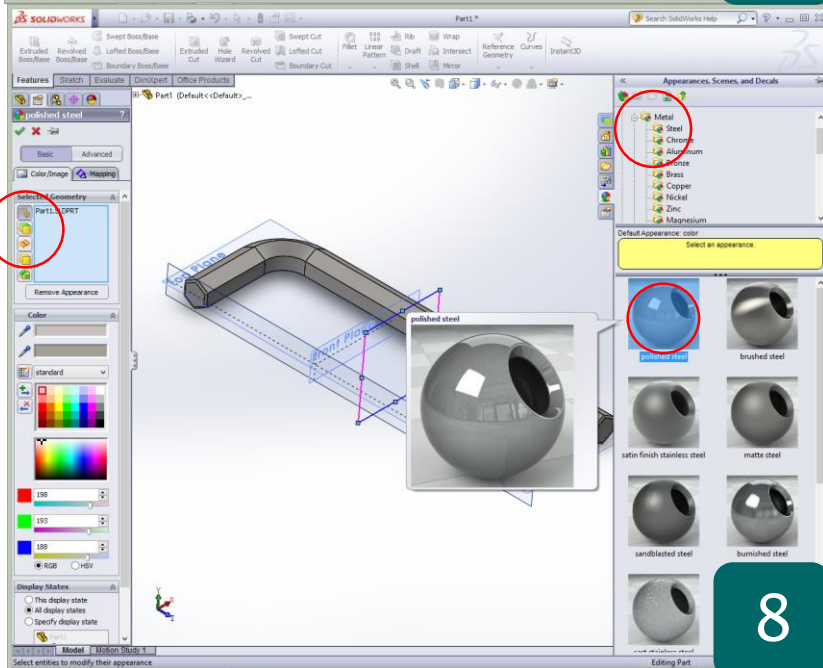
- Access the **'Features Toolbar'** and click on the **'Swept Boss'** feature
- In the left feature menu click on the **'sketch profile'** and select the hexagon sketch
- Click on the **'path'** box below and select the sketch path in the workspace
- A preview should be shown as in the screenshot
- Confirm with the green tick

Why? – A swept boss is an incredibly easy feature to use to create complex form. This is a simple example of a path which can be far more complex. The profile must centre around the end of the path each time



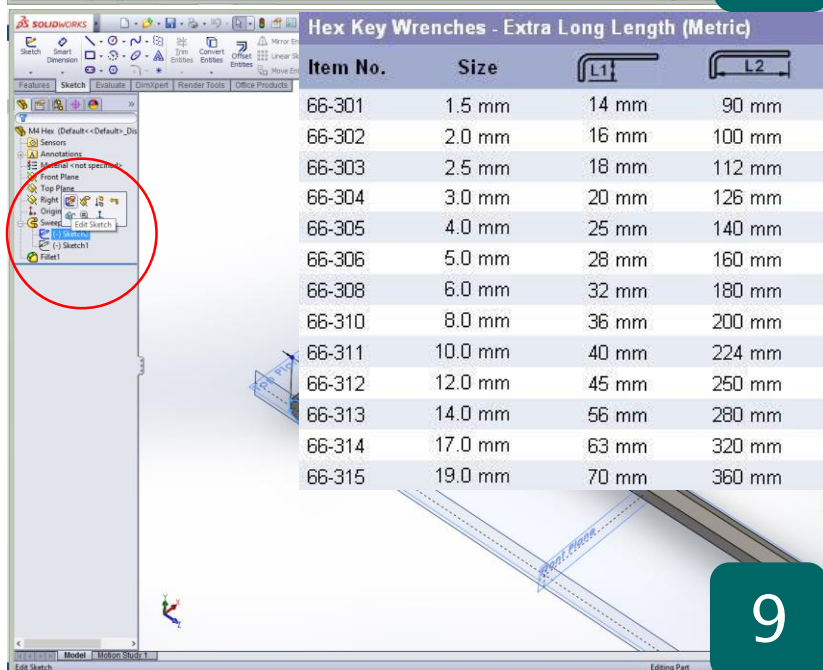
- Access the 'Features' Toolbar
- Click 'Fillet'
- Apply a **0.2mm** fillet to the end of the hex key on each face
- This finishes the hex key as the edge would be too sharp in the real world

Why? – Applying a light fillet to edge of a model enhances the realism or the model as all products have a slight radius to their edge unless for cutting



- Use the 'Edit appearance' Tool in the middle of the screen to access the Render option for the model
- Select an appropriate 'steel' based material and apply it to the whole part by double clicking the preview
- Alternatively explore the different materials available and even try applying a different render to each face
- To do this select 'Faces' in the left feature menu next to the blue selection box

Why? – When completing any model the Render is the fun bit allowing you to enhance the realism of your design. Other rendering software can also be used.



- If you would like to make the whole set follow the dimensioning chart shown on the left for metric Hex keys
- I modelled 2 – 12mm in the render
- For each one **DO NOT** start from scratch, save a copy of your original hex key
- File > Save as > (change the name to Hex M6 etc..)
- In the Model tree you can simply alter the dimensions for the next Hex key and save
- Repeat this process until done saving copies each time
- The Holder design is up to you

Why? – If you found one Hex key easy it is good to repeat the process to practice using 'Swept Boss' and the final model complexity is improved