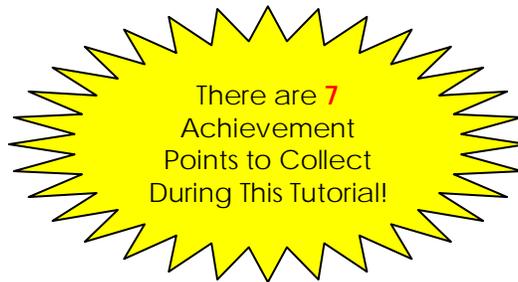


R-Type Tutorial 2

A Step by Step Guide

Designing an
R-Type Car
In
SolidWorks



Requirements: SolidWorks Student Edition or SolidWorks Design Kit

You are advised to complete D-Type tutorials 1&2 and also R-Type 1 before attempting this tutorial.

Information for F1 in Schools Coordinator:

Welcome to our new range of F1 in Schools (SolidWorks) Tutorials!

In writing these tutorials, we have tried to look at this project from your perspective and in the following ways:

- **You are busy subject teachers** whose main priority is your core- curriculum area.
- **You know little about SolidWorks** and know it can be a HUGE undertaking to know all there is to know about any CAD package.
- **You want to feel confident** to answer student questions and will not undertake these tutorials in front of a class until you are ready to do so.

If the above scenario sounds familiar, we are relieved! It means we have understood your needs and have aimed these tutorials in exactly the right direction. We hope the above three issues have been resolved as follows:

- **We know how busy you are!** These tutorials have been written with the hope that you can simply hand them out / give yourself some space / let the students explore and discover for themselves / making progress at YOUR pace.
- **We have aimed these tutorials at those with no CAD experience at all.** Secondly, neither you or your students need to know all there is to know about SolidWorks for the following reasons:
 1. There simply is not enough time to do so.
 2. You don't need to.
 3. Both you and your students would die of boredom and feel you were either achieving nothing or were achieving far too slowly to remain interested.
- **We have reduced each tutorial down to a manageable chunk** for both you and your students to read / attempt / attempt again / attempt again with your own ideas rather than ours.

Summary and Suggested Approach

As a suggested starting point (and without wanting to teach you how to suck eggs) we suggest the following:

- **The whole group work through the booklets**, regardless of chosen areas of responsibility in their F1 in Schools team. This will surprise you when you hear students wishing to change their roles, having found the software easier or harder than they anticipated! The ACHIVEMENT POINTS can be used by you as a reward system.
- **Save / repeat / save again / repeat again.** This should be repeated until the students are correcting their own errors and drawing their own ideas rather than ours. You may then wish to assign the role of Team Design Engineer having seen who is most capable.

As with all of our support materials, we welcome your feedback. This is the only way we know we are meeting your needs as F1 in Schools coordinators.

With regards,
The F1 in Schools Middle-East Team.

For Your Information

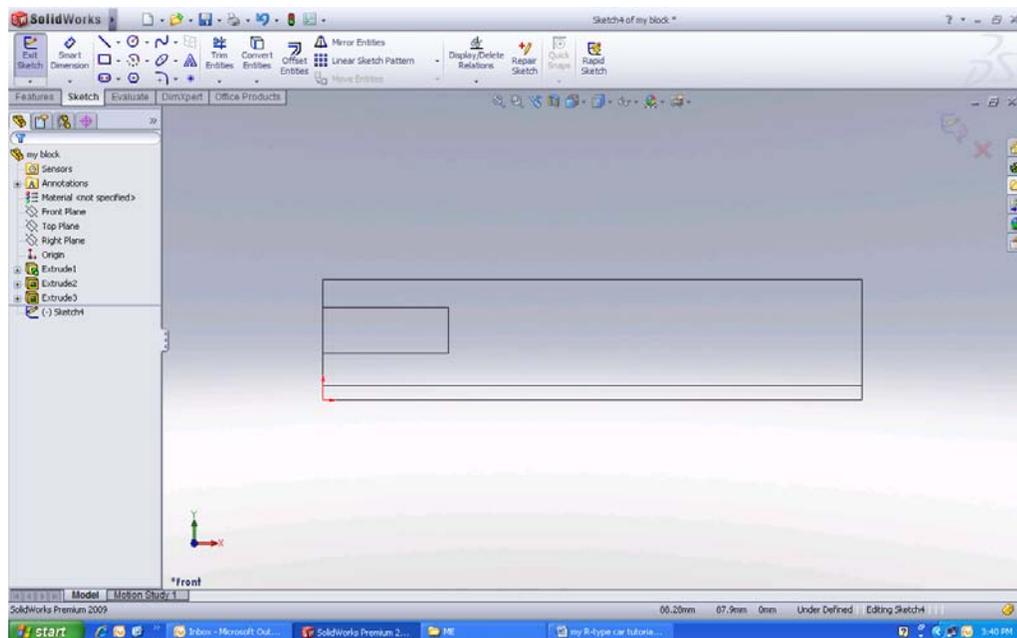
We will now show you how to draw an R-Type car using the Balsa-Wood block which you have already drawn in R-Type Tutorial 1.

For Your Information

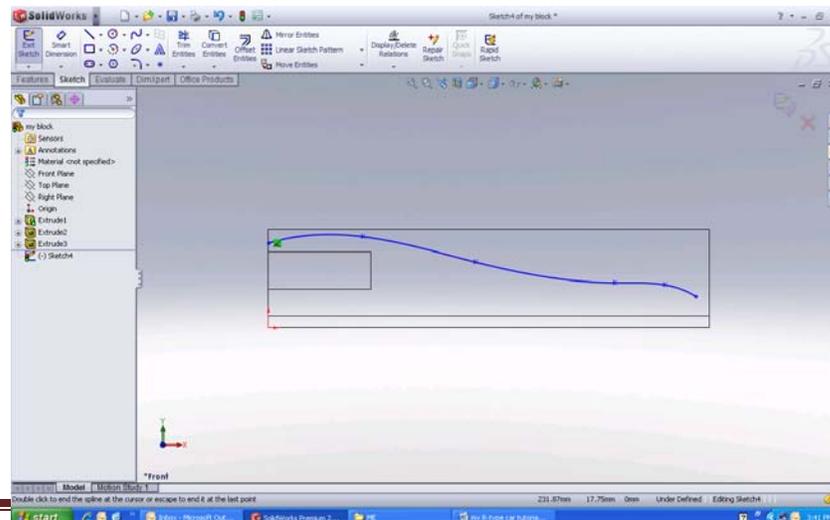
We are assuming you have already drawn a D-Type car in a previous tutorial. This car is basically the same procedure, apart from adding wings.

1. **OPEN THE R-TYPE BLOCK** which you have drawn from the R-Type Tutorial 1 booklet.

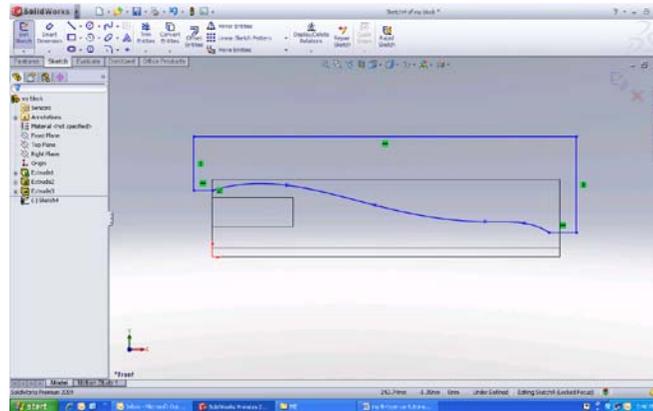
2. **FEATURES TAB / EXTRUDED CUT TOOL**  **/ FRONT PLANE / VIEW FRONT / DISPLAY WIREFRAME** your screen should look like the one below



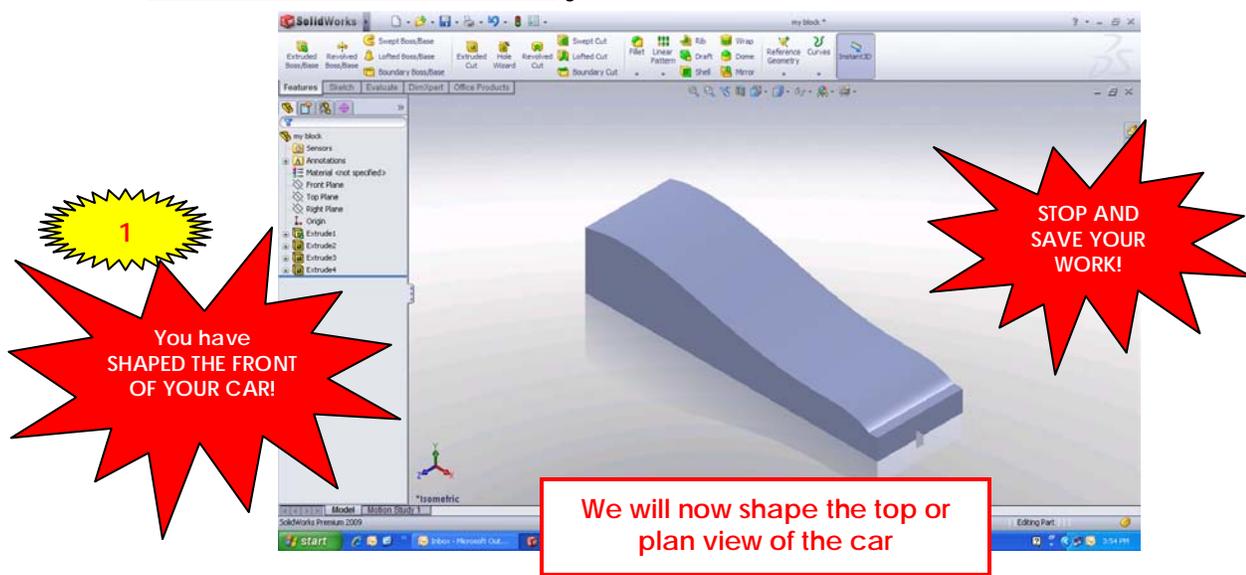
3. **SPLINE TOOL /** draw a shape similar to the one below **/ ESCAPE**



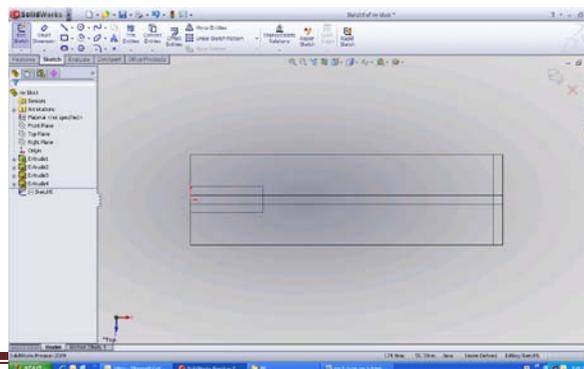
4. LINE TOOL / CLOSE THE SKETCH your screen should look like the one below



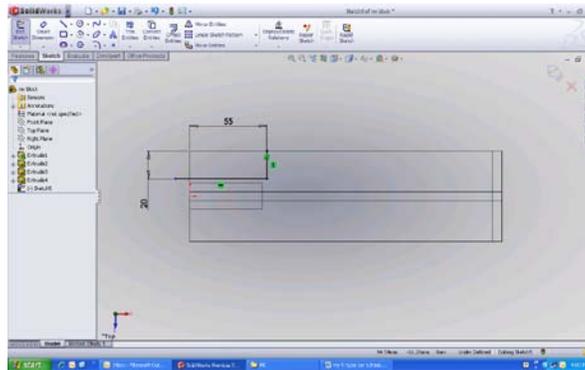
5. VIEW ISOMETRIC / ACCEPT SKETCH / DIRECTION 1&2 THROUGH-ALL / TICK OK / DISPLAY SHADED your screen should look like the one below



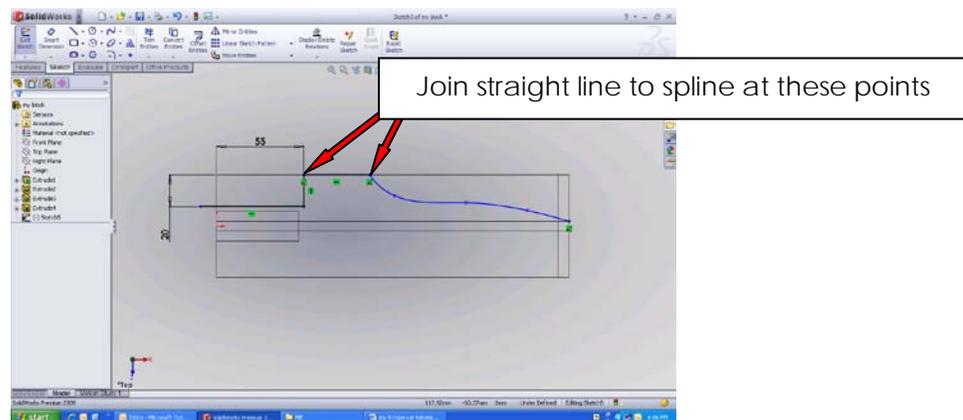
6. FEATURES TAB / EXTRUDED CUT TOOL  / TOP PLANE / VIEW TOP / DISPLAY WIREFRAME your screen should look like the one below



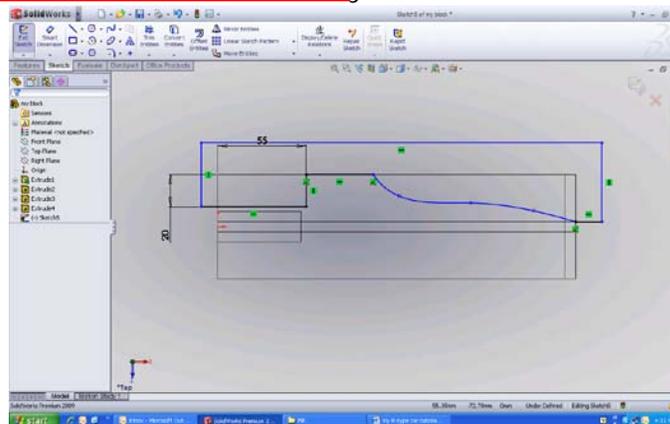
7. LINE TOOL / CREATE THE LINES BELOW / SMART DIMENSION / ADD DIMENSIONS AS BELOW



8. LINE TOOL / SPLINE TOOL draw a shape similar to the one below



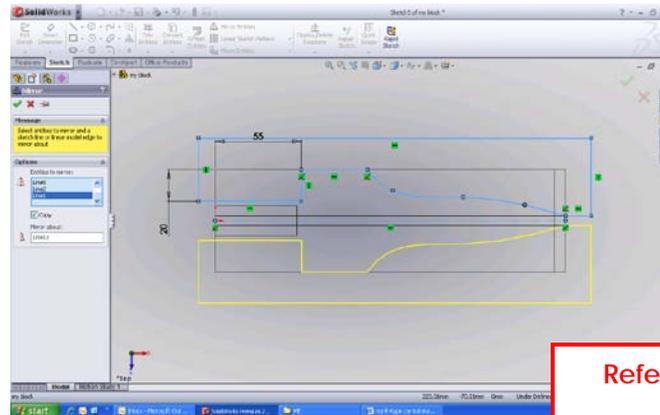
9. LINE TOOL / CLOSE THE SKETCH your screen should look like the one below



10. LINE TOOL / FOR CONSTRUCTION / CREATE CENTRE LINE as below

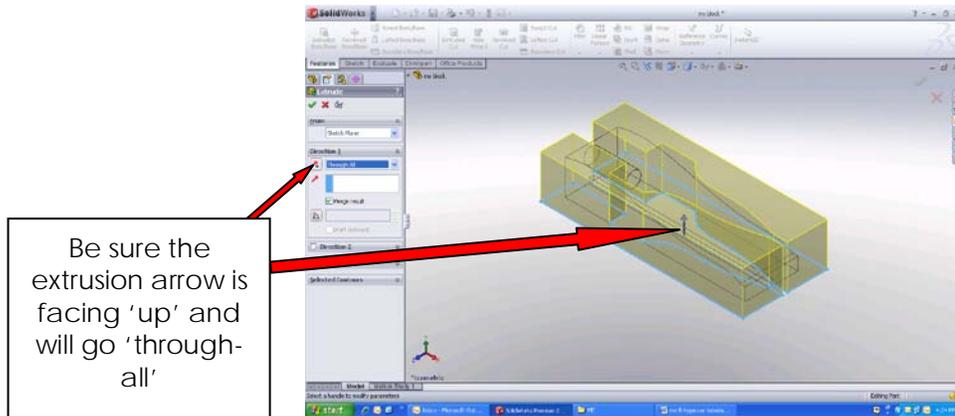


11. **MIRROR ENTITIES / MIRROR LINES AND SPLINE** your screen should look like the one below



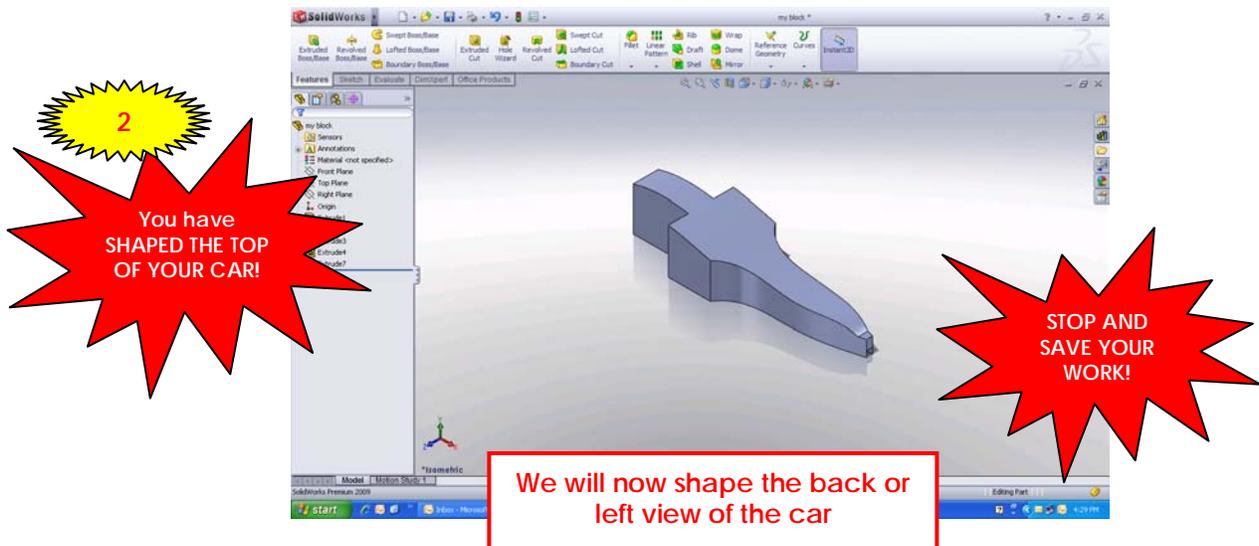
Refer to D-Type Car tutorial Steps 25 & 26

12. **TICK TO COMPLETE / ACCEPT SKETCH / VIEW ISOMETRIC** as below



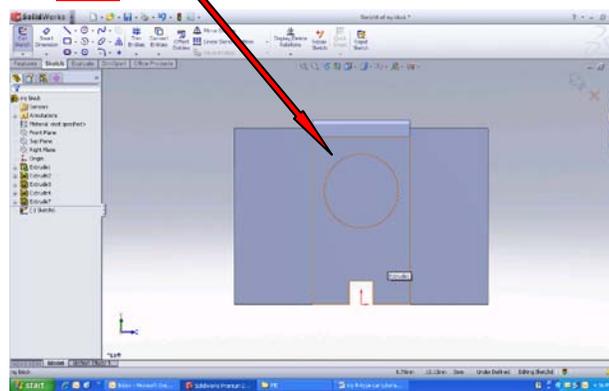
Be sure the extrusion arrow is facing 'up' and will go 'through-all'

13. **TICK OK TO EXTRUDE / DISPLAY SHADED WITH EDGES** as below

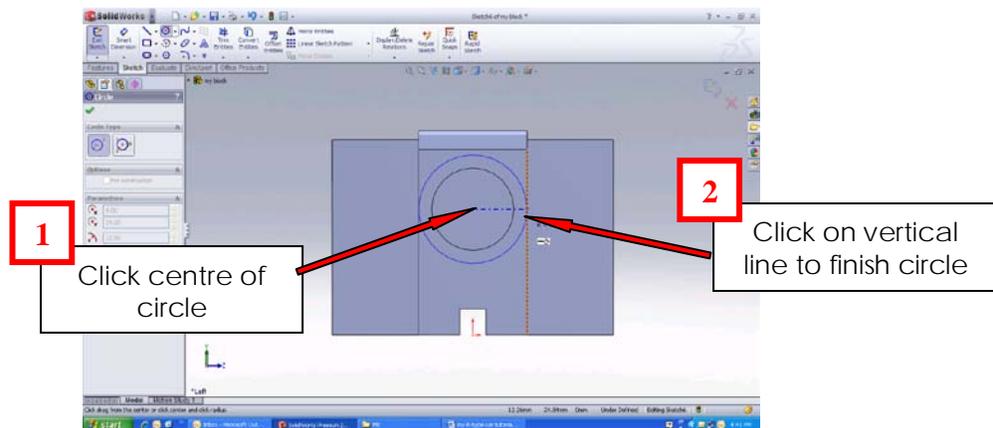


SAVE YOUR WORK / open the block again and try repeating everything you have done so far.....without looking at your tutorial pages!

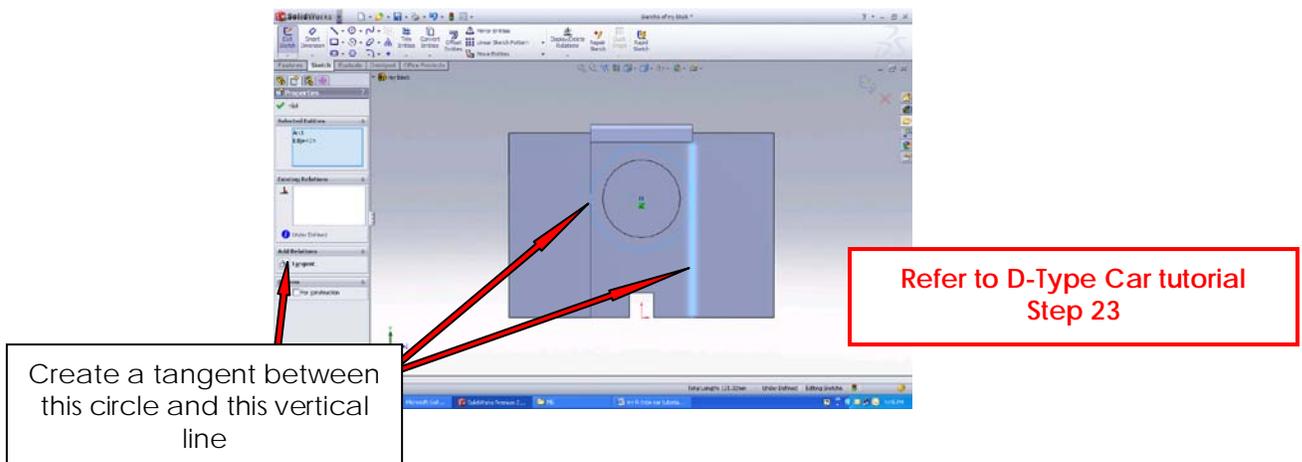
14. VIEW LEFT / EXTRUDED CUT TOOL / SELECT MIDDLE SECTION OF FACE
as shown below **NOT** inside the circle!



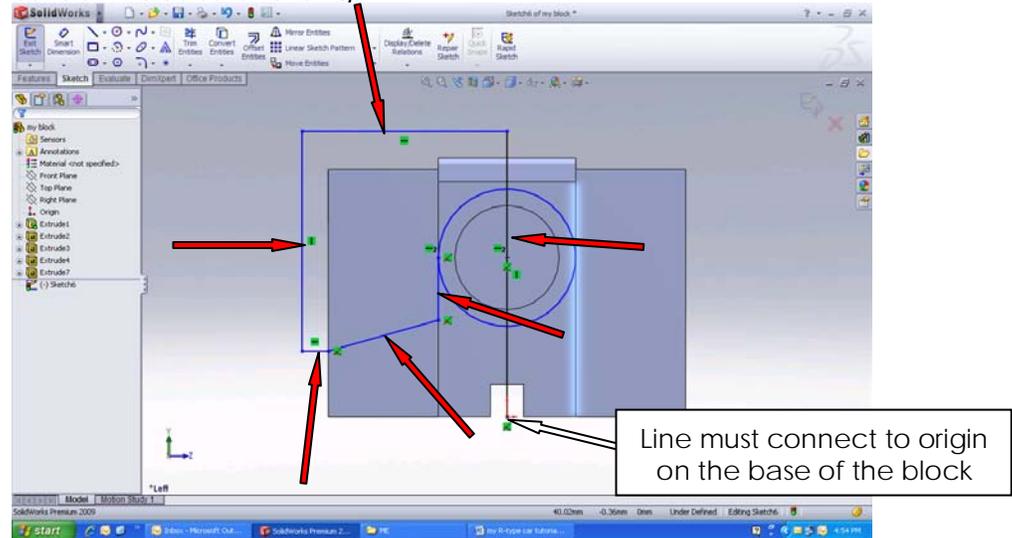
15. CIRCLE TOOL / DRAW 'OUTER CIRCLE' as shown below



16. SELECT NEW CIRCLE / SELECT VERTICLE LINE USED ABOVE / CREATE A TANGENT BETWEEN THEM BOTH

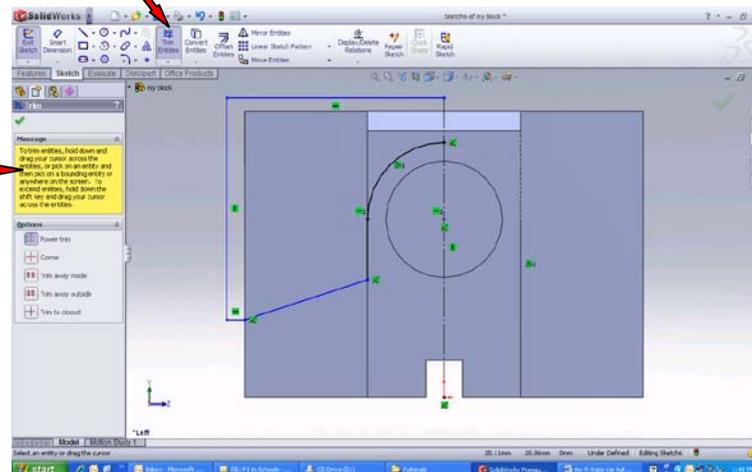


17. **LINE TOOL** draw a shape similar to the one below **USING 6 STRAIGHT LINES** be sure to connect to the origin

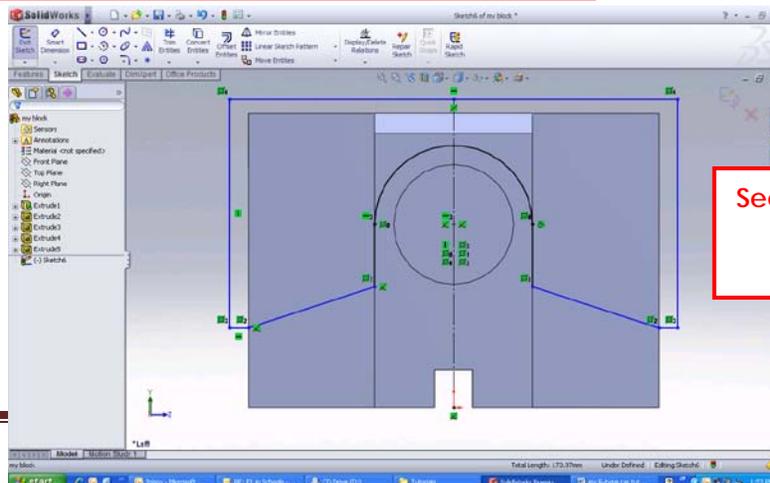


18. **ESCAPE / SELECT THE VERTICLE CENTRE-LINE / MAKE IT A CONSTRUCTION LINE**
19. **TRIM ENTITIES TOOL / REMOVE UNWATED PARTS OF OUTER CIRCLE** your screen should look ...like the one below

Read for instruction on Trim Entities tool!

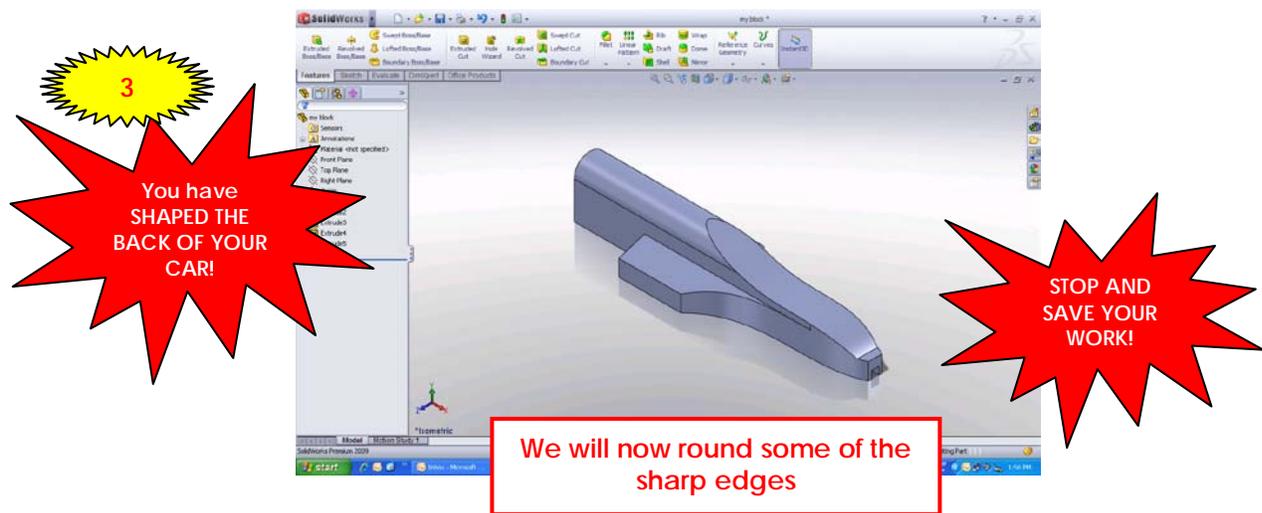


20. **MIRROR ENTITIES / MIRROR LINES AND SPLINE** as below



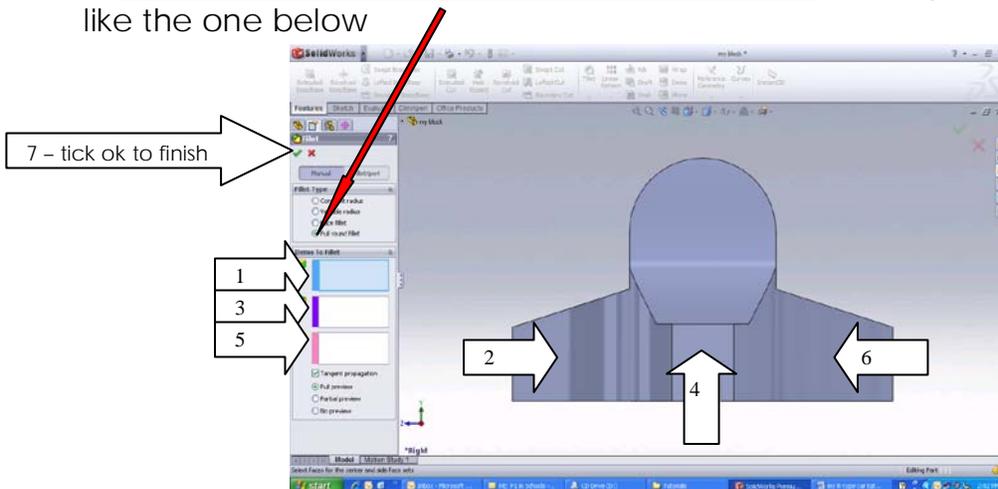
See step 11 above, also refer to D-Type Car tutorial Steps 25 & 26

21. **REPEAT STEPS 12 & 13 ABOVE / MAKE SURE EXTRUSION IS TOWARDS THE FRONT OF THE CAR / THROUGH-ALL** the result is below

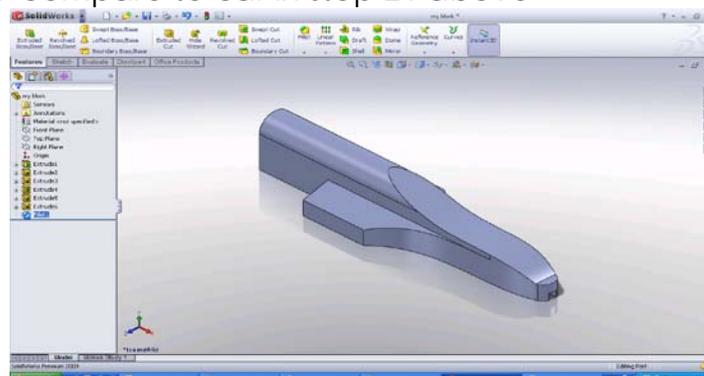


SAVE YOUR WORK / open the block again and try repeating everything you have done so far.....without looking at your tutorial pages!

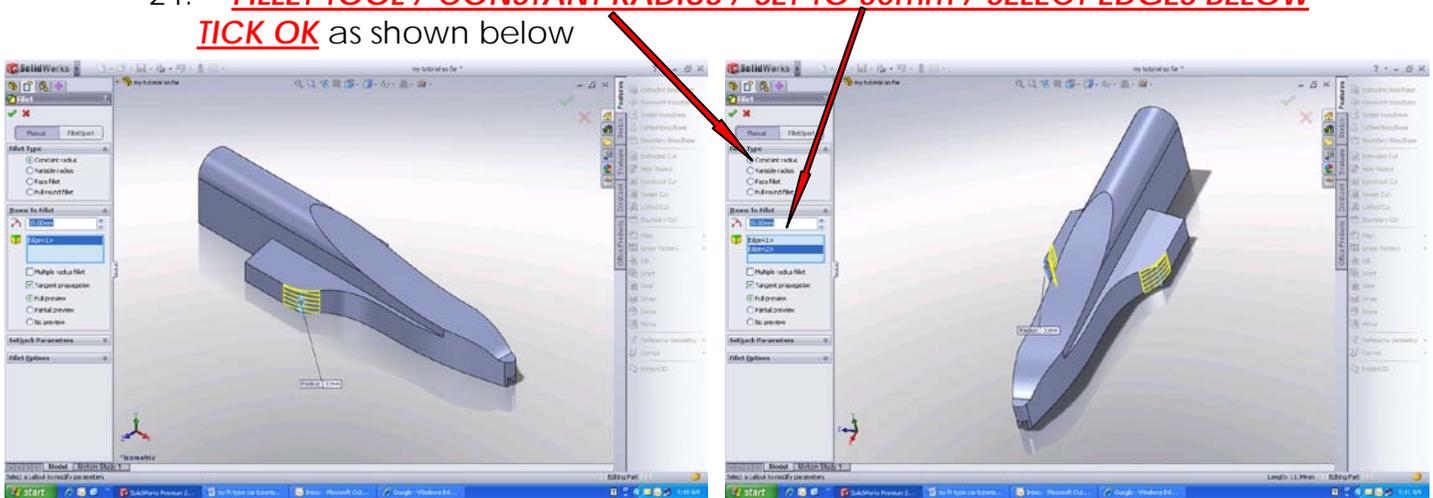
22. **FILLET TOOL / FULL ROUND FILLET / VIEW RIGHT** so that your screen looks like the one below



23. **FOLLOW SEQUENCE OF MOUSE-CLICKS ABOVE / VIEW ISOMETRIC** see result below / compare to car in step 21 above

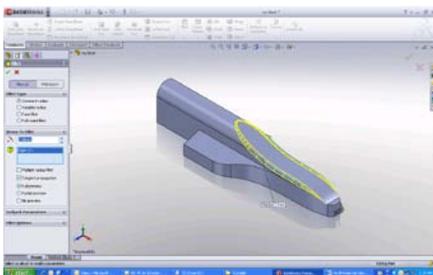


24. **FILLET TOOL / CONSTANT RADIUS / SET TO 30mm / SELECT EDGES BELOW**
TICK OK as shown below

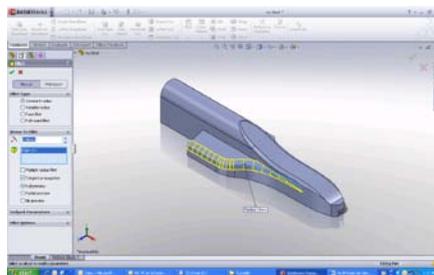


ROTATE USING ARROW KEYS ON KEYBOARD / RETURN TO ISOMETRIC VIEW

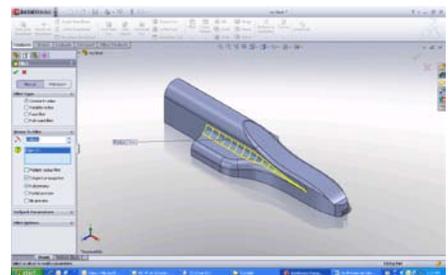
25. **FILLET TOOL / CONSTANT RADIUS / FILLET EDGES AS FOLLOWS** be sure to do both sides of your car!



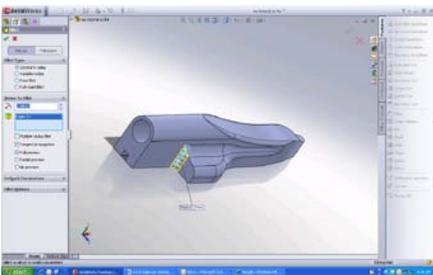
3mm radius



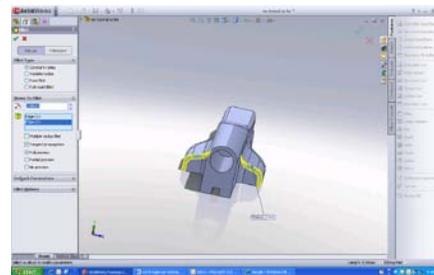
8mm radius



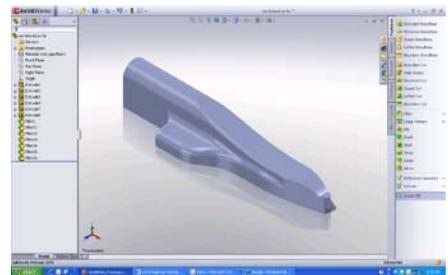
8mm radius



5mm radius



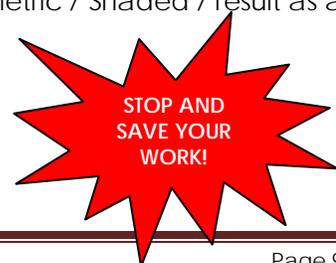
3mm radius



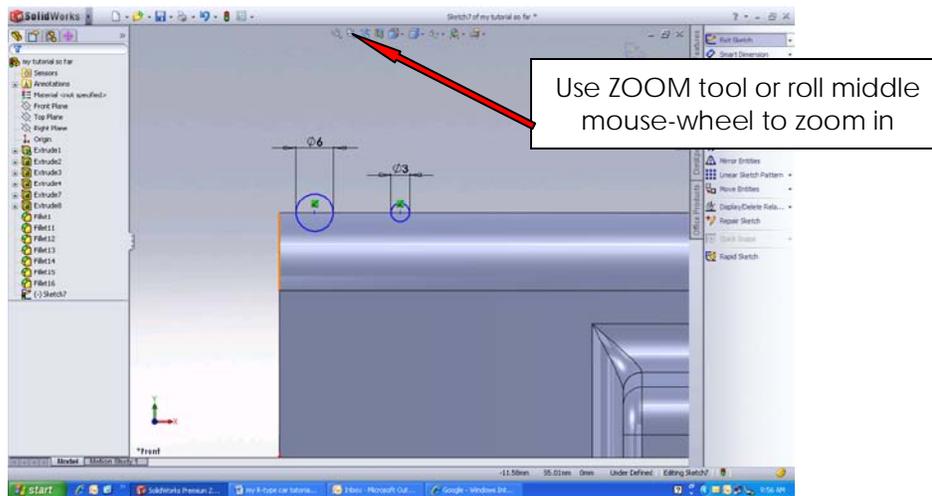
Isometric / Shaded / result as above



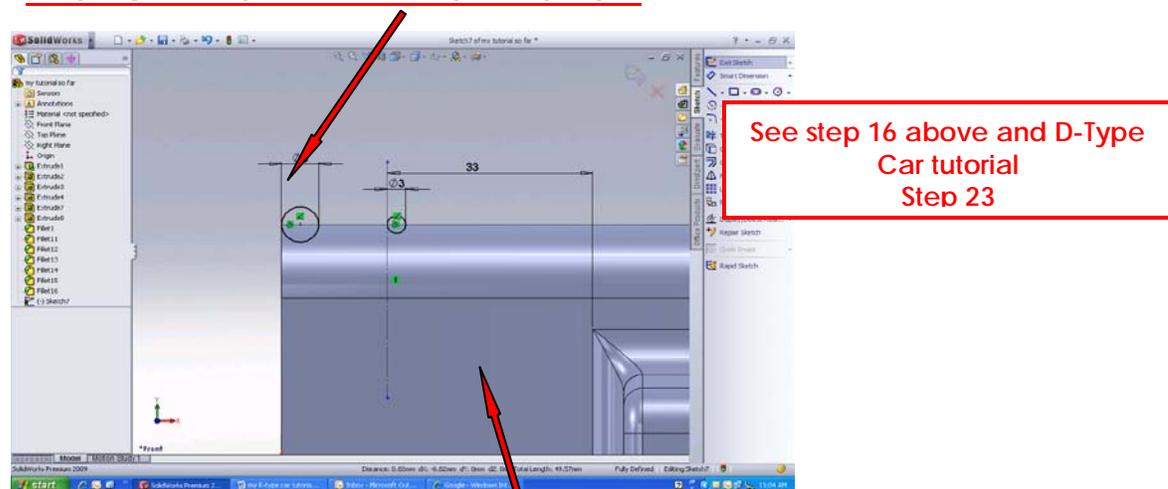
We will now add the rear wing



26. VIEW FRONT / SHADED WITH EDGES / EXTRUDED BOSS-BASE / FRONT PLANE / CREATE 2 CIRCLES as below

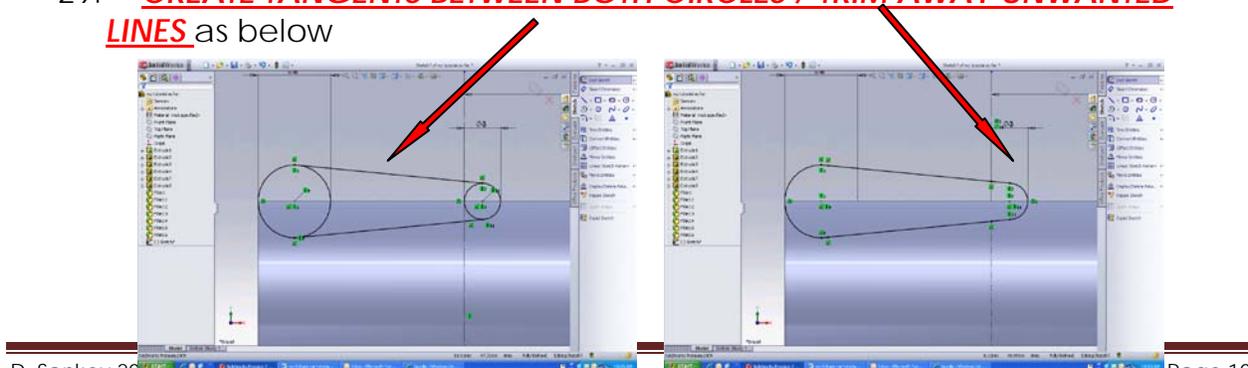


27. EXIT FROM SMART DIMENSION TOOL / CREATE A TANGENT BETWEEN THE BACK OF THE CAR AND THE 6mm CIRCLE

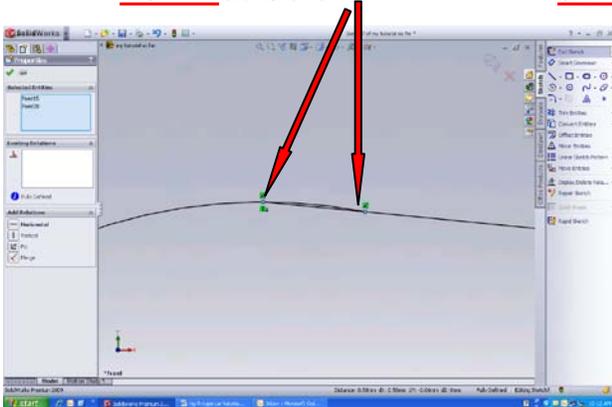


28. ADD THE CONSTRUCTION LINE ABOVE / CREATE A TANGENT BETWEEN IT AND THE SMALLER CIRCLE

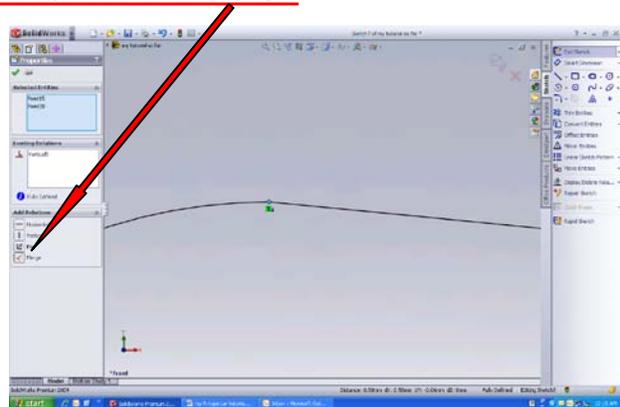
29. CREATE TANGENTS BETWEEN BOTH CIRCLES / TRIM AWAY UNWANTED LINES as below



30. ZOOM AND INSPECT THE TANGENT POINTS / IF MORE THAN ONE AT EACH POINT as below.....SELECT BOTH AND MERGE

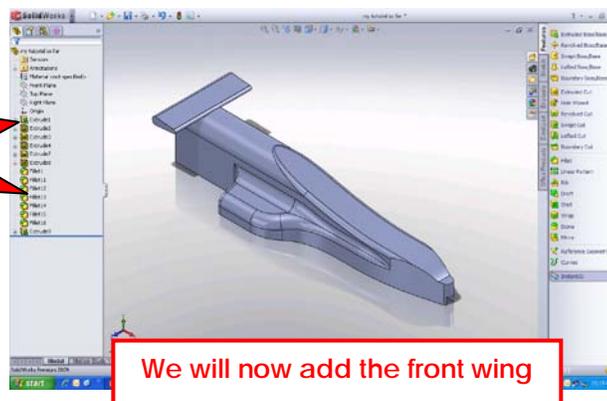


Before



After

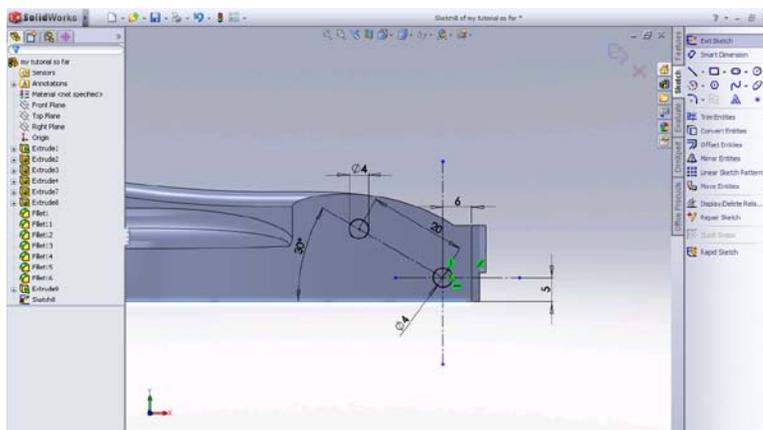
31. VIEW ISOMETRIC / ACCEPT SKETCH / MAKE DIRECTIONS 1&2 TO 32.5mm/ CLICK OK TO EXTRUDE below is the result



We will now add the front wing

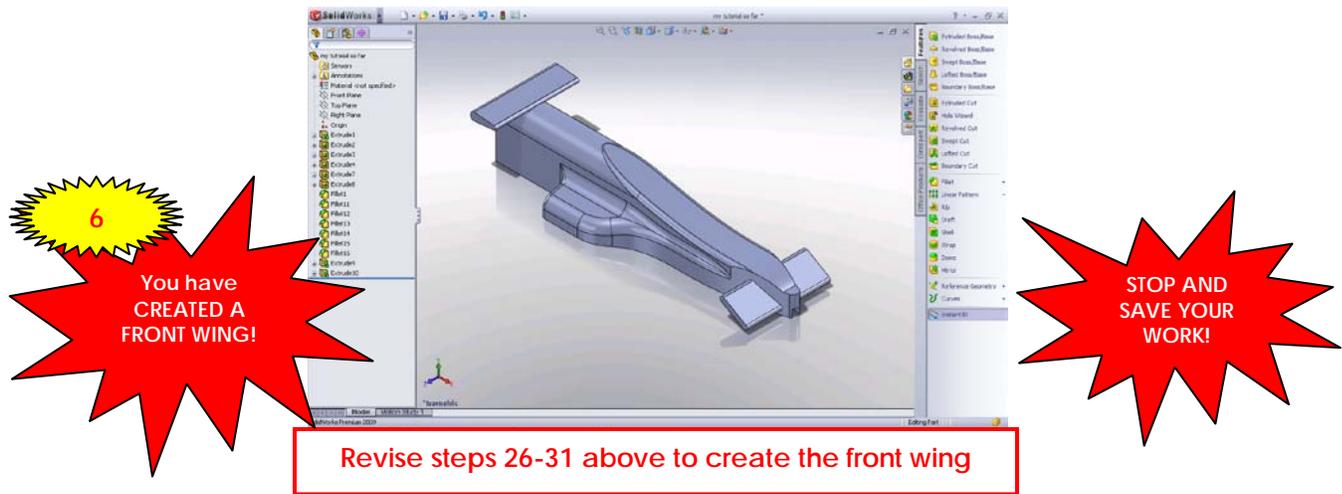


32. VIEW FRONT / SHADED WITH EDGES / EXTRUDED BOSS-BASE / FRONT PLANE / CREATE 2 CIRCLES as below



By now you should realize we are repeating much of steps 26-31 above to create the front wing

33. CREATE TANGENTS / REMOVE UNWANTED LINES / EXTRUDE result is below



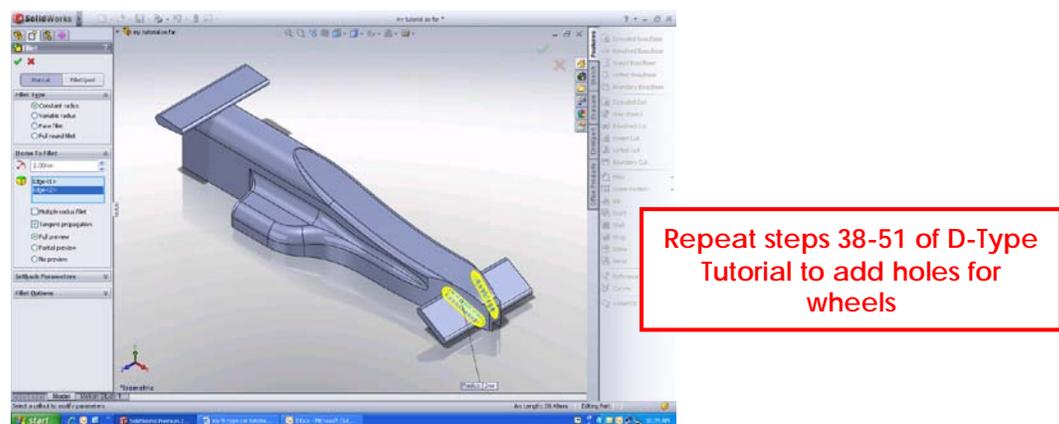
6

You have CREATED A FRONT WING!

STOP AND SAVE YOUR WORK!

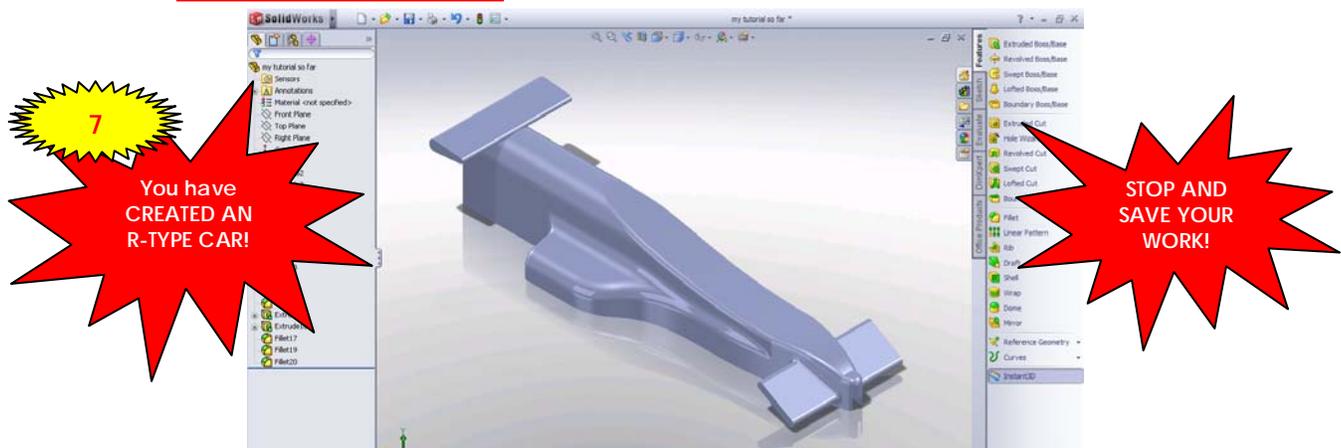
Revise steps 26-31 above to create the front wing

34. ADD A 2mm RADIUS TO BODY & WING INTERSECTIONS as below



Repeat steps 38-51 of D-Type Tutorial to add holes for wheels

35. ISOMETRIC / SHADED result is below



7

You have CREATED AN R-TYPE CAR!

STOP AND SAVE YOUR WORK!

SAVE YOUR WORK / start a new drawing and try repeating everything you have done so far.....without looking at your tutorial pages!

NEXT TUTORIAL?.....Tutorial 3 - Assembling an R-Type Car in SolidWorks