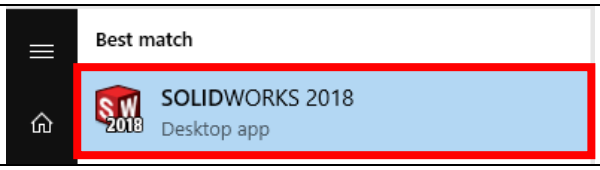
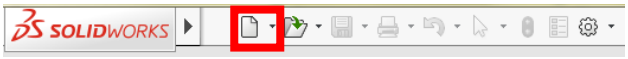
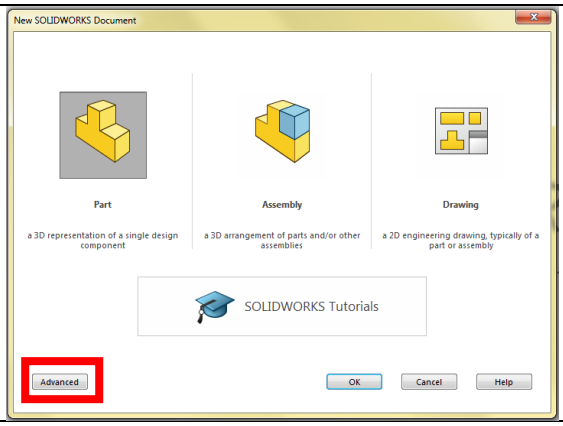
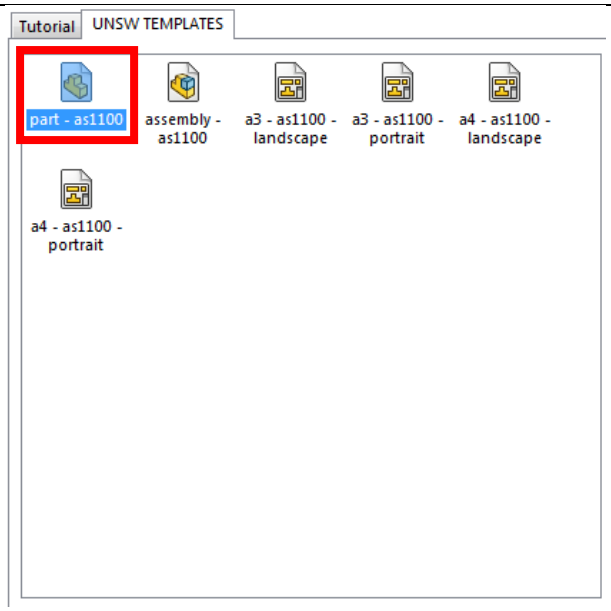
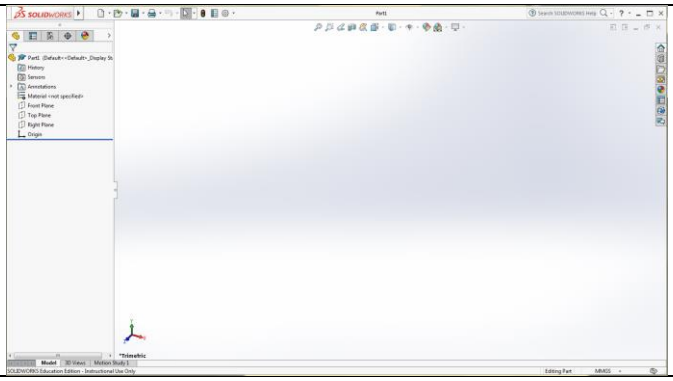
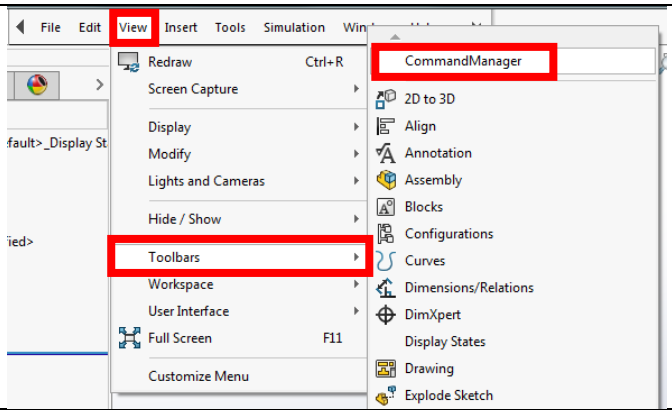
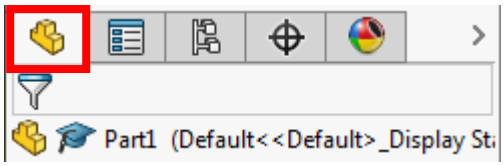
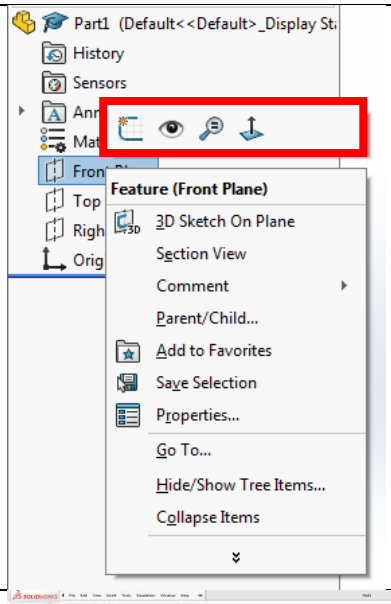
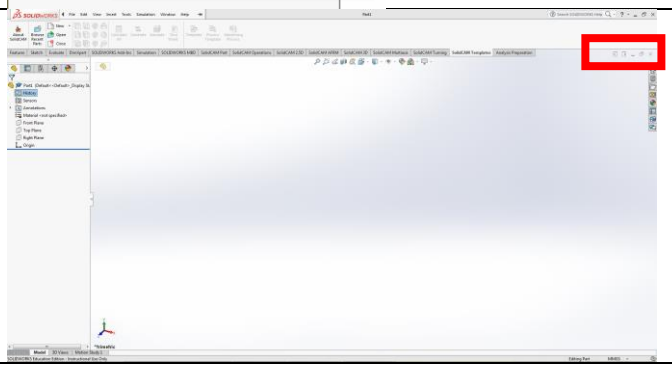
1 – 2D SKETCHING

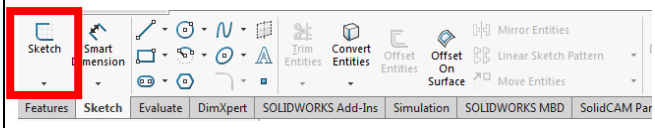
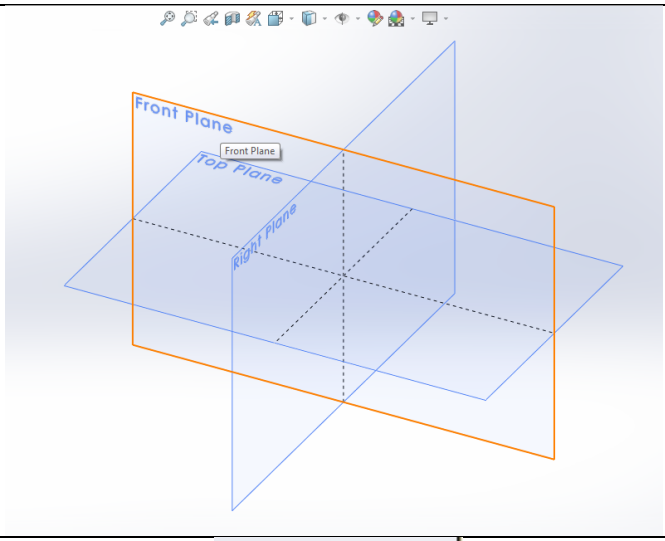
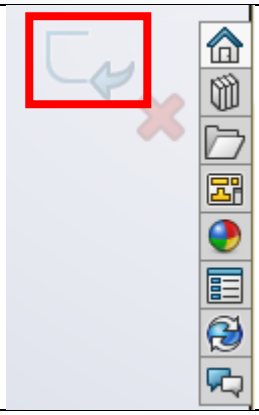
By following this tutorial, you will learn how to:

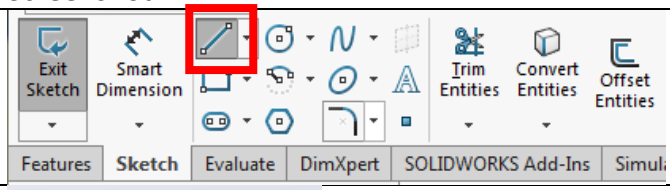
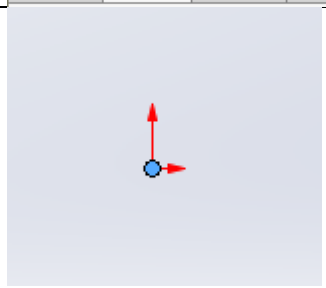
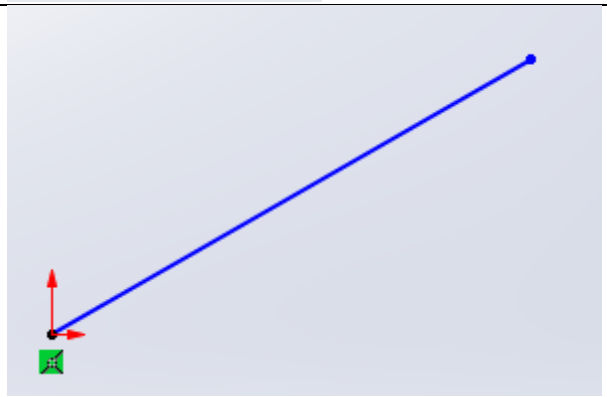
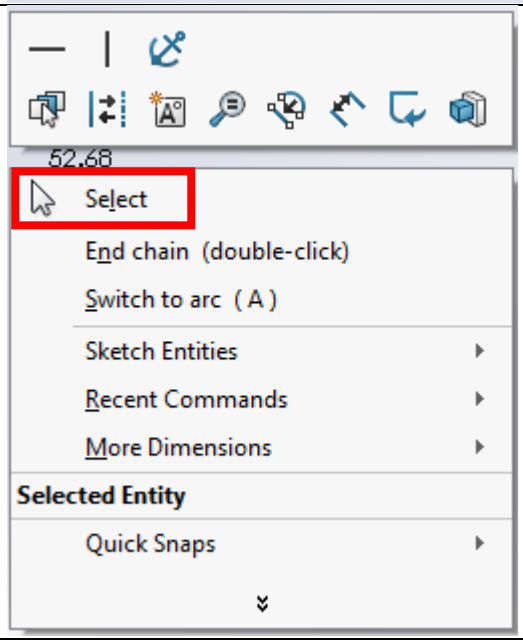
1. Set up a SolidWorks part file
2. Use the SolidWorks menu
3. Create a new sketch plane
4. Create straight lines, circles, rectangles, and slots
5. Fully dimension shapes
6. Use the trim tool
7. Use a sketch fillet
8. Create a relation between two entities

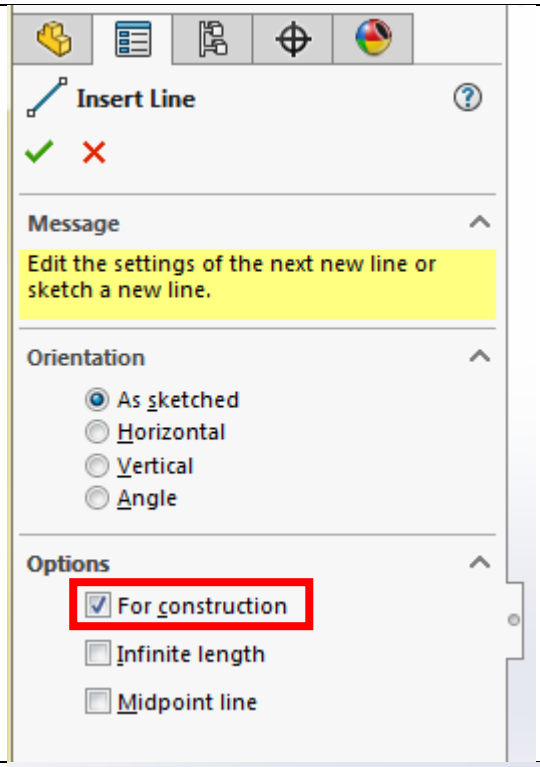
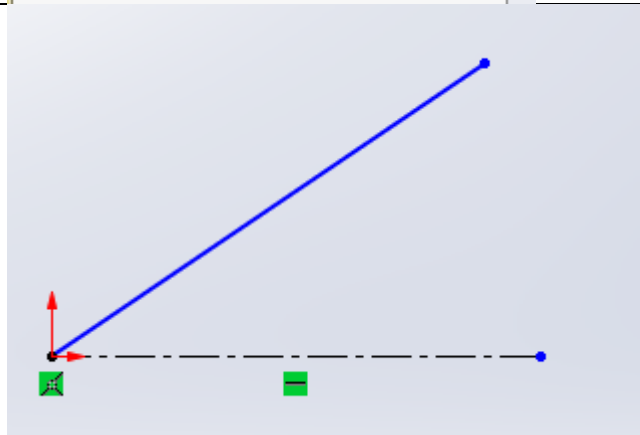
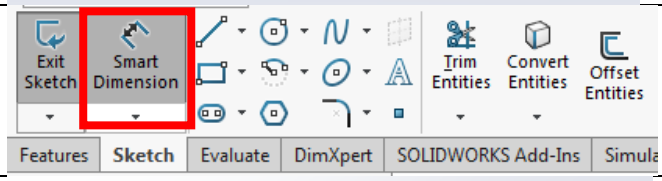
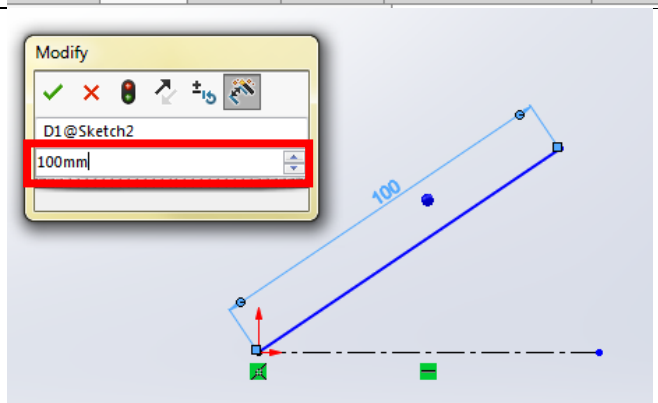
Set up a SolidWorks part file		
No.	Instruction	Screenshot
1	Open SolidWorks from the start menu.	
2	Click on the New File button.	
3	Click on the Advanced button.	

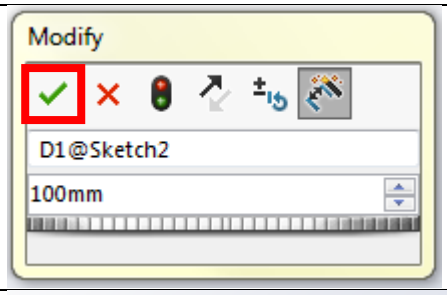
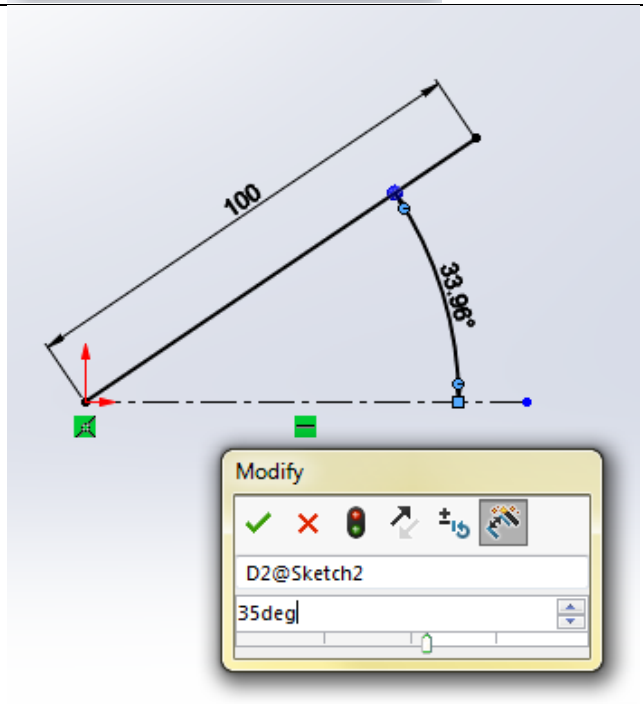
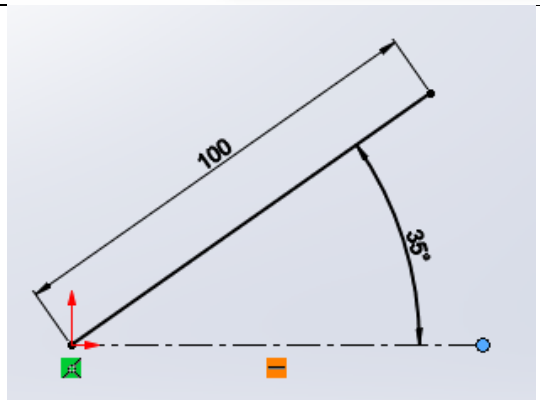
4	Click on the “part - as1100” option under the UNSW TEMPLATES tab. Click OK.	
5	You have now created a new part file.	

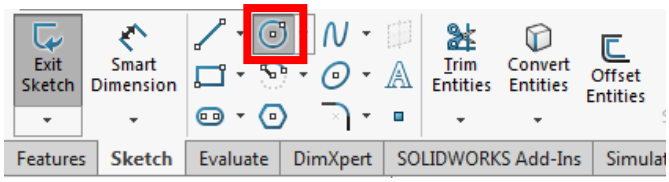
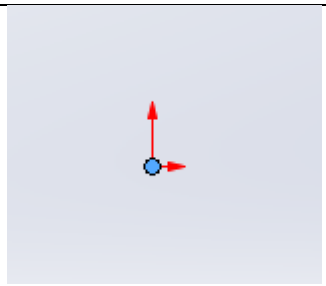
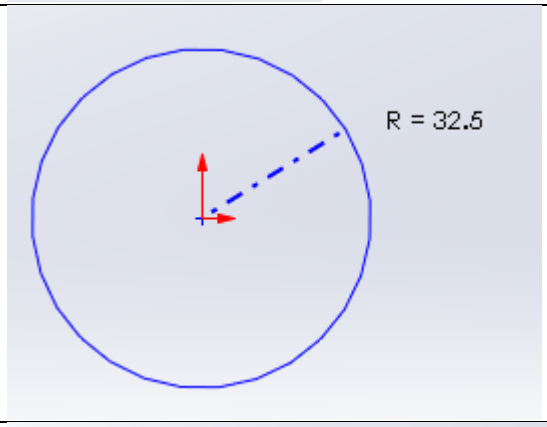
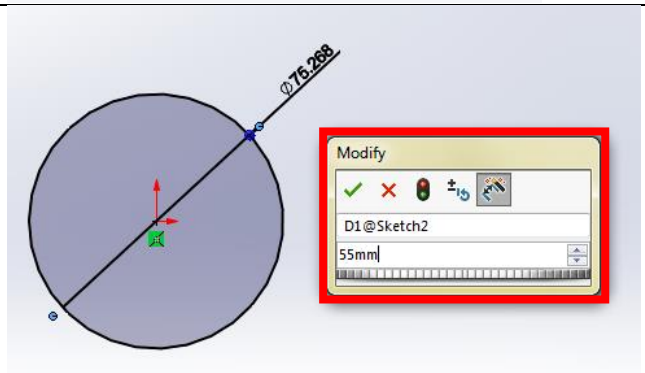
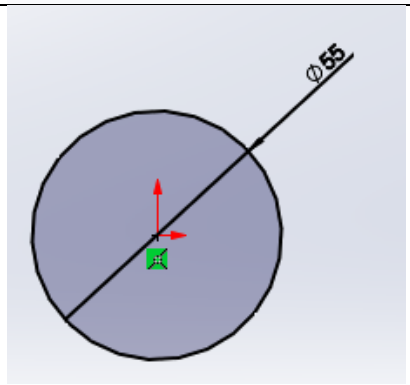
Use the SolidWorks menu		
No.	Instruction	Screenshot
1	On the menu bar, go to View >> Toolbars >> CommandManager to bring up the command manager	
2	On the left sidebar, ensure that the feature manager is selected	
3	Right click on an item in the tree to see options. Hover your mouse over the icons for a description.	
4	Click on the minimise option on the work area to minimise the current part file.	

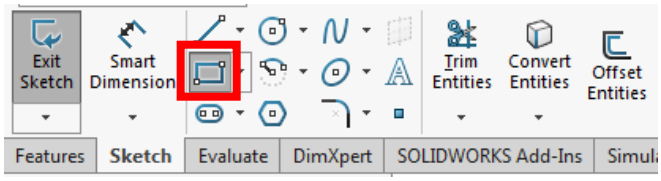
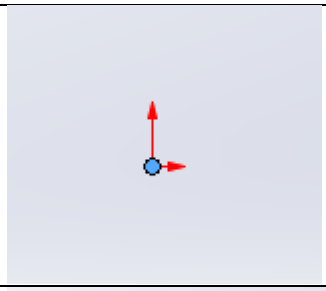
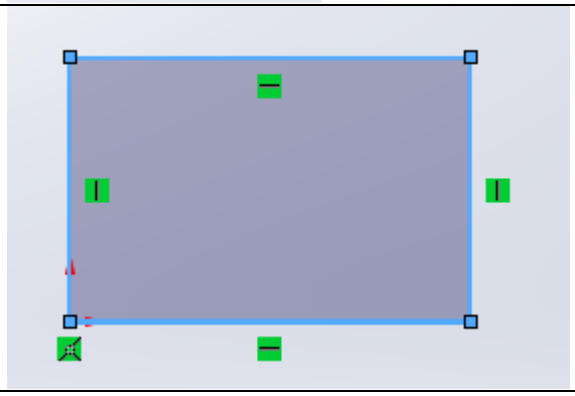
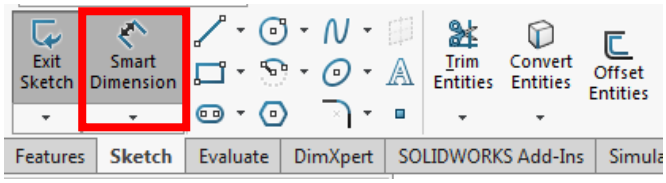
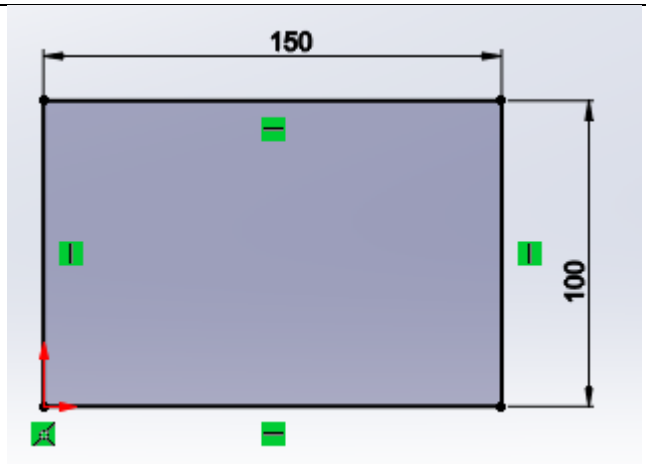
Create a new sketch plane		
No.	Instruction	Screenshot
1	Go to the Sketch tab on the command manager. Click “Sketch”.	
2	Click on the appropriate plane.	
3	Click the Exit Sketch button to exit the sketch plane.	

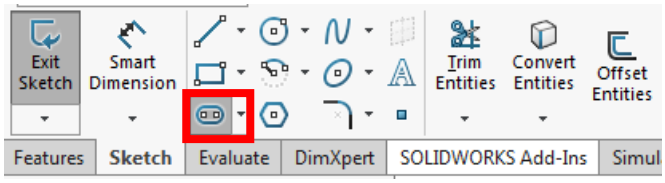
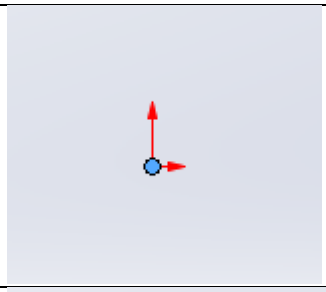
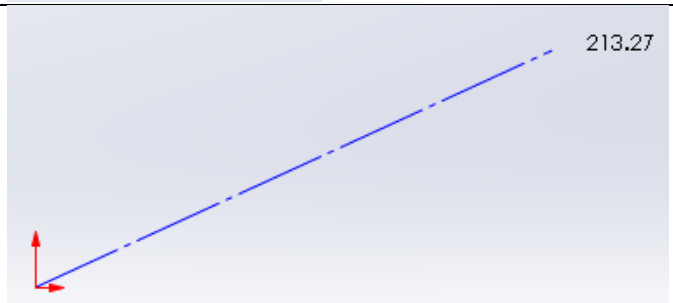
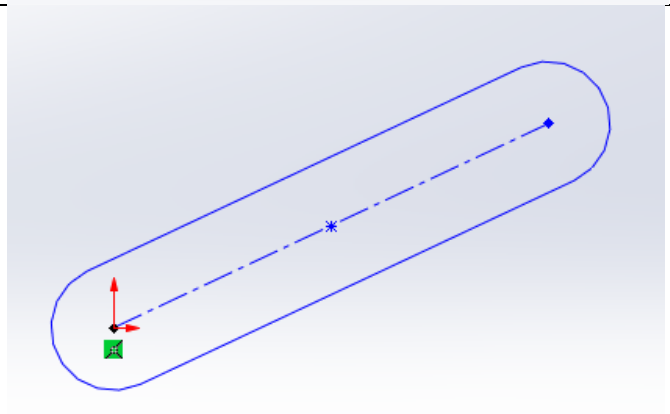
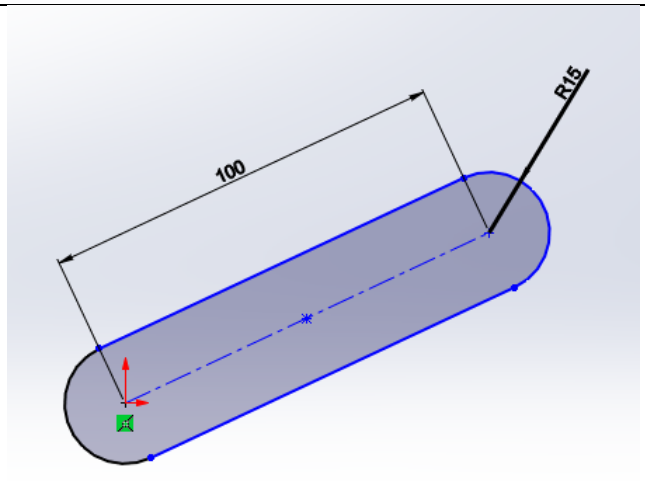
Create a line		
No.	Instruction	Screenshot
1	Click the “Line” button in the Sketch tab.	
2	Click on the origin to specify the starting point of the line	
3	Click on the desired ending point of the line.	
4	Right click and choose “Select” to finish the drawing action.	

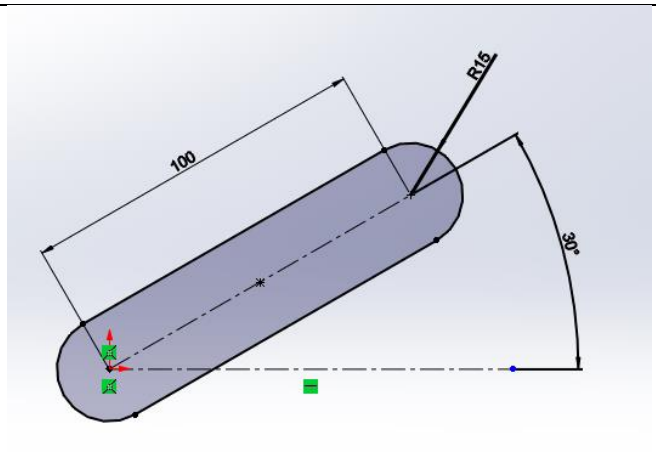
5	To create a construction line, choose the “For Construction” option.	
6	Create a horizontal reference line.	
7	Click on “Smart Dimension” in the Sketch tab.	
8	Click on the created line and specify a value in the Modify box.	

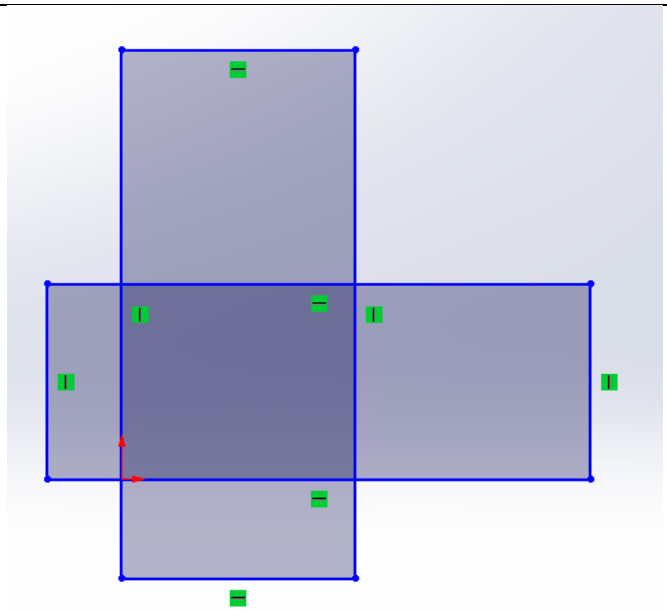
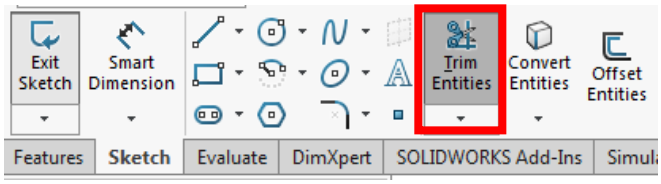
9	Click the OK button to confirm.	
10	Click the Smart Dimension button. Click on both lines and specify a value in the Modify box. Click the OK button to confirm.	
	You have now fully dimensioned the created line.	

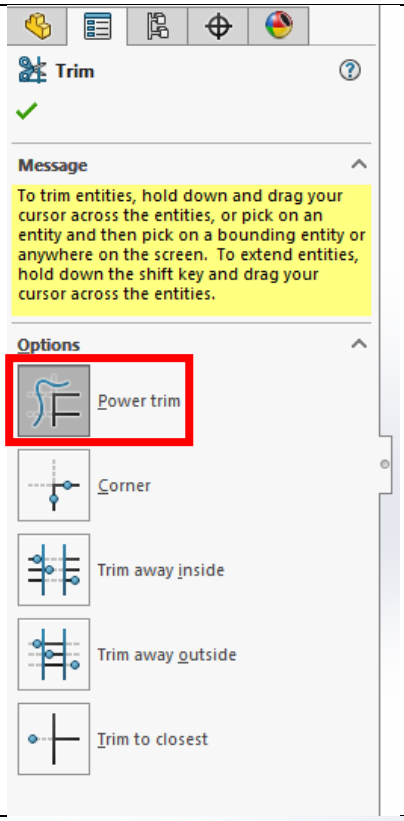
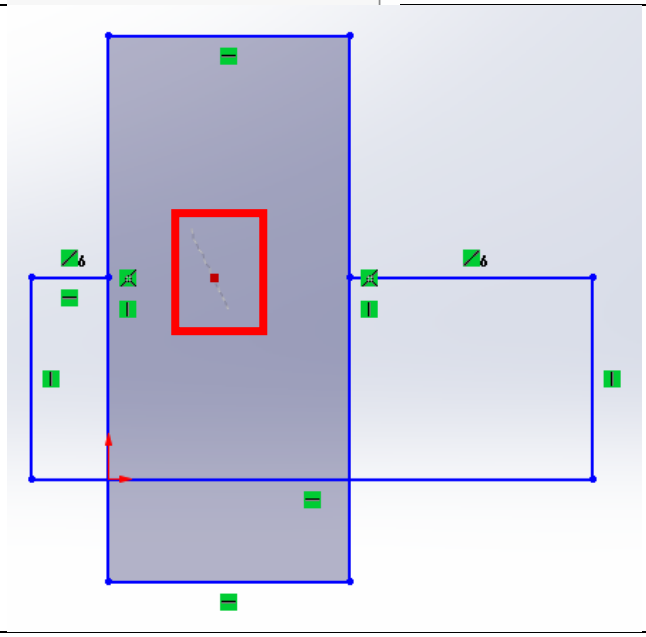
Create a Circle		
No.	Instruction	Screenshot
1	Click the “Circle” button in the Sketch tab.	
2	Click on the origin to specify the starting point of the line	
3	Move the pointer to specify the radius of the circle. Click to set.	
4	Use “Smart Dimension” to specify the dimensions of the circle.	
5	You have now fully dimensioned the circle.	

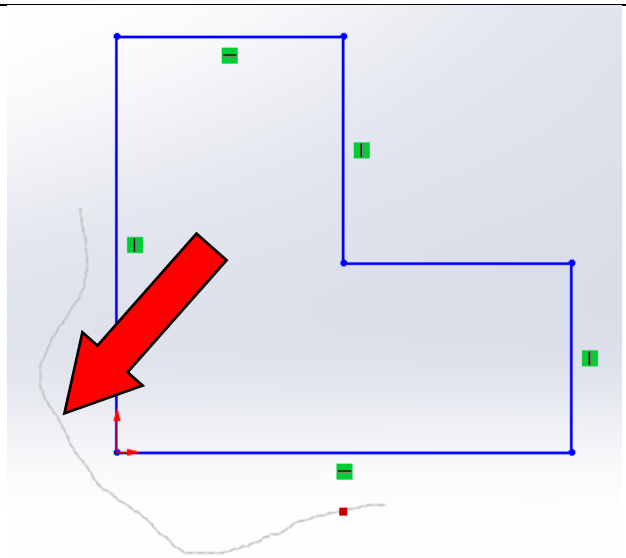
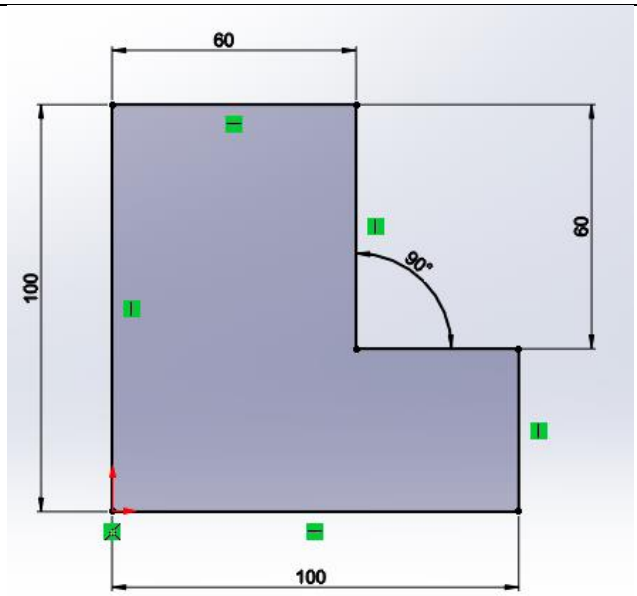
Create a Circle		
No.	Instruction	Screenshot
1	Click the “Rectangle” button in the Sketch tab.	
2	Click on the origin to specify the starting point of the line	
3	Move the pointer to specify the size of the rectangle. Click to set.	
4	Use “Smart Dimension” to specify the dimensions of the rectangle.	
5	You have now fully dimensioned the rectangle.	

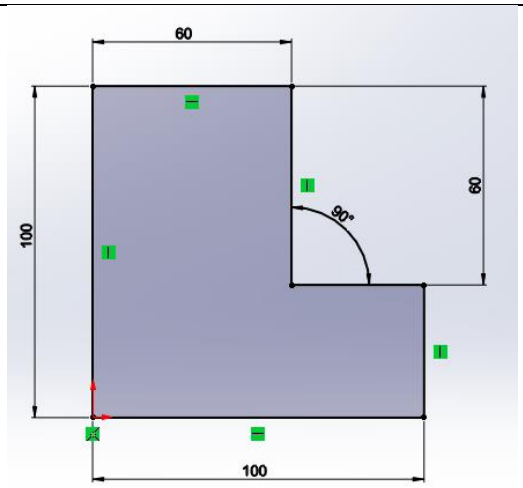
Create a Slot		
No.	Instruction	Screenshot
1	Click the “Straight Slot” button in the Sketch tab.	
2	Click on the origin to specify the starting point of the line	
3	Move the pointer to specify the length of the slot. Click to set.	
4	Move the pointer to specify the width of the slot. Click to set.	
5	Use the “Smart Dimension” tool to dimension the slot size.	

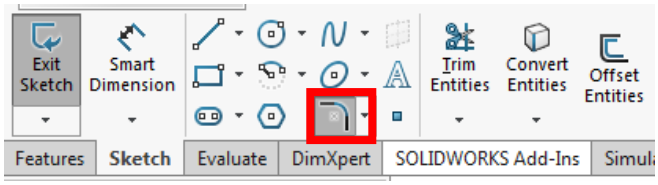
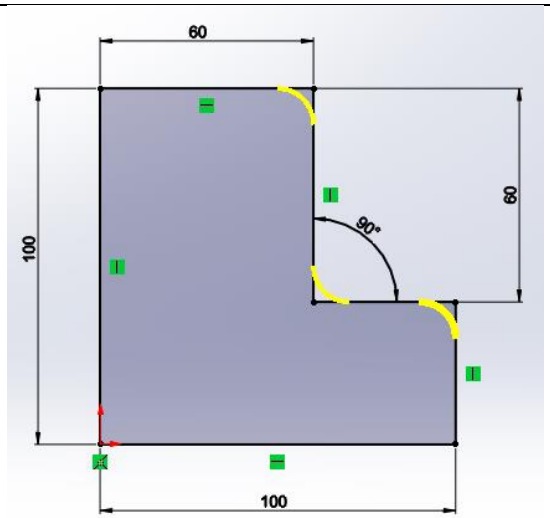
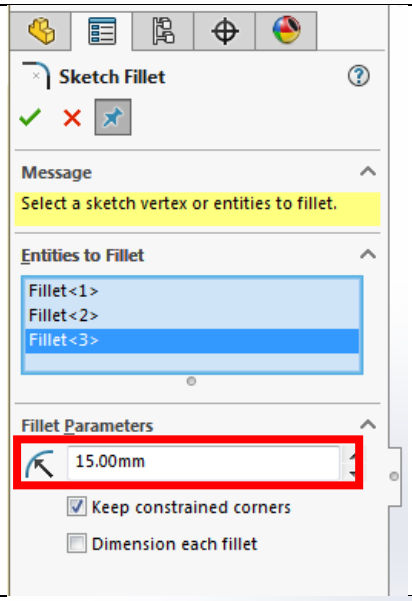
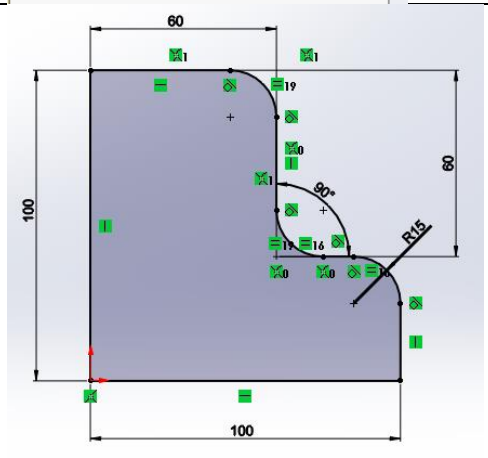
6	Use a construction line with the “Smart Dimension” tool to dimension the slot angle.	

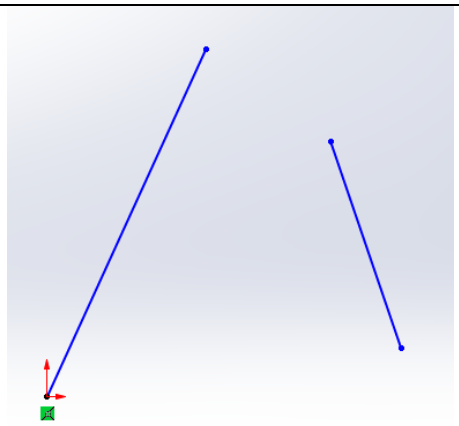
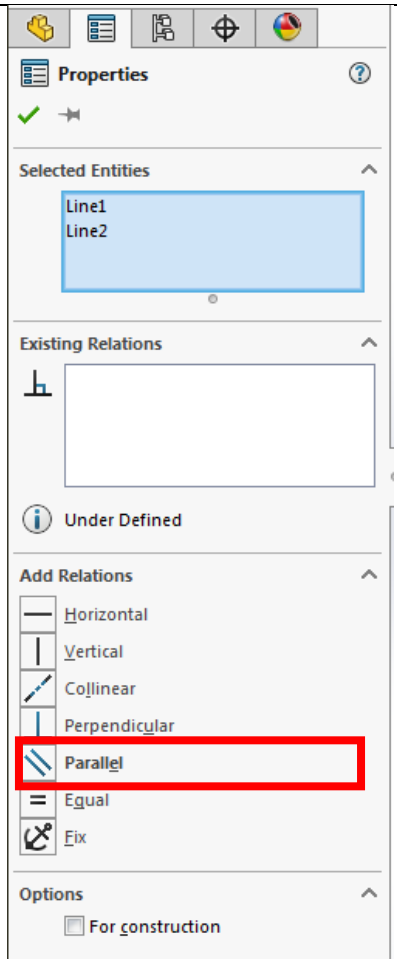
Use the trim tool		
No.	Instruction	Screenshot
1	Create two overlapping rectangles	
2	Select the “Trim Entities” button in the Sketch tab.	

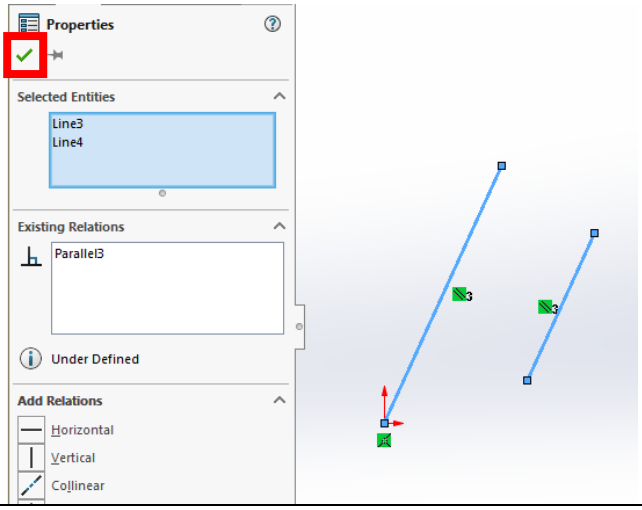
3	Select the “Power Trim” option.	
4	Click and drag the pointer across a line to remove it.	

5	Repeat to trim other lines. TIP: You can cross multiple lines at once by holding and dragging across all applicable lines.	
6	Use the “Smart Dimension” tool to fully dimension the shape.	

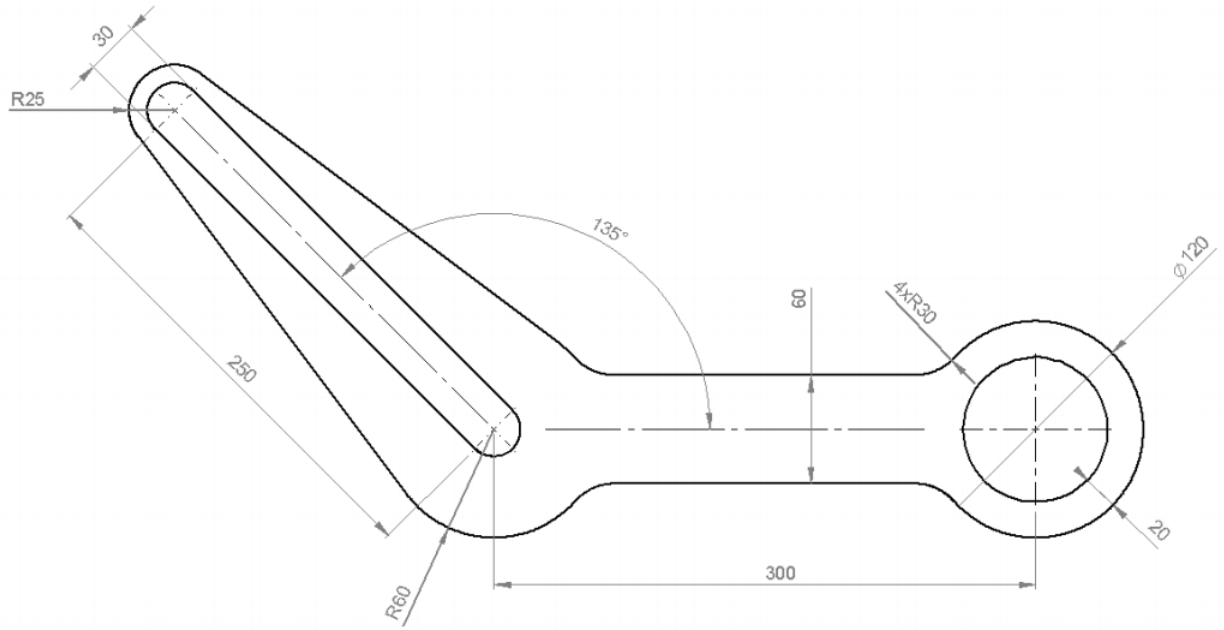
Use a sketch fillet		
No.	Instruction	Screenshot
1	Use the shape created above.	

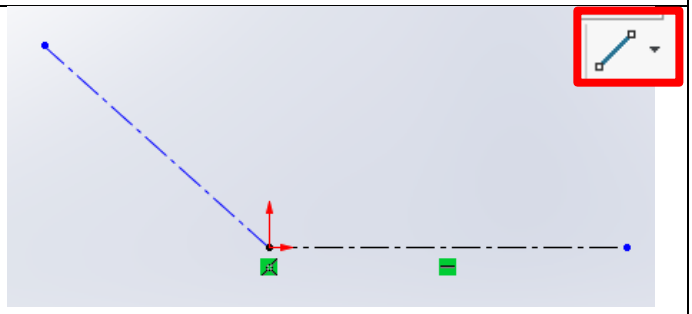
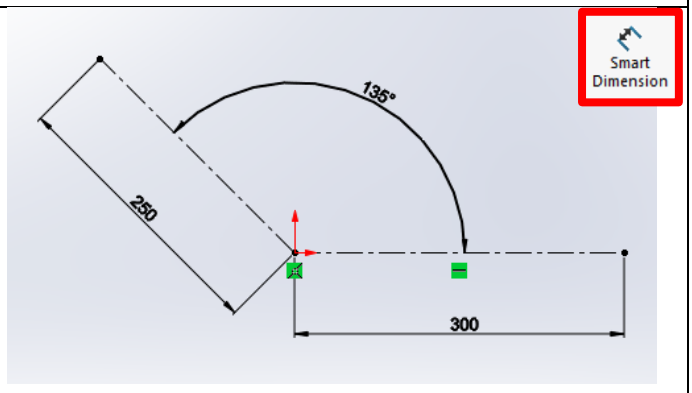
2	Select the “Sketch Fillet” button in the Sketch tab.	
3	Click all the corners you want to fillet	
4	Enter the desired corner radius in the “Fillet Parameters” menu.	
5	Ensure that the shape is fully dimensioned.	

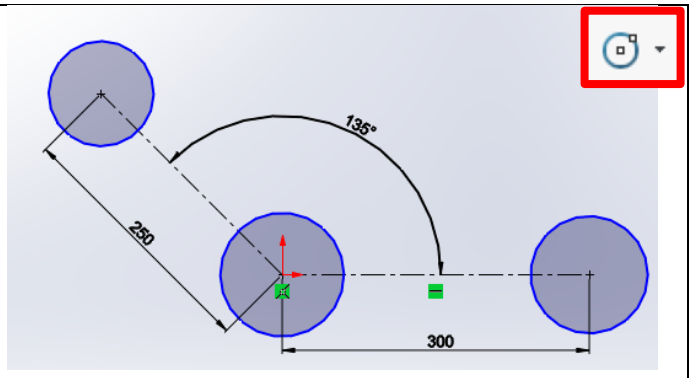
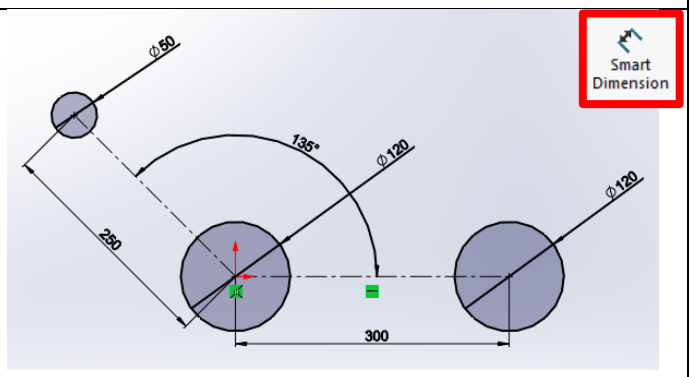
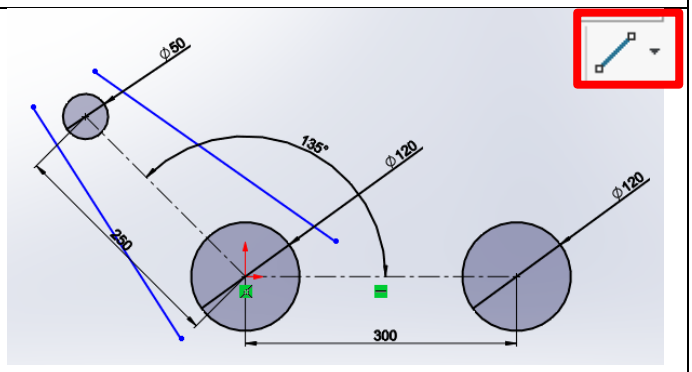
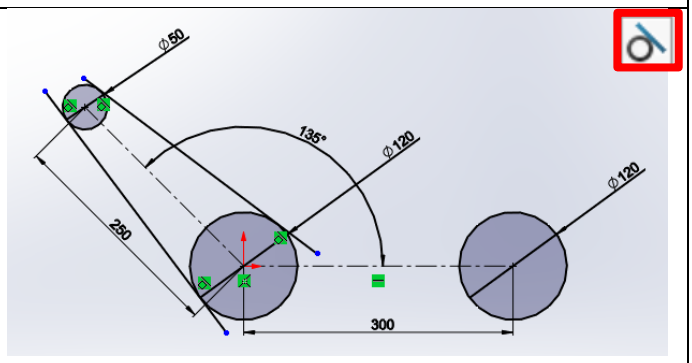
Create a relation between two entities		
No.	Instruction	Screenshot
1	Draw two lines.	
2	Click the first line. Hold CTRL on the keyboard. Click the second line. This will bring up the Relation Properties menu.	
3	Choose the appropriate relation.	

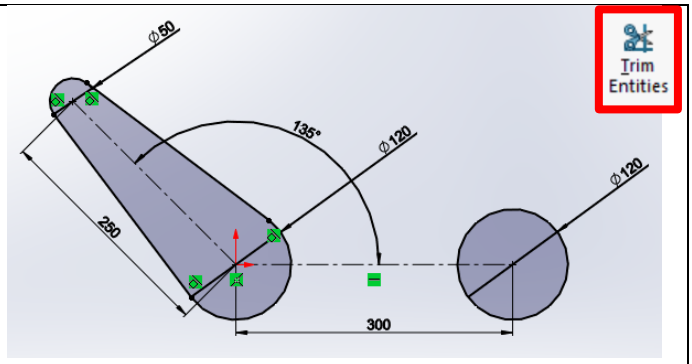
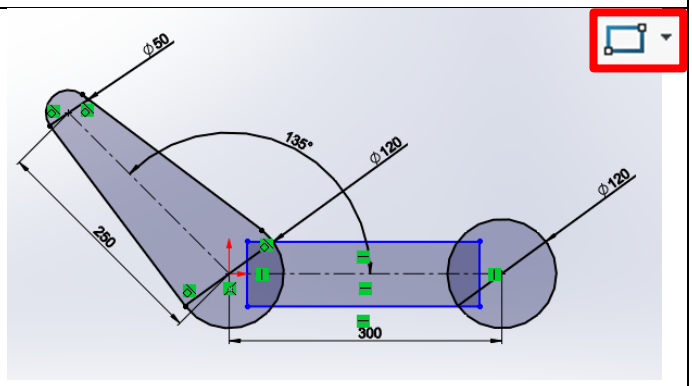
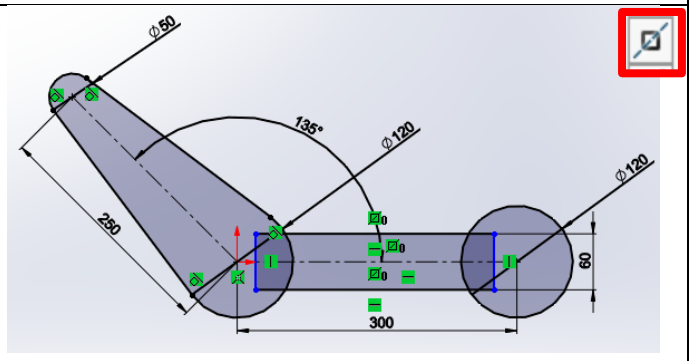
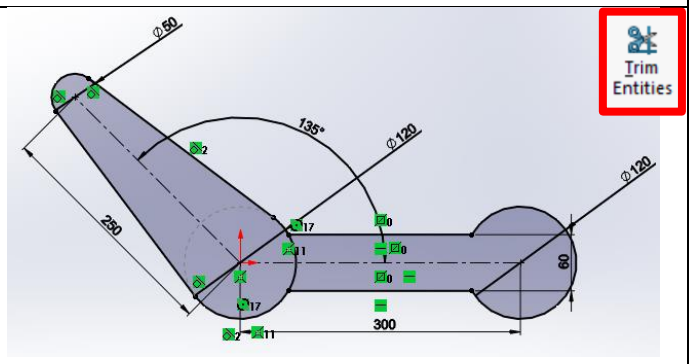
4	Click the OK button to confirm.	

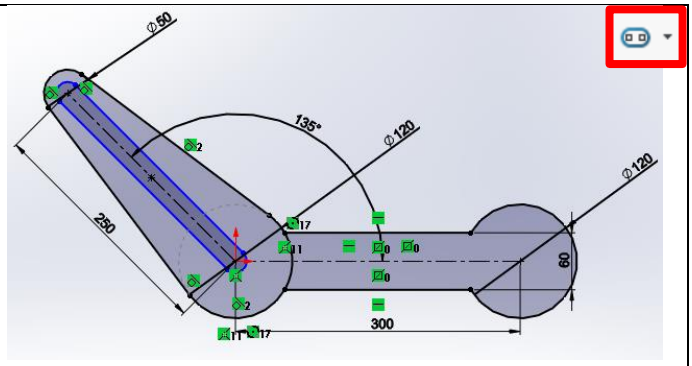
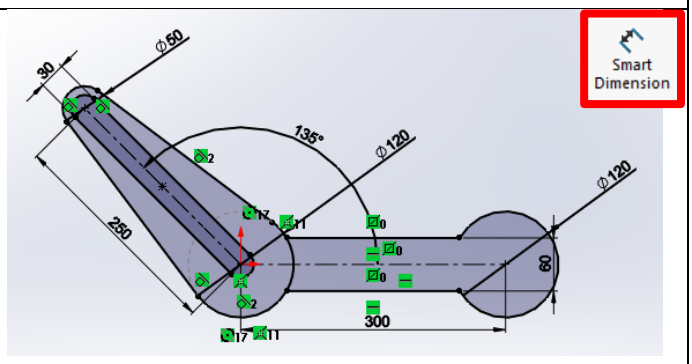
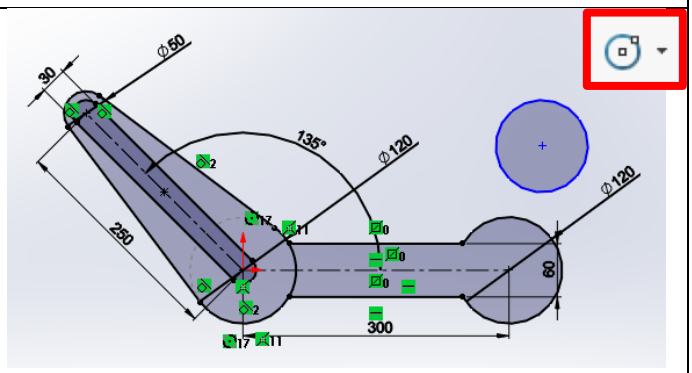
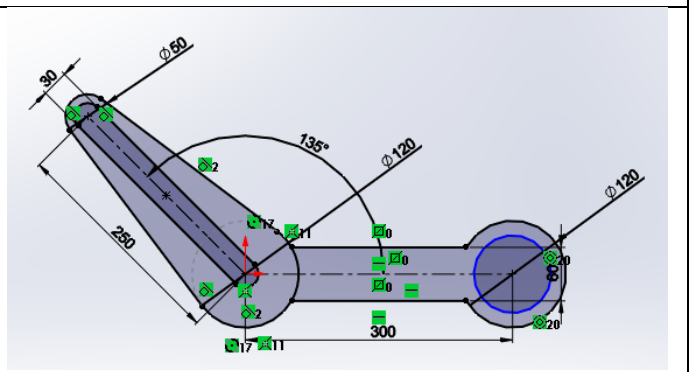
Sketching Example

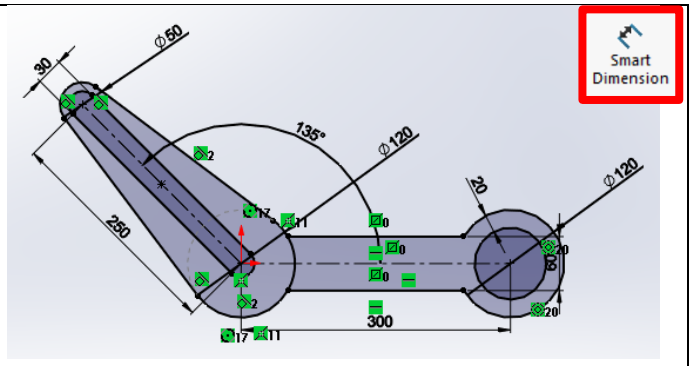
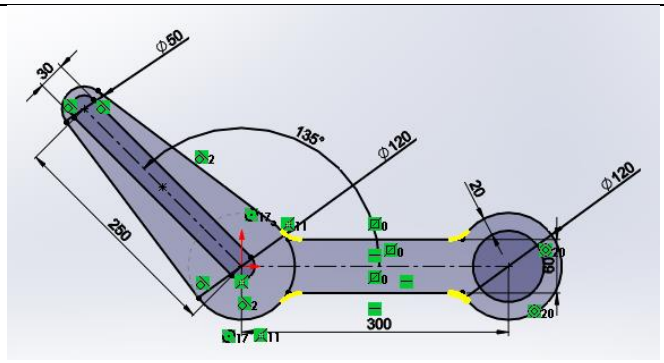
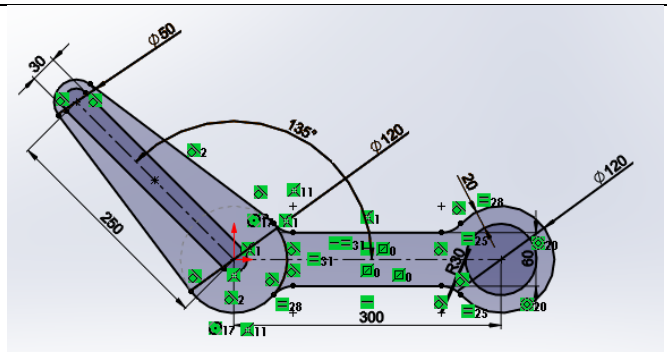


Sketching Example		
No.	Instruction	Screenshot
1	Create two construction lines.	
2	Smart Dimension the size and angle of the two lines. - Horizontal line = 300mm - Inclined line = 250mm - Angle = 135˚	

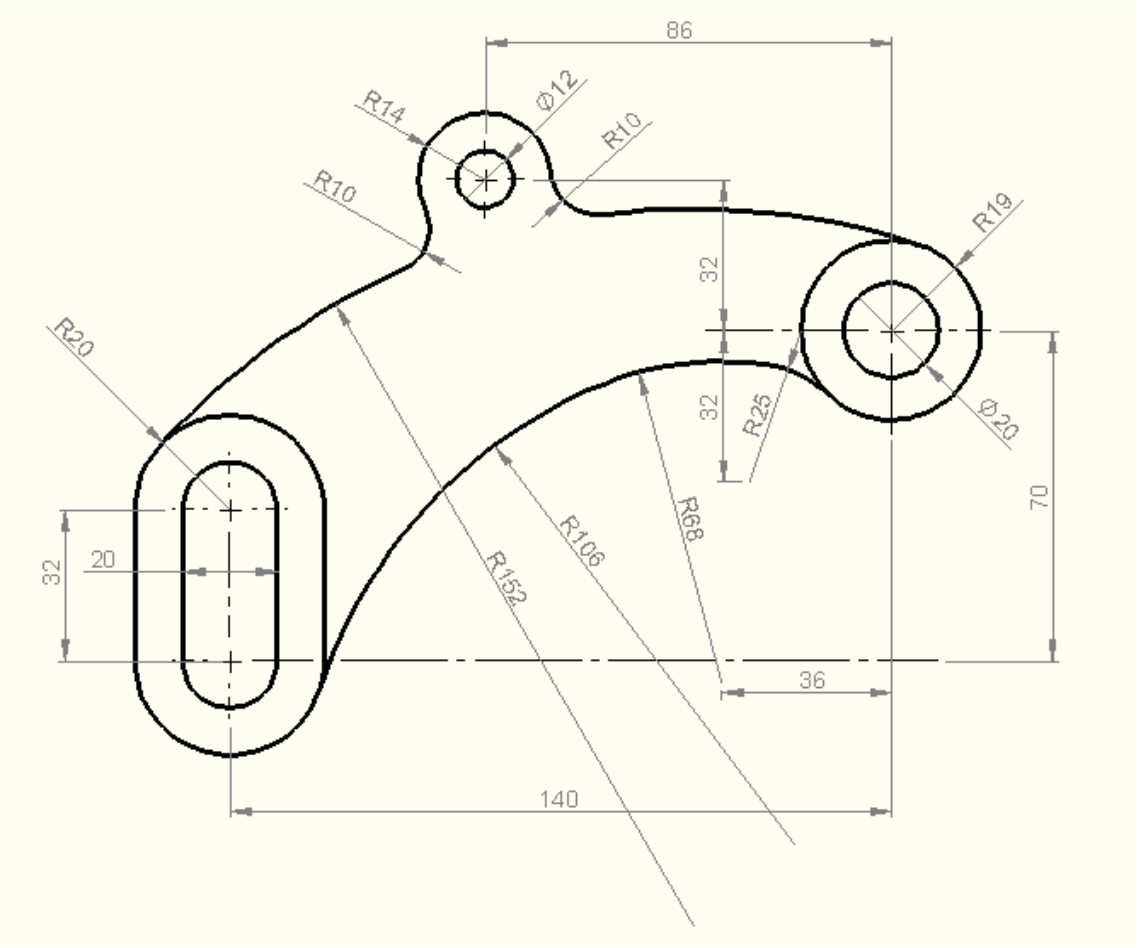
3	Create three circles and position them onto the two lines.	
4	Smart Dimension the size of the three circles. - Diameter = 50mm, 120mm, 120mm	
5	Create two lines as shown.	
6	Add Tangent relations between each of the lines and the two circles.	

7	Trim all redundant lines.	
8	Create a horizontal rectangle as shown.	
9	Smart dimension the rectangle height 60mm. Use the Symmetry relation to position the rectangle on the centreline.	
10	Trim all redundant lines.	

11	Create a slot using the inclined construction line as a centreline. Ensure that the ends are concentric to the existing circles.	
12	Smart Dimension the slot. - Width = 30mm	
13	Create a new circle close to the right-most circle.	
14	Add a Concentric relation between the two circles. 	

15	Smart Dimension the radial offset between the two circles to 20mm.	
16	Use sketch fillet, R = 30mm, at each corner.	
17	Complete!	

Exercise 1 – Rocker Arm



Exercise 2 – Gasket