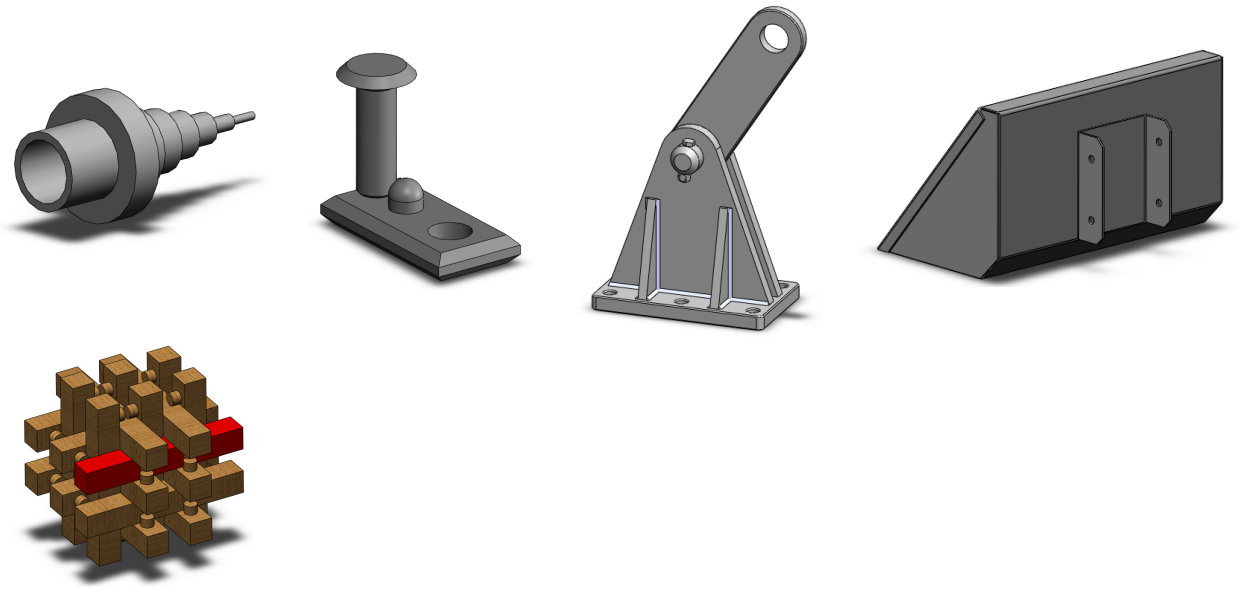
SolidWorks® tutorials

EXERCISES



Junior and Senior Secondary Technical Education

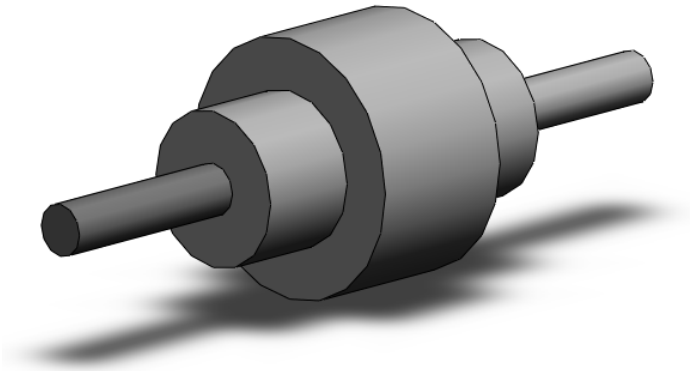
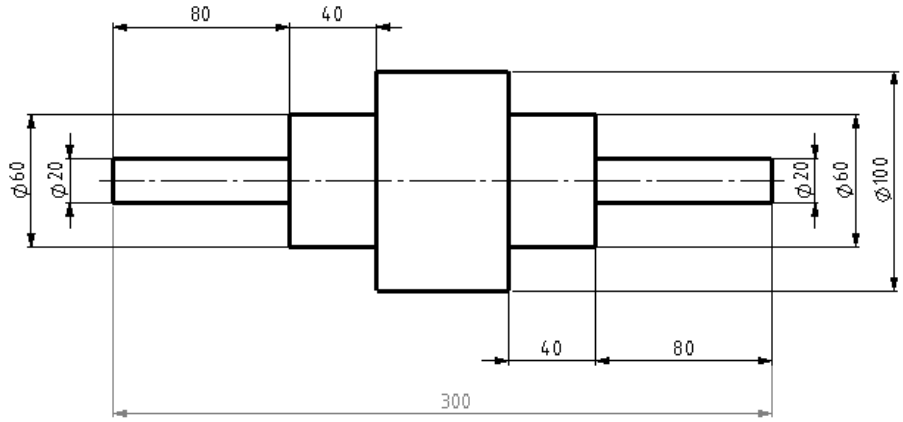
Voor gebruik met SolidWorks® Educational Release 2008-2009

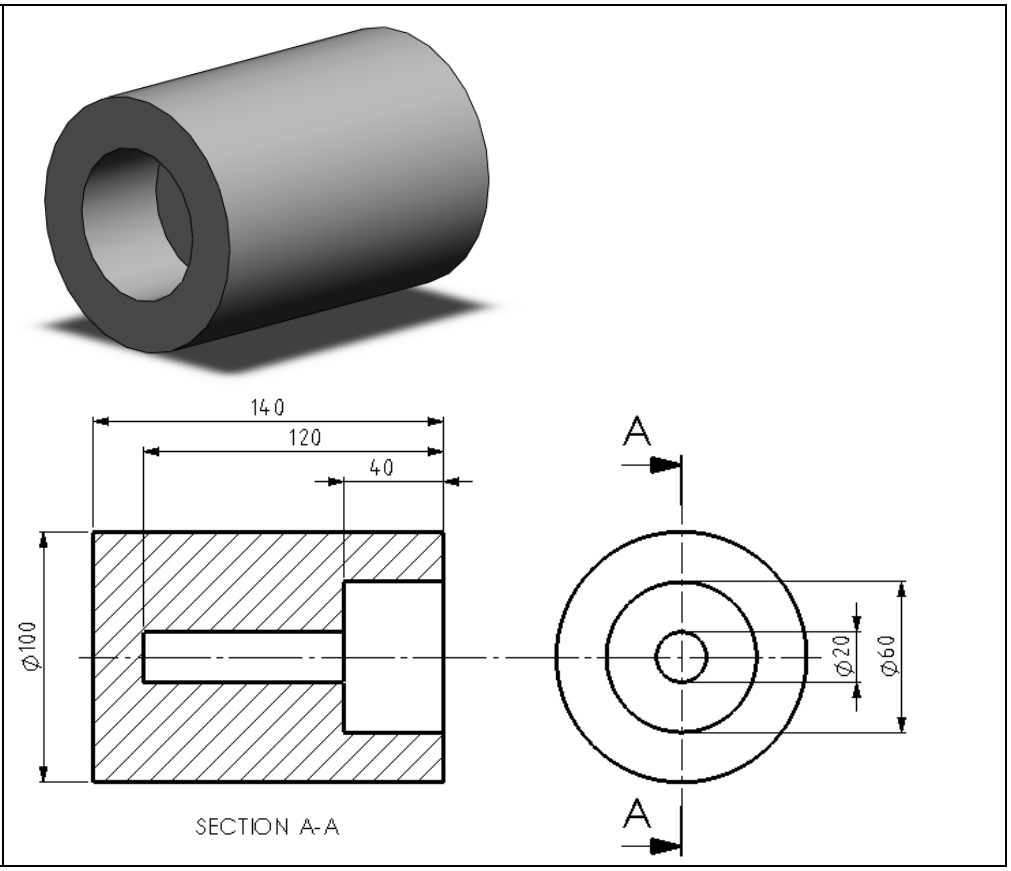
This tutorial has been developed at the request of SolidWorks Benelux and may be used by anyone who wants to learn how to use the SolidWorks 3D CAD software. **It is not permitted to use this tutorial or parts of this tutorial in any other way.** If you have any questions, please contact SolidWorks Benelux. Contact details are given on the last page of this tutorial.

Initiative: Kees Kloosterboer (SolidWorks Benelux)
Educational coordination: Jack van den Broek (specialist class Dr. Knippenberg)
Realization: Arnoud Breedveld (PAZ Computerworks)

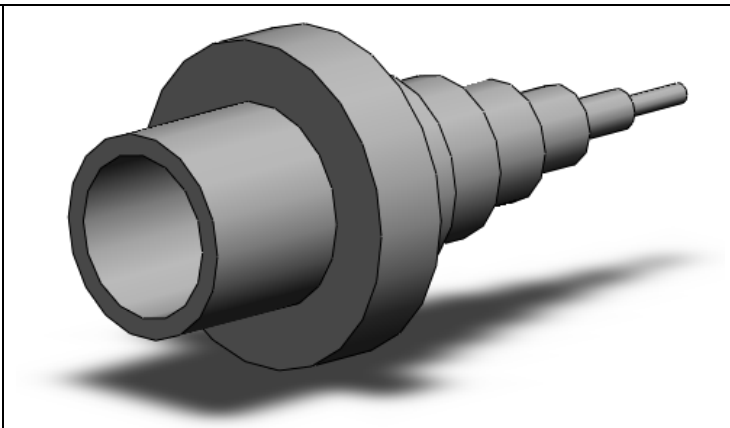
Exercises

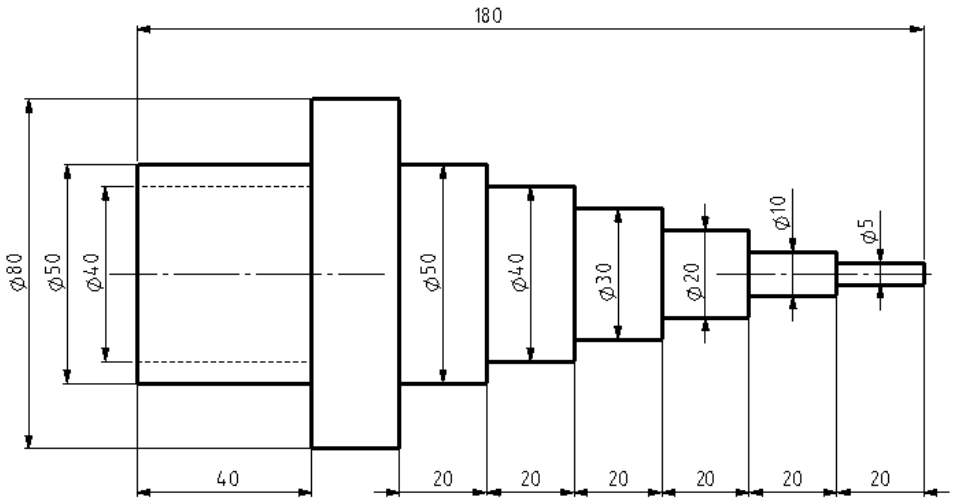
Approach	Congratulations! You have already worked through the first few SolidWorks tutorials, so you already have some understanding of SolidWorks. In order to really get to know the program, it is important that you practice a lot! That is why we have put this bundle together. You now have a large number of exercises to help you become familiar with SolidWorks. The best idea is to do the relevant exercises from this bundle every time you have completed a SolidWorks tutorial. You can then put what you have learnt into practice straight away. The exercises you are going to do depend on each other. This means that: you may make an axle in the exercises for tutorial one, another part in tutorial 3 and then put them together in an assembly in tutorial 7. **It is therefore very important that you save everything that you make** (parts, assemblies and drawings)! Create a new folder for this purpose. You could call this folder "SolidWorks exercises", for example. Always give the file the same name as the exercise (for example: Exercise1-1sldprt). Most of the exercises do not have an explanation. You should be able to model the part using the drawing. **Have fun drawing and good luck!**

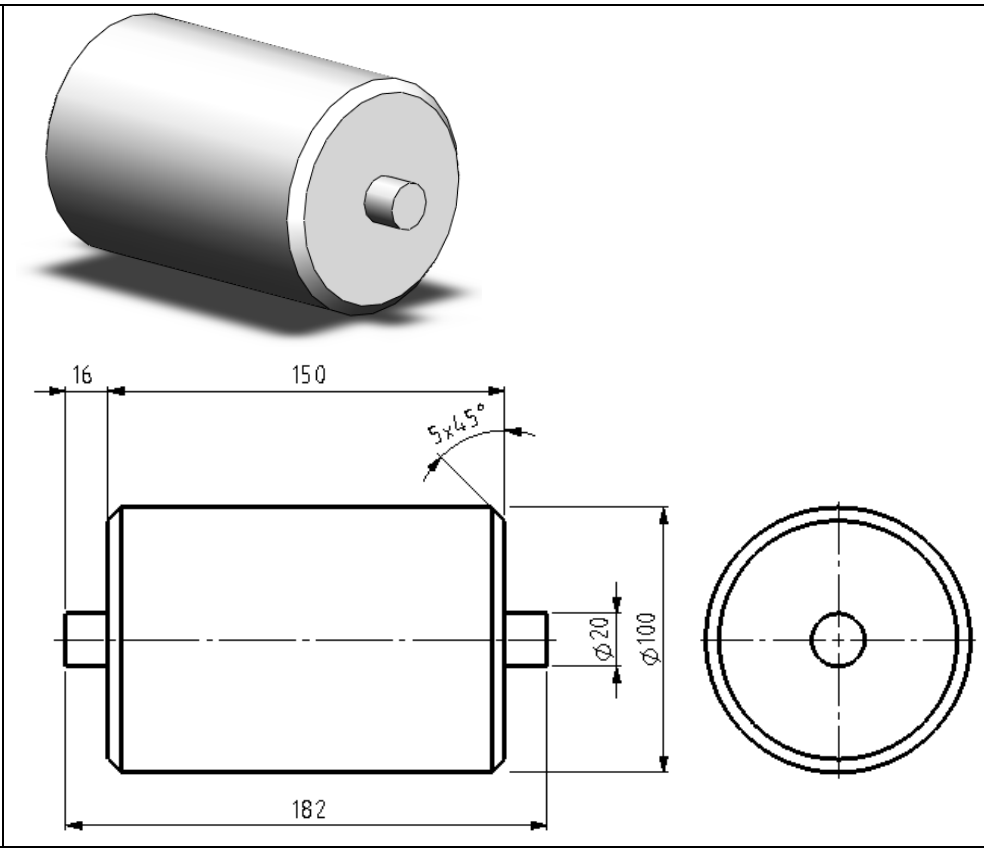
	Tutorial 1 Exercises
Exercise 1-1	 

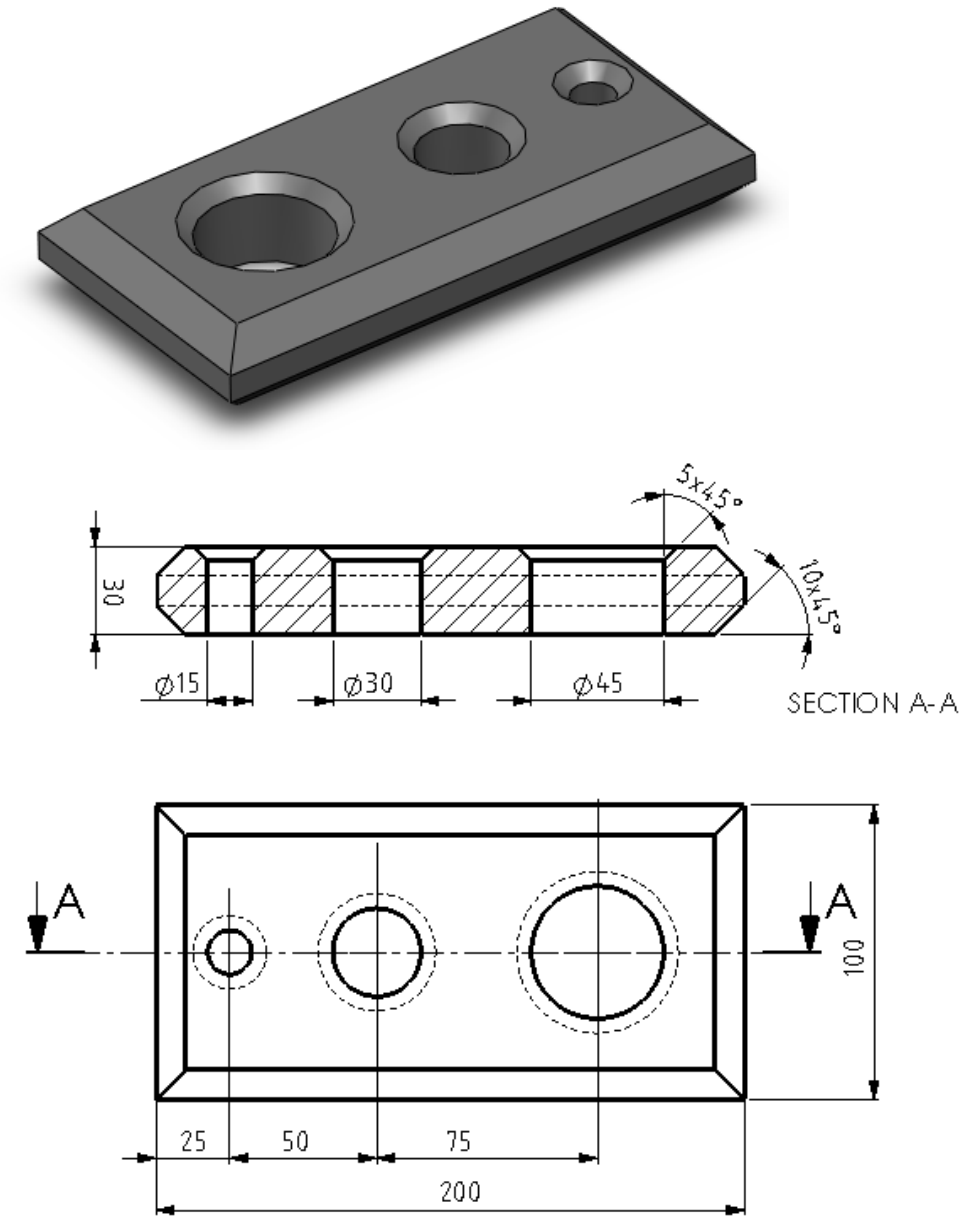
Exercise 1-2	

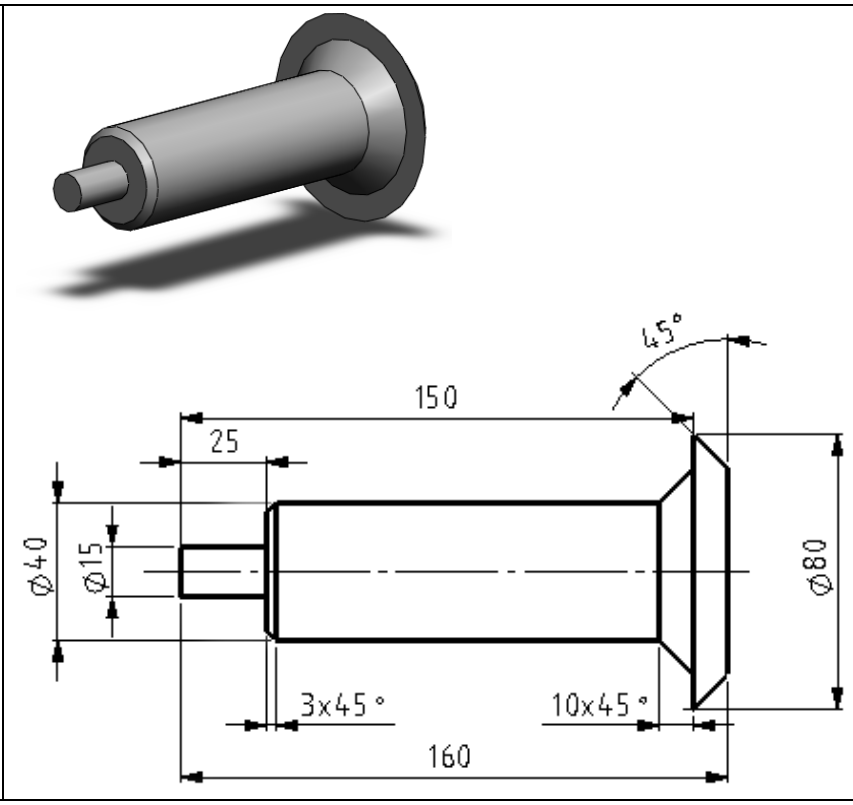
Exercise 1-3

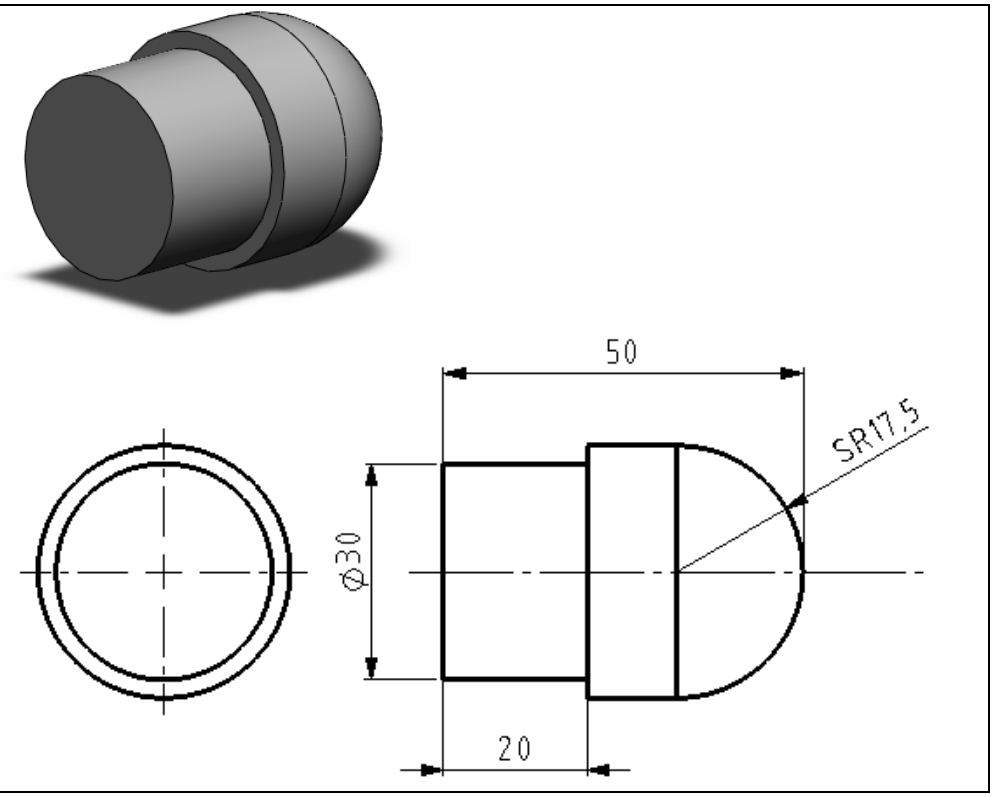




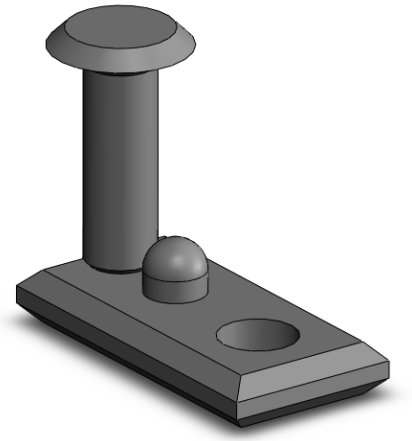
Exercise 1-4	

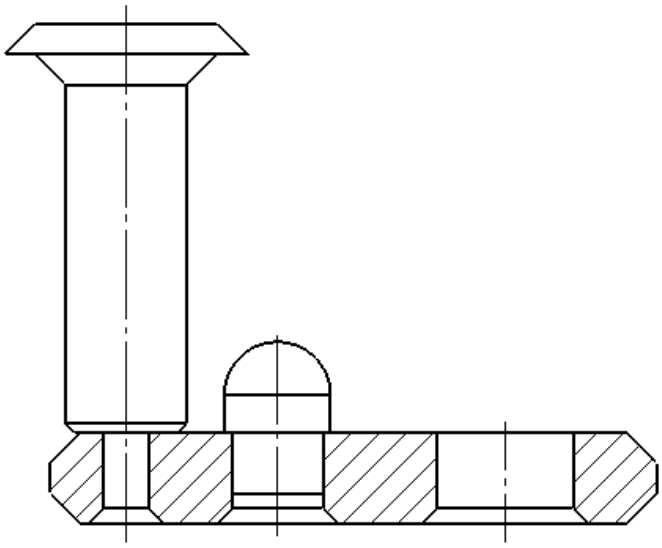
	Tutorial 2 Exercises
Exercise 2-1	

Exercise 2-2	

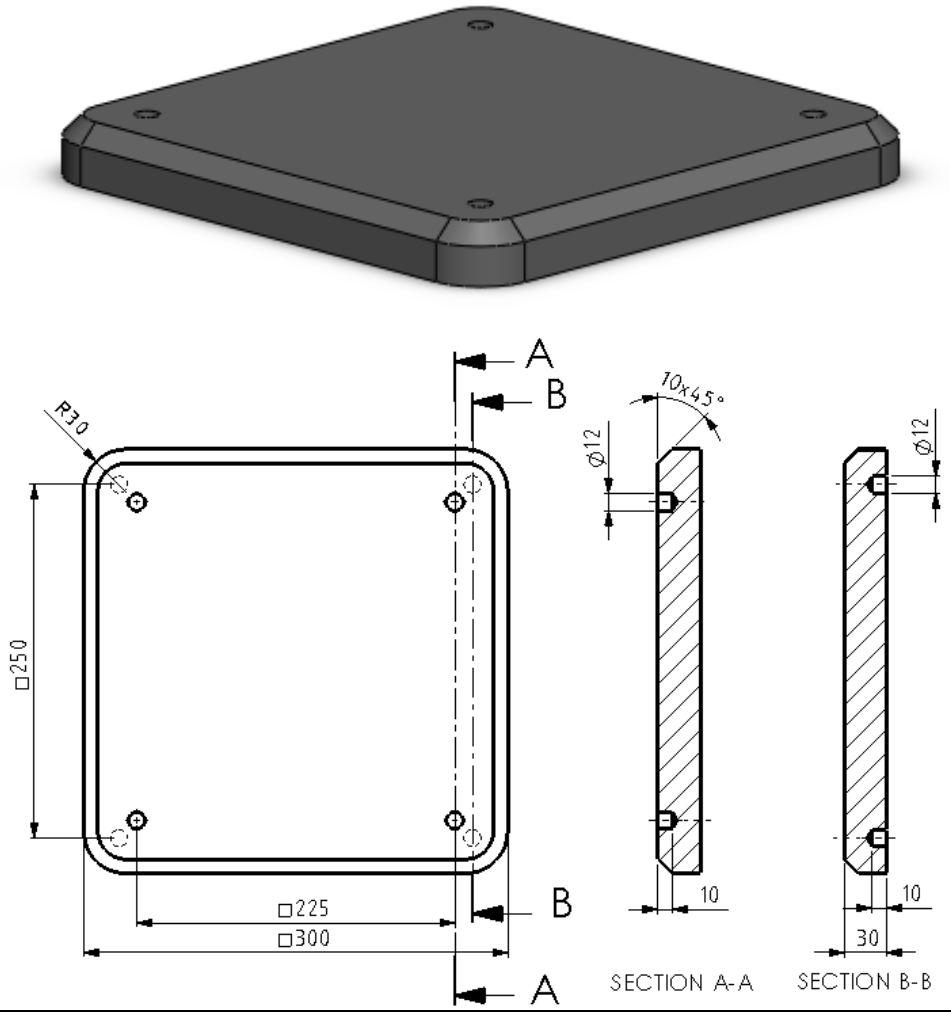
Exercise 2-3	

Exercise 2-4
Use the parts from exercises 2-1 through 2-3 to make the assembly shown on the right.

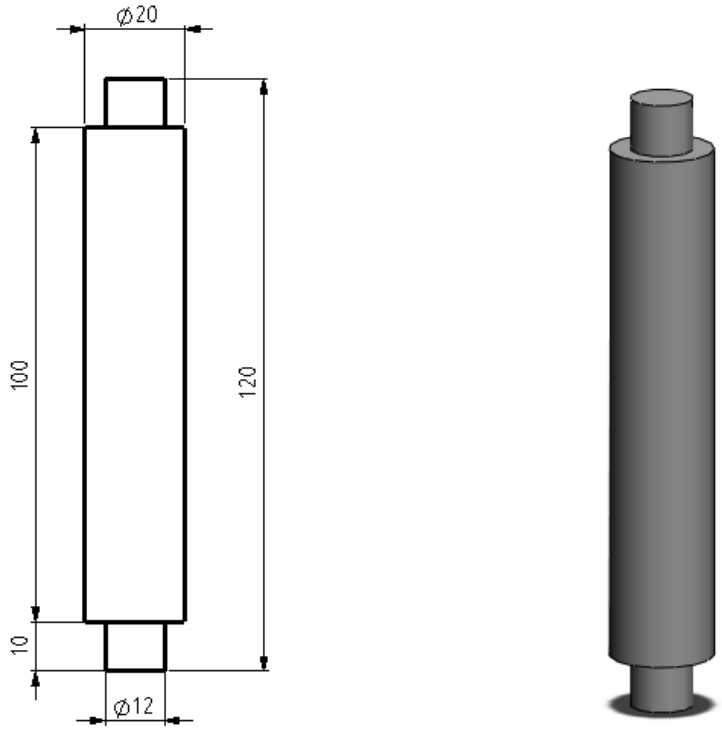


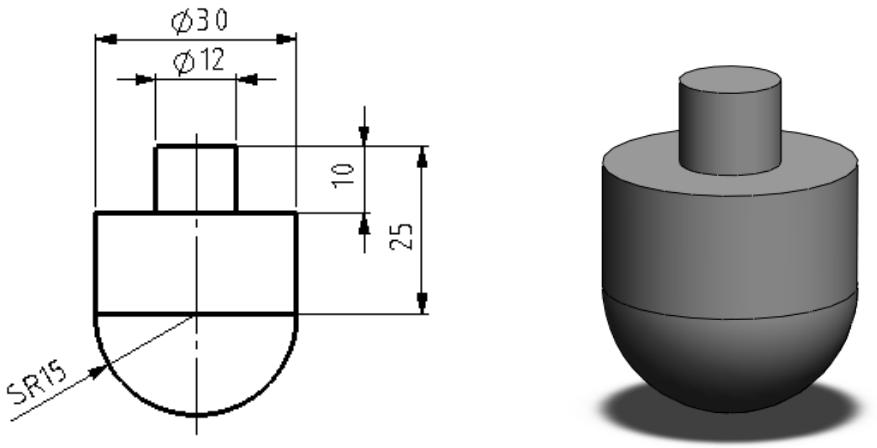


Exercise 2-5



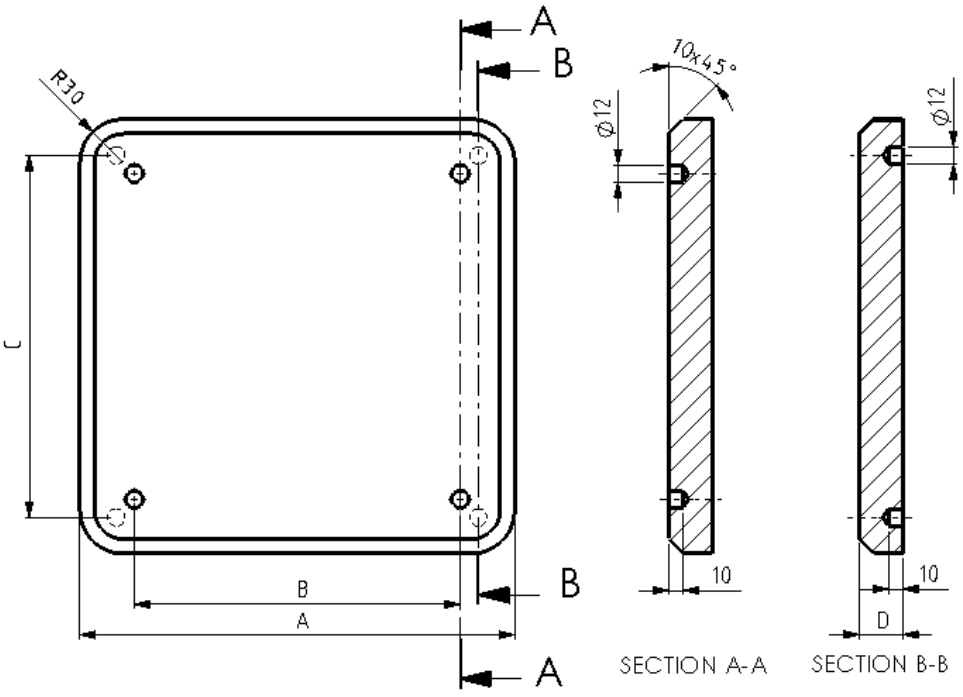
Exercise 2-6



Exercise 2-7	

Tutorial 3 Exercises

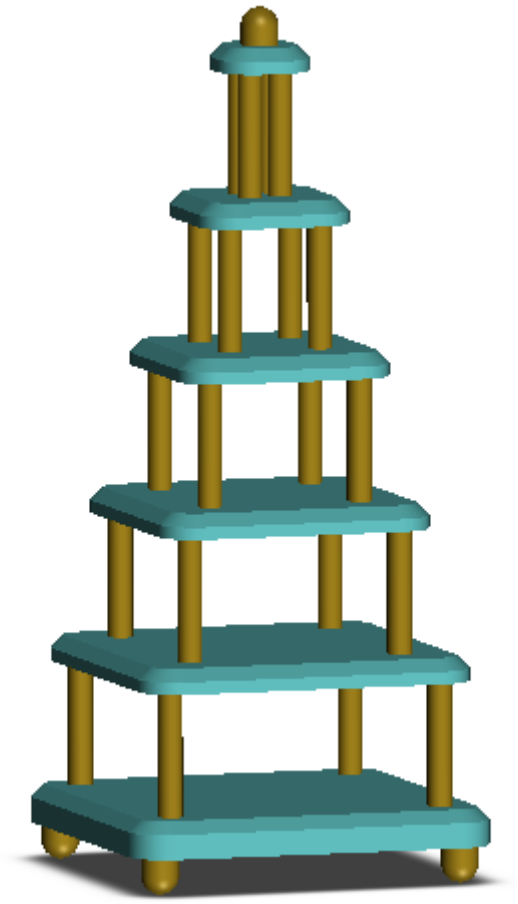
Exercise 3-1
Based on the model from exercise 2-5, make configurations using the dimensions in the table on the right. Configuration 1 has the same dimensions as the model in exercise 2-5, so 5 new configurations need to be made.



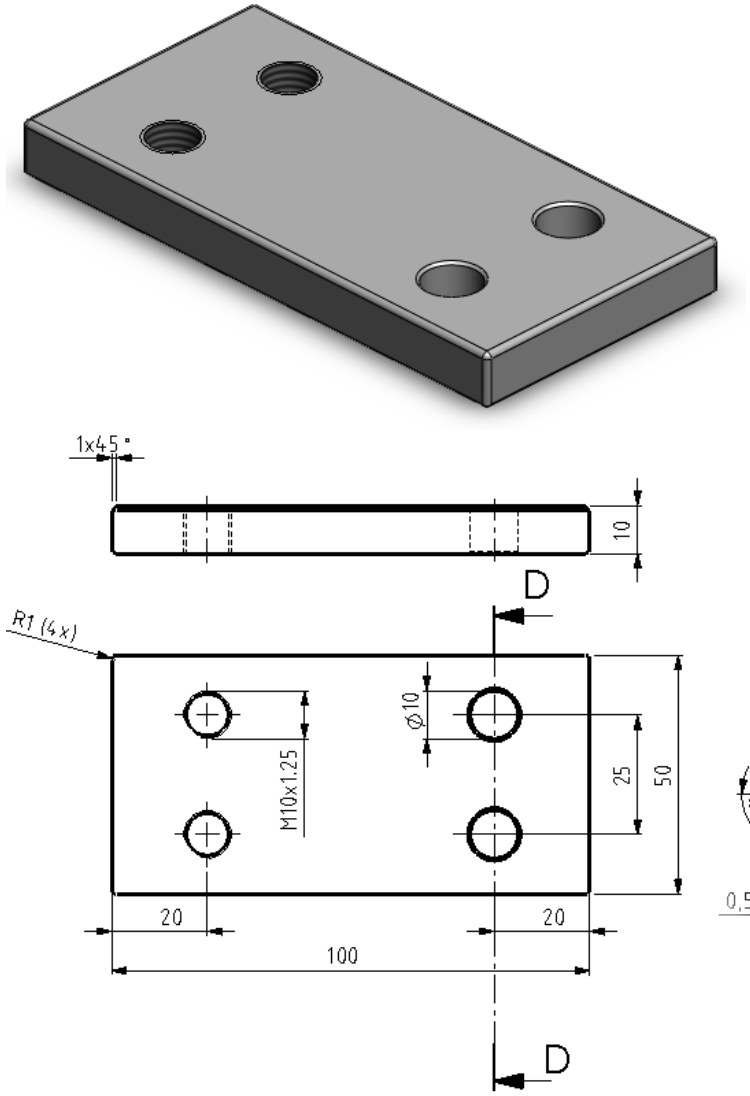
	A	B	C	D
Configuration 1	300	225	250	30
Configuration 2	275	175	225	20
Configuration 3	225	125	175	20
Configuration 4	175	75	125	20
Configuration 5	125	25	75	20
Configuration 6	75	0*	25	20

* Configuration 6 has just one single hole in its upper surface, in the middle of the surface.

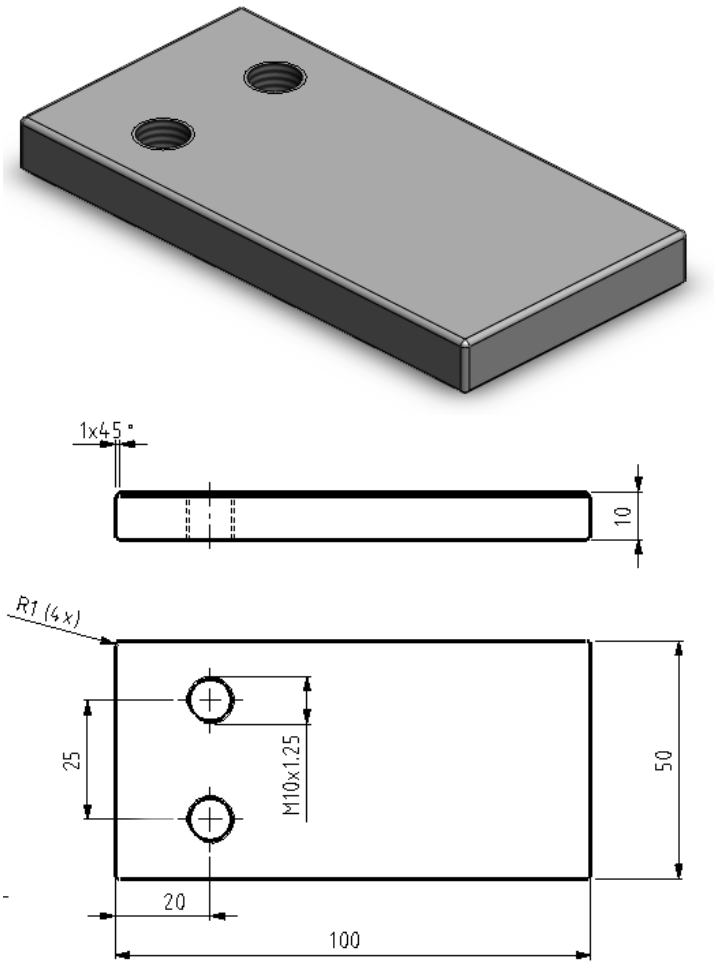
Exercise 3-2
Put the parts from exercises 2-5 through 3-1 together to produce an assembly as shown on the right. Use different colors for the different parts.

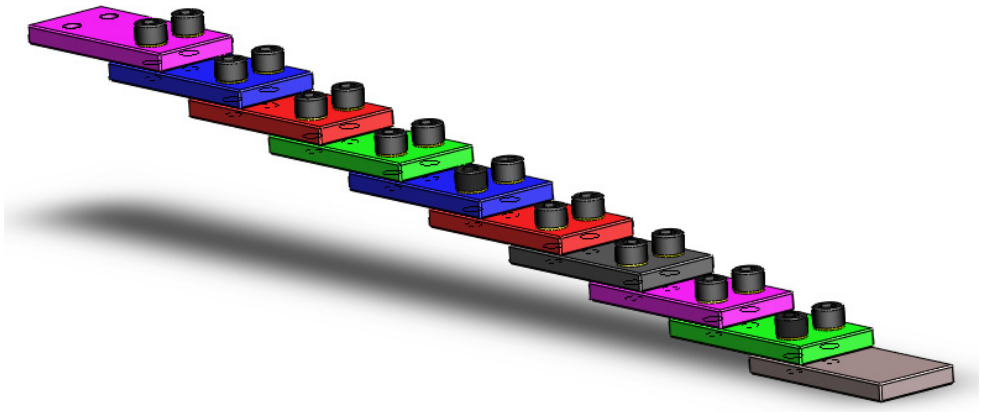


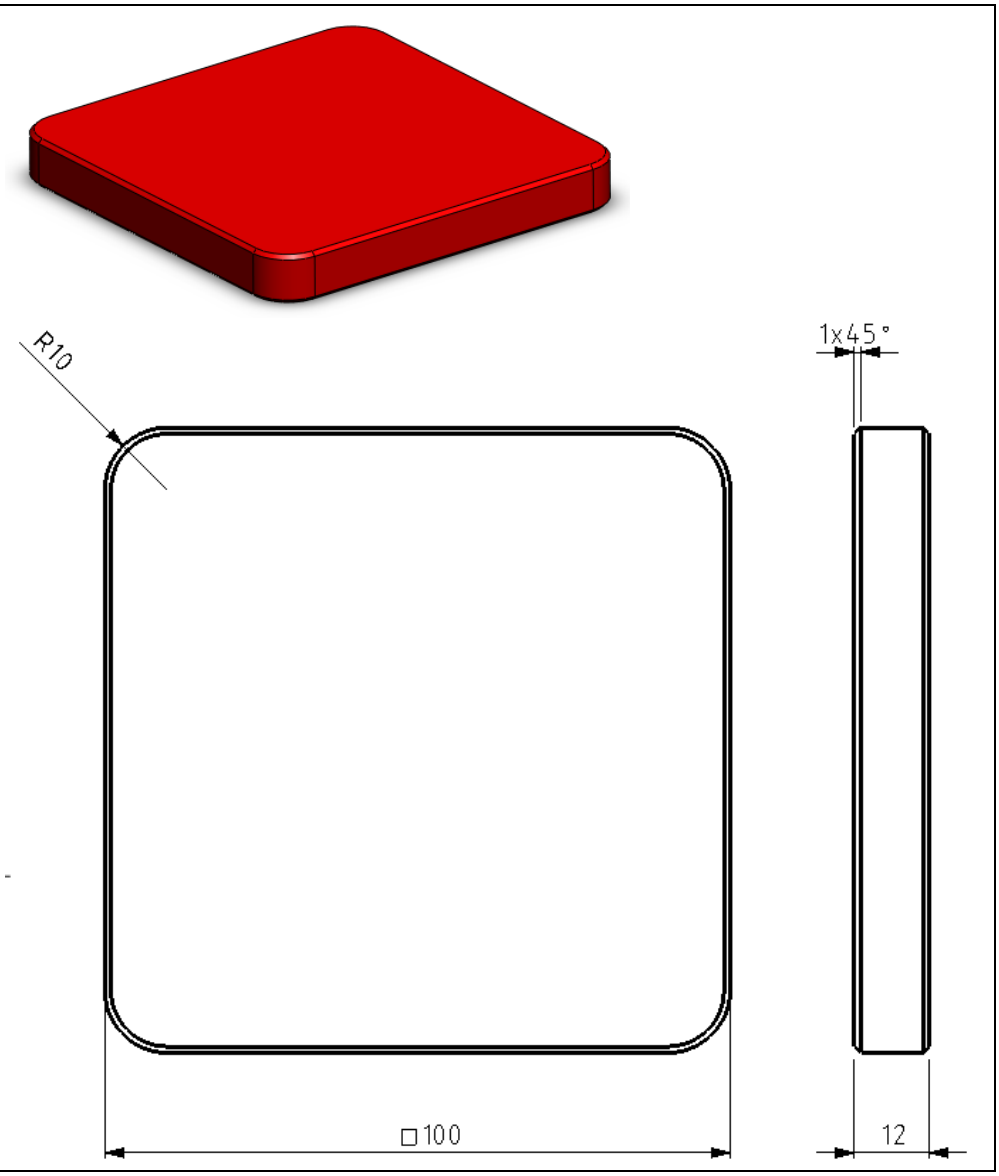
Exercise 3-3

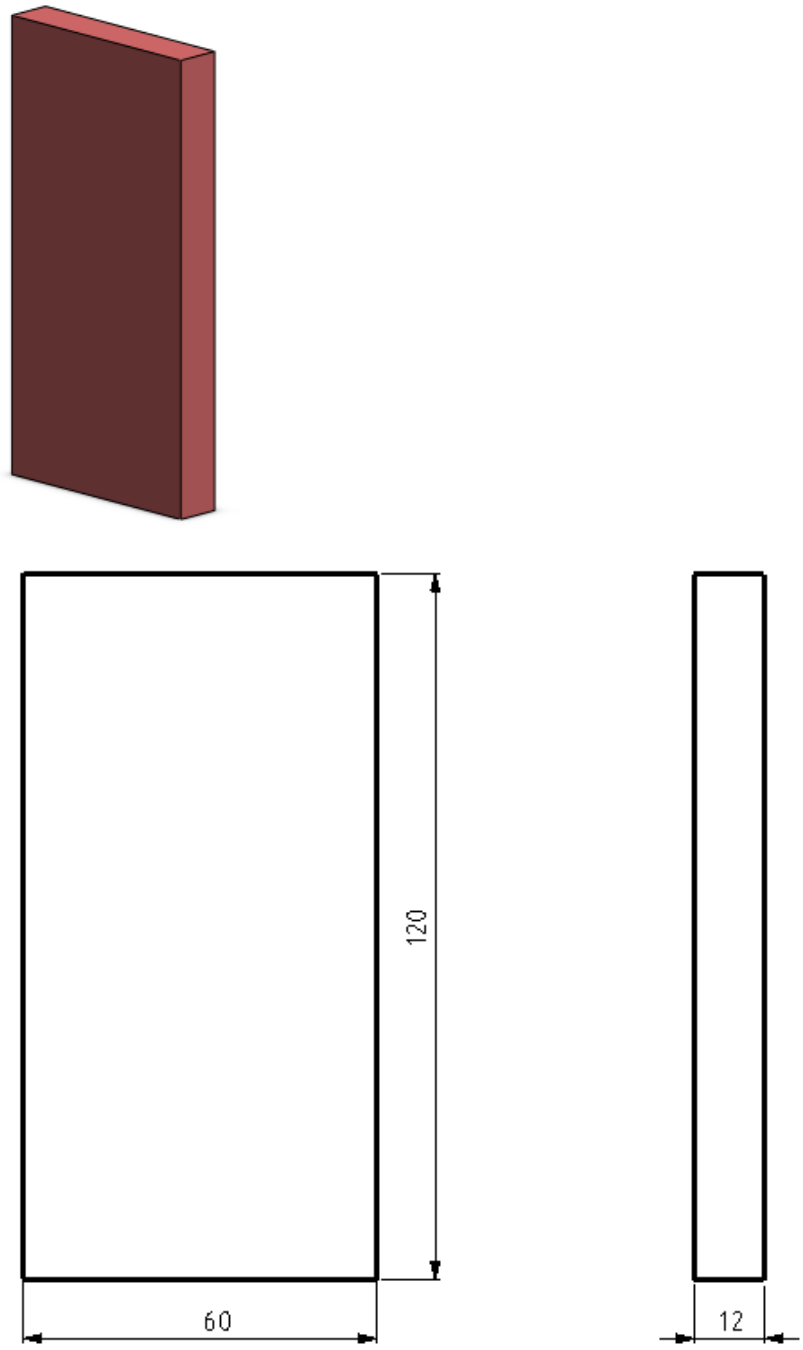
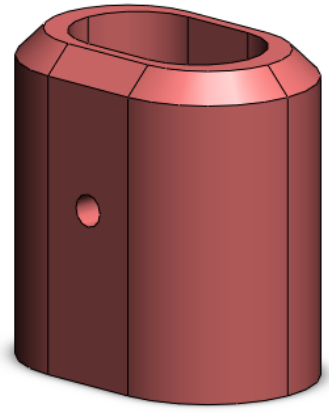

1x45°
10
D
R1 (4x)
Ø10
M10x1.25
25
50
20
20
100
D
R1
1x45°
1,5
0,50
SECTION D-D

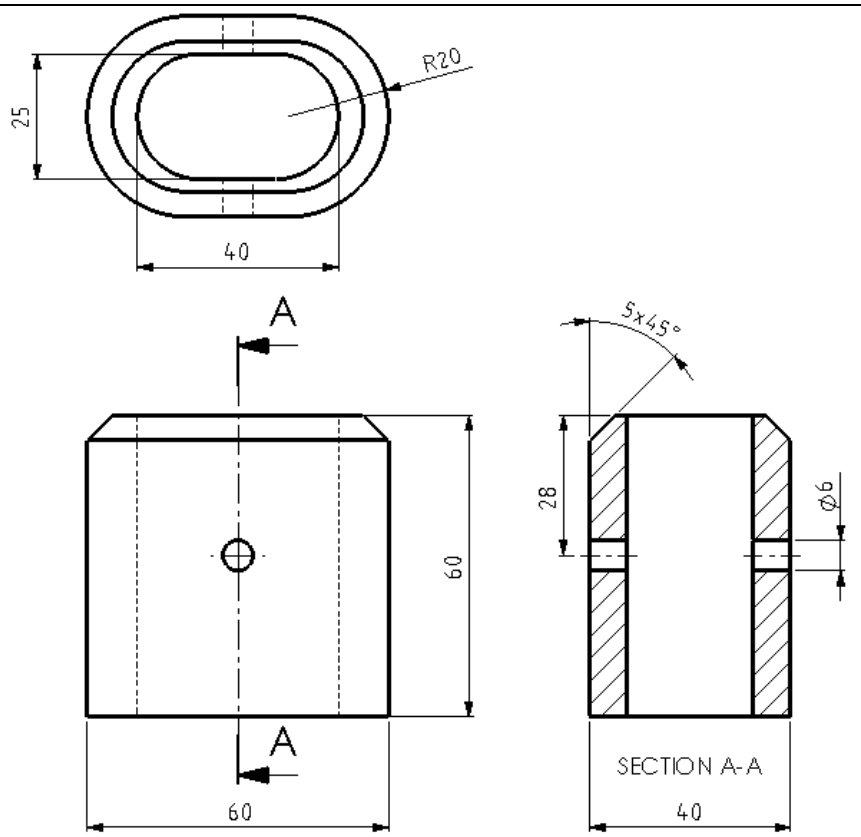
Exercise 3-4
Make a new configuration out of the model from exercise 3-3 as shown on the right. You need to suppress the two holes to make this configuration.



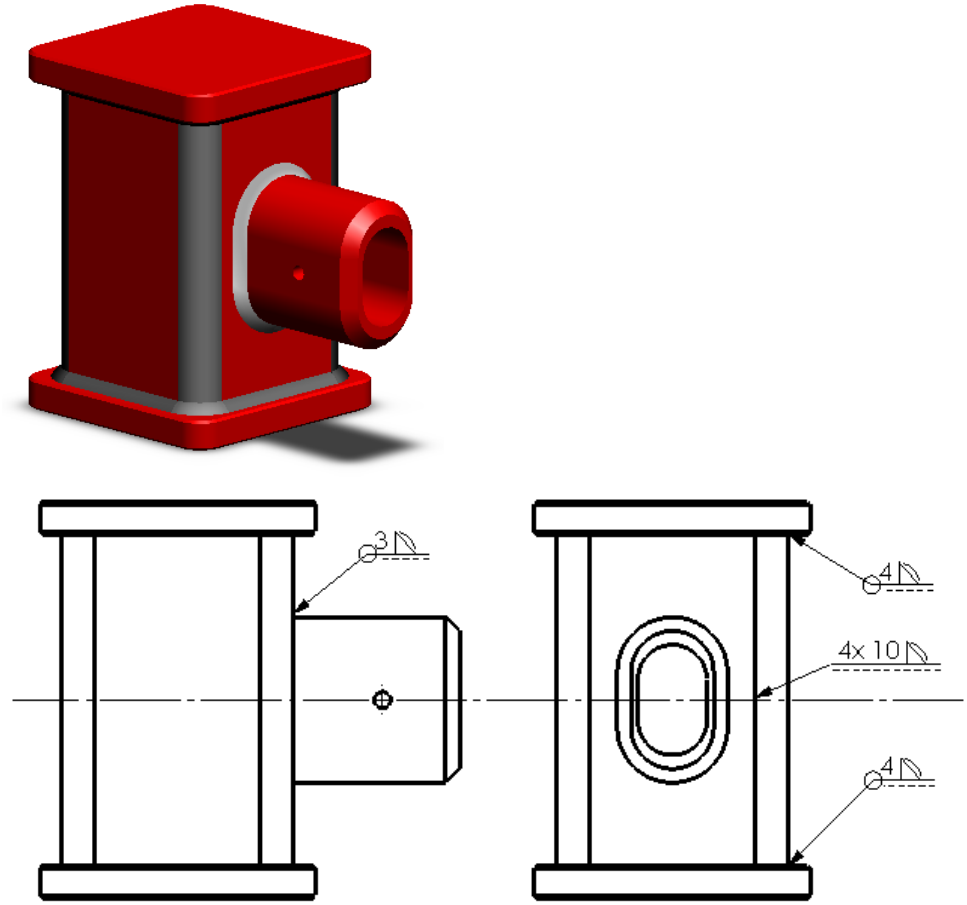
Exercise 3-5 Make an assembly as shown on the right. Use the parts from exercises 3-3 and 3-4. To secure it, use a Hex Socket Head, M12x1.25x20 from the Toolbox. Place a plain washer under each screw.	

Exercise 3-6	

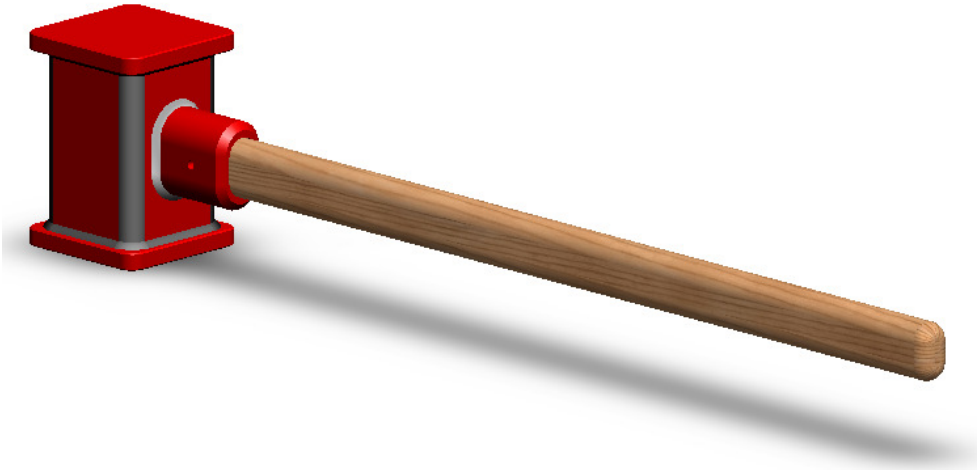
Exercise 3-7	
Exercise 3-8	


R20
25
40
A
60
A
60
5x45°
28
Ø6
SECTION A-A
40

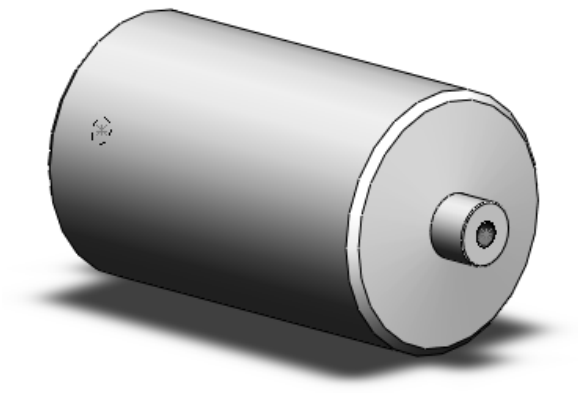
Exercise 3-9
Use the parts from exercises 3-6 through 3-8 to make the assembly. Add fillet welds as shown in the drawing on the right.

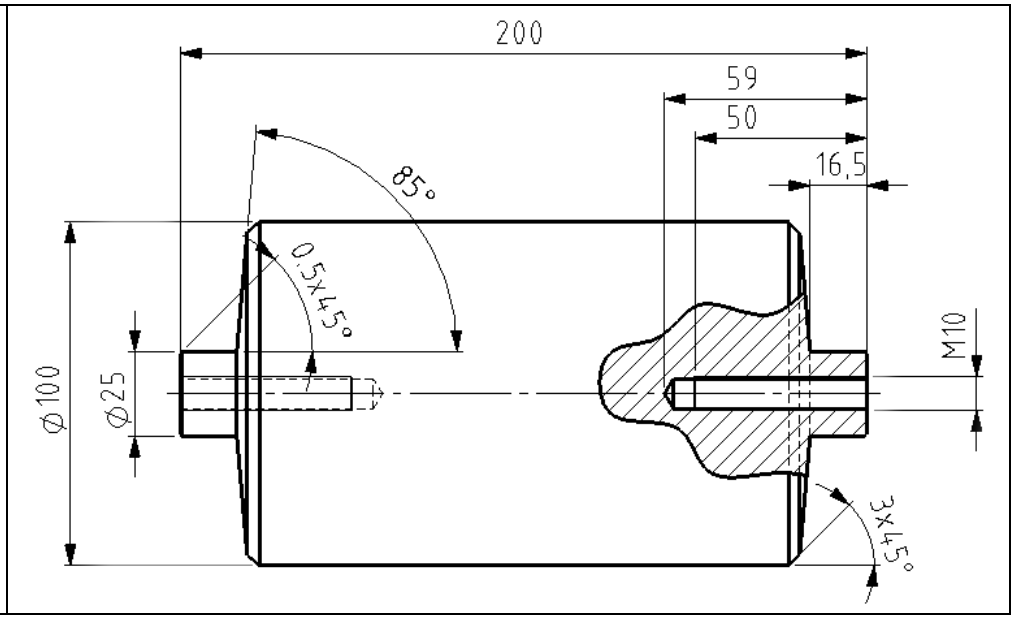


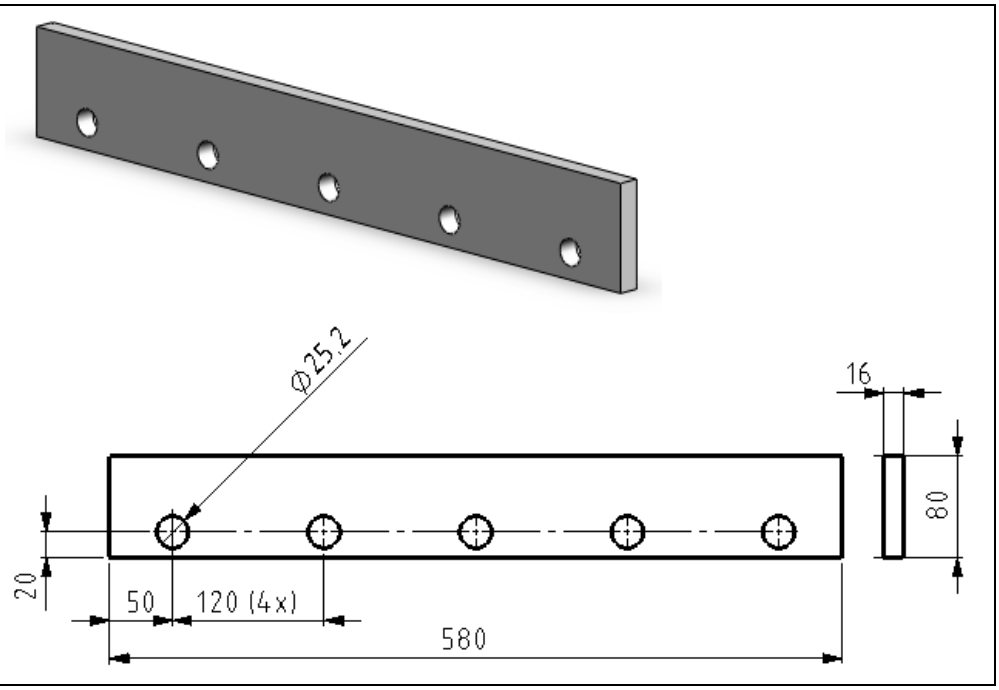
Exercise 3-10
Now make a 700mm long handle and add it to the assembly.

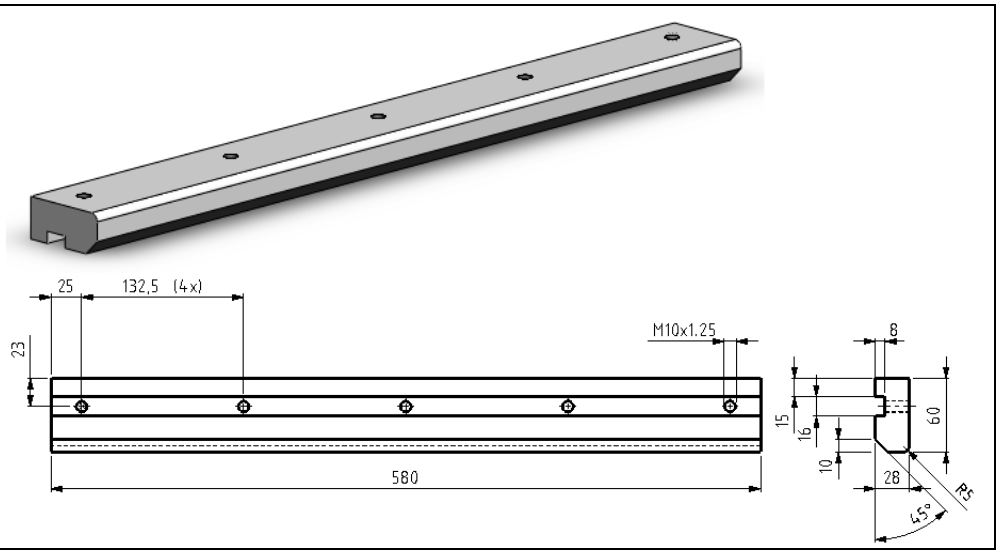


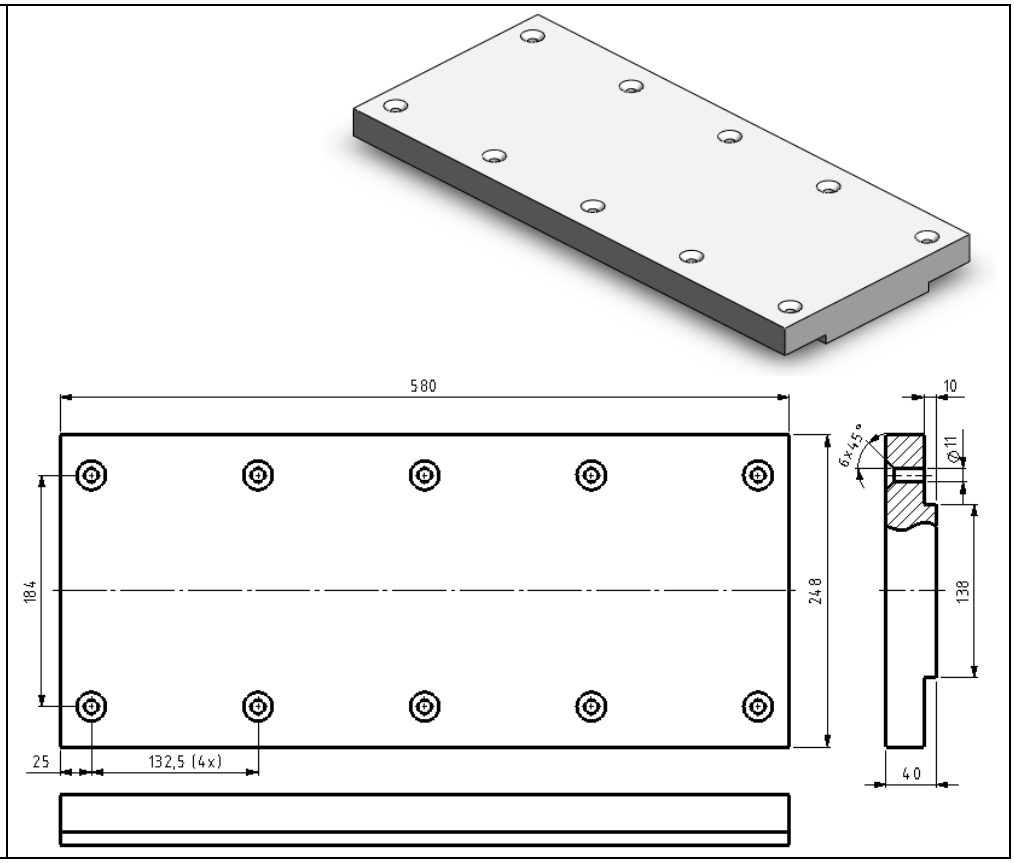
Exercise 3-11

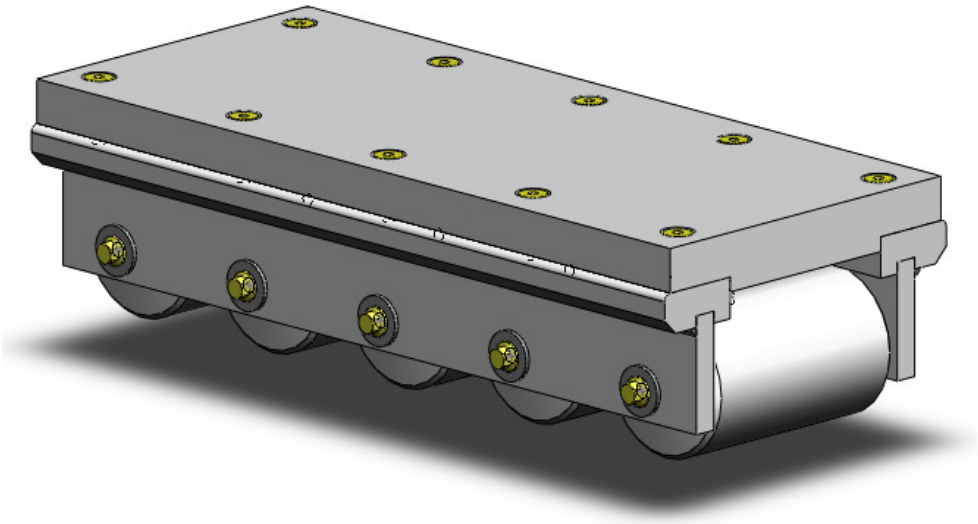



200
59
50
16,5
85°
0,5x45°
Ø100
Ø25
M10
3x45°

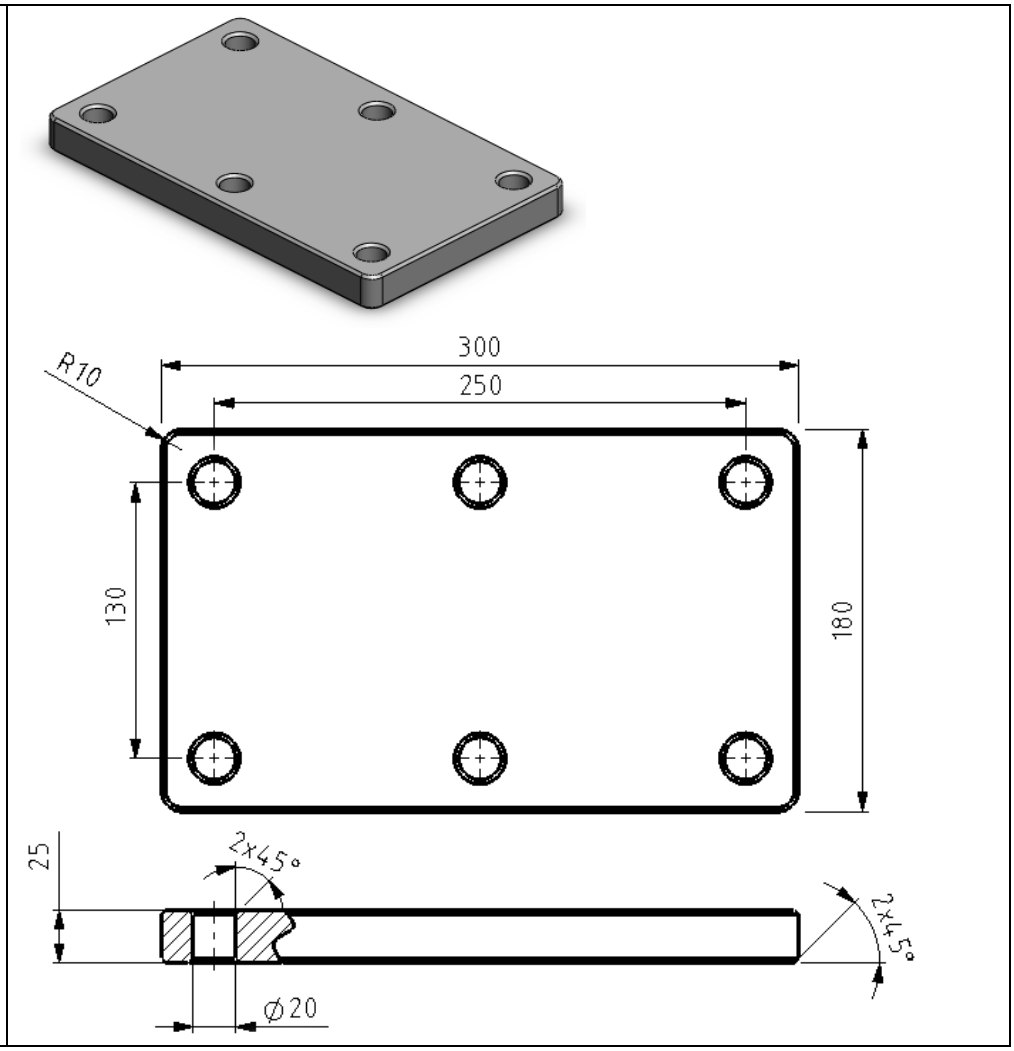
Exercise 3-12	

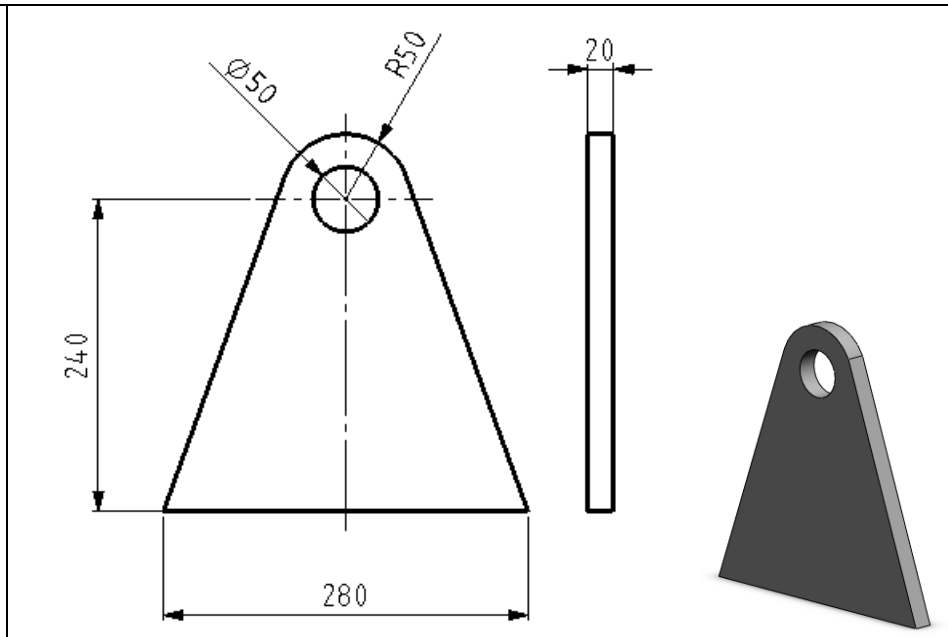
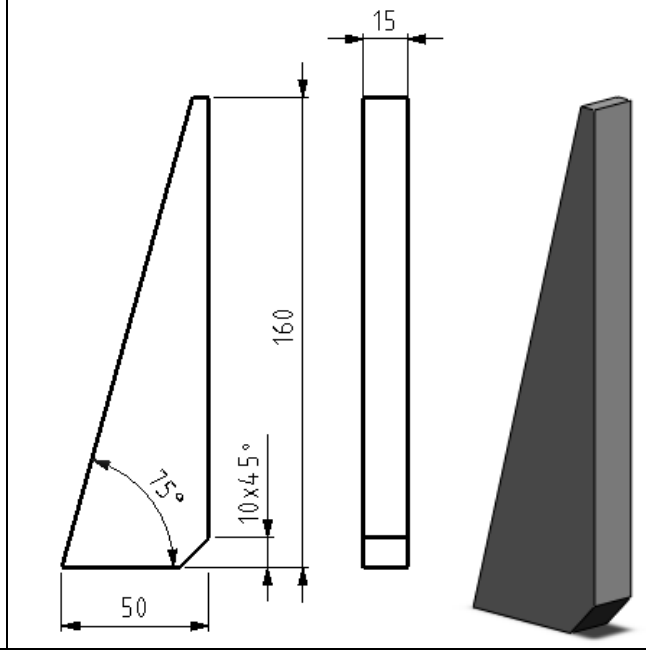
Exercise 3-13	

Exercise 3-14	

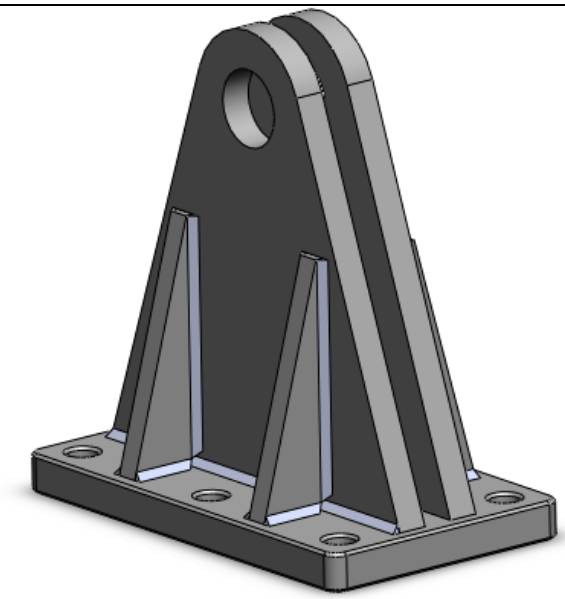
Exercise 3-15 Make the assembly using parts 3-11 through 3-14. Use 10x Socket Countersunk Head Screw (ISO 10642) M10x45 to attach strip 3-13 to top plate 3-14. Weld strip 3-12 to strip 3-13 using a fillet weld over the full length. Use hex head screws M10x30 and an extra large plain washer to secure the rollers (3-11).	

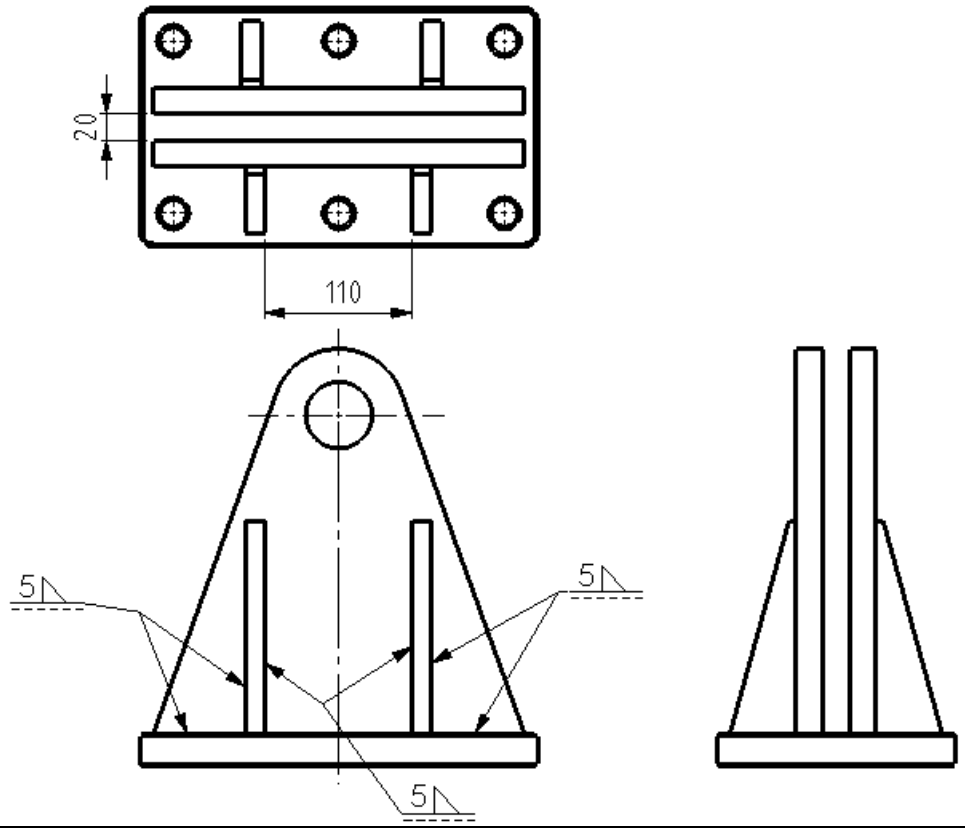
Exercise 3-16

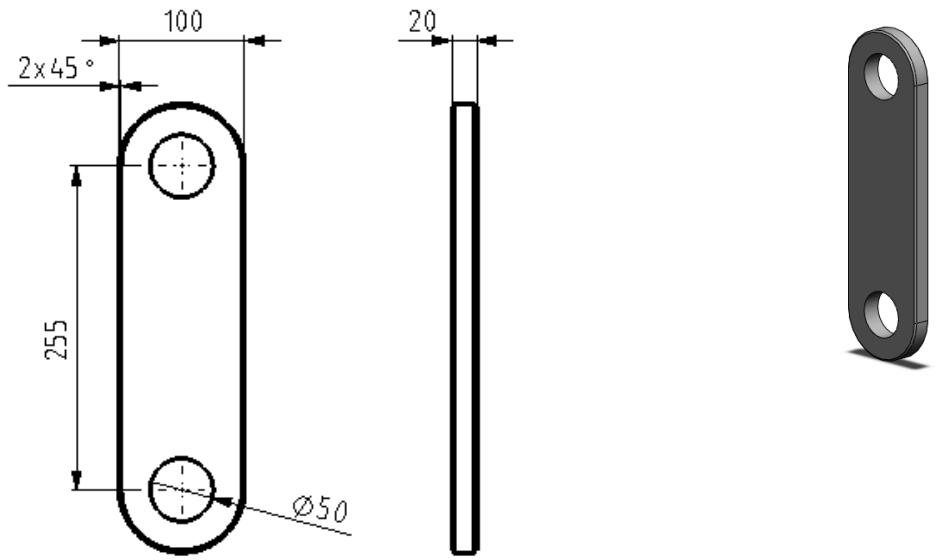
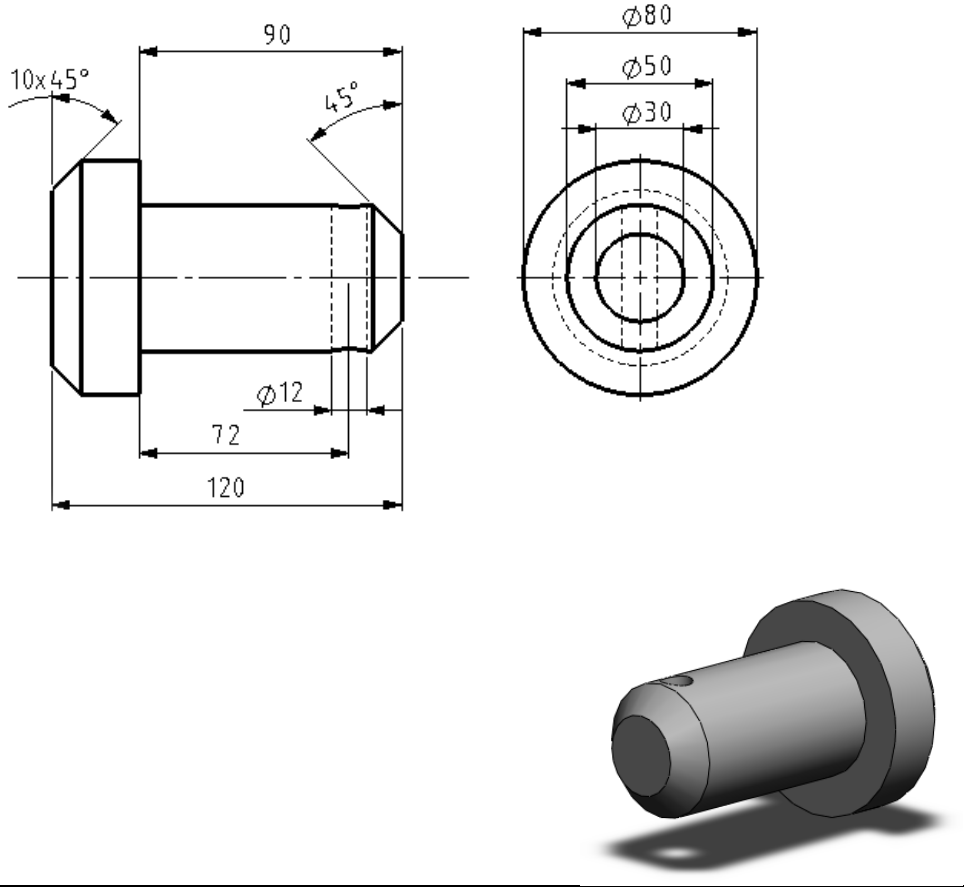


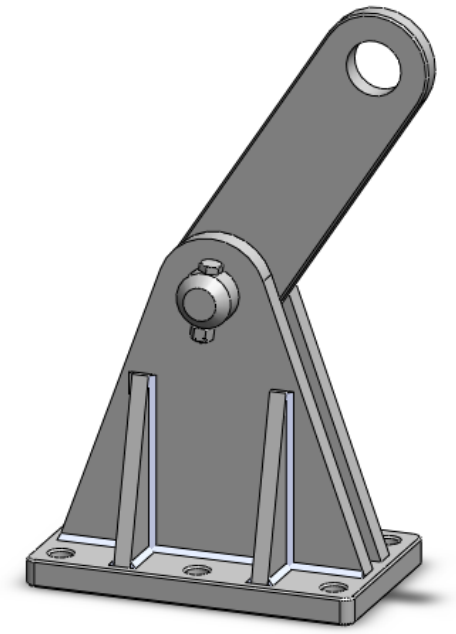
Exercise 3-17	
Exercise 3-18	

Exercise 3-19
Make a welded assembly out of parts 3-16 through 3-18 as shown in the drawing on the right. Apply the welds as shown in the assembly drawing.



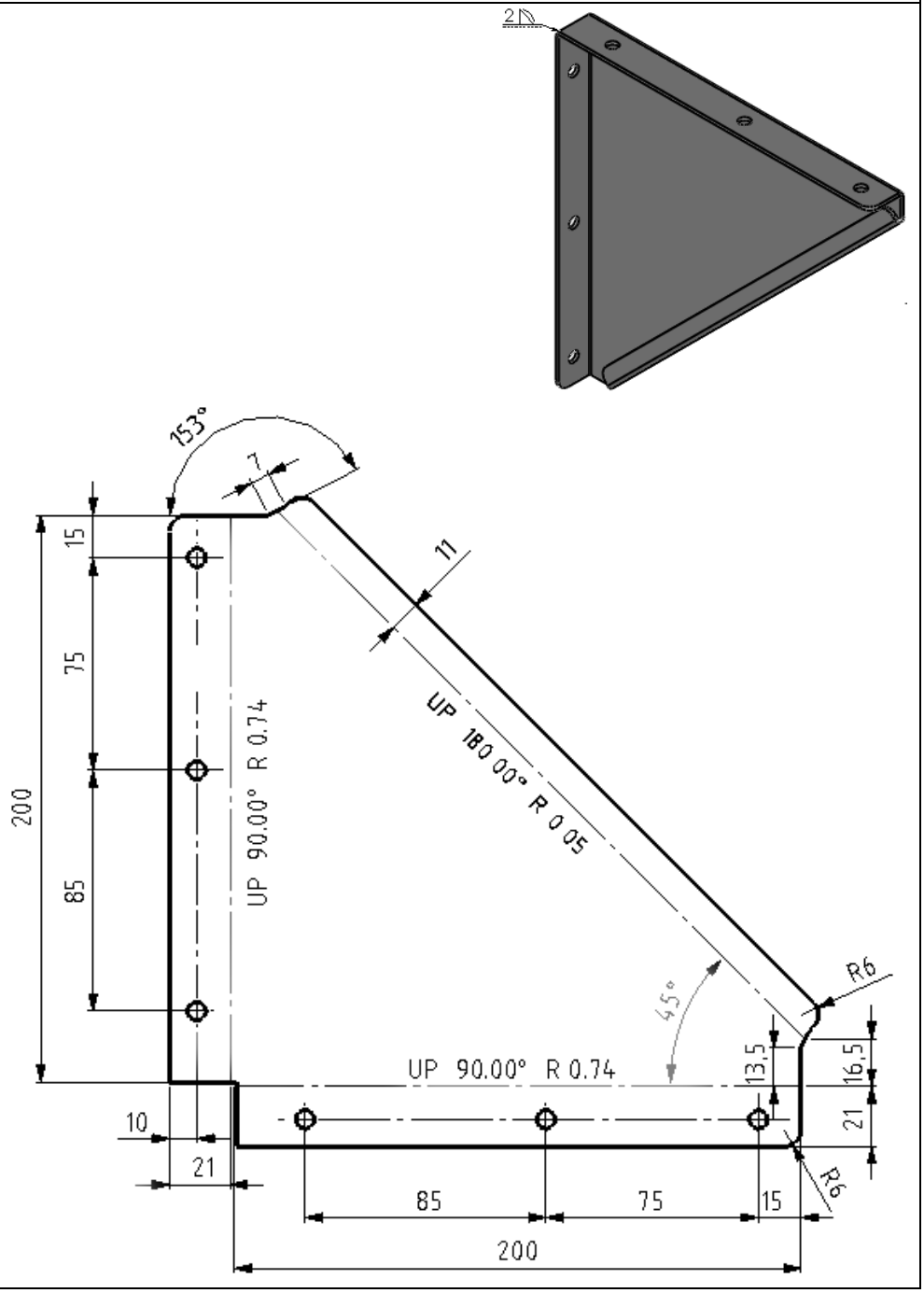


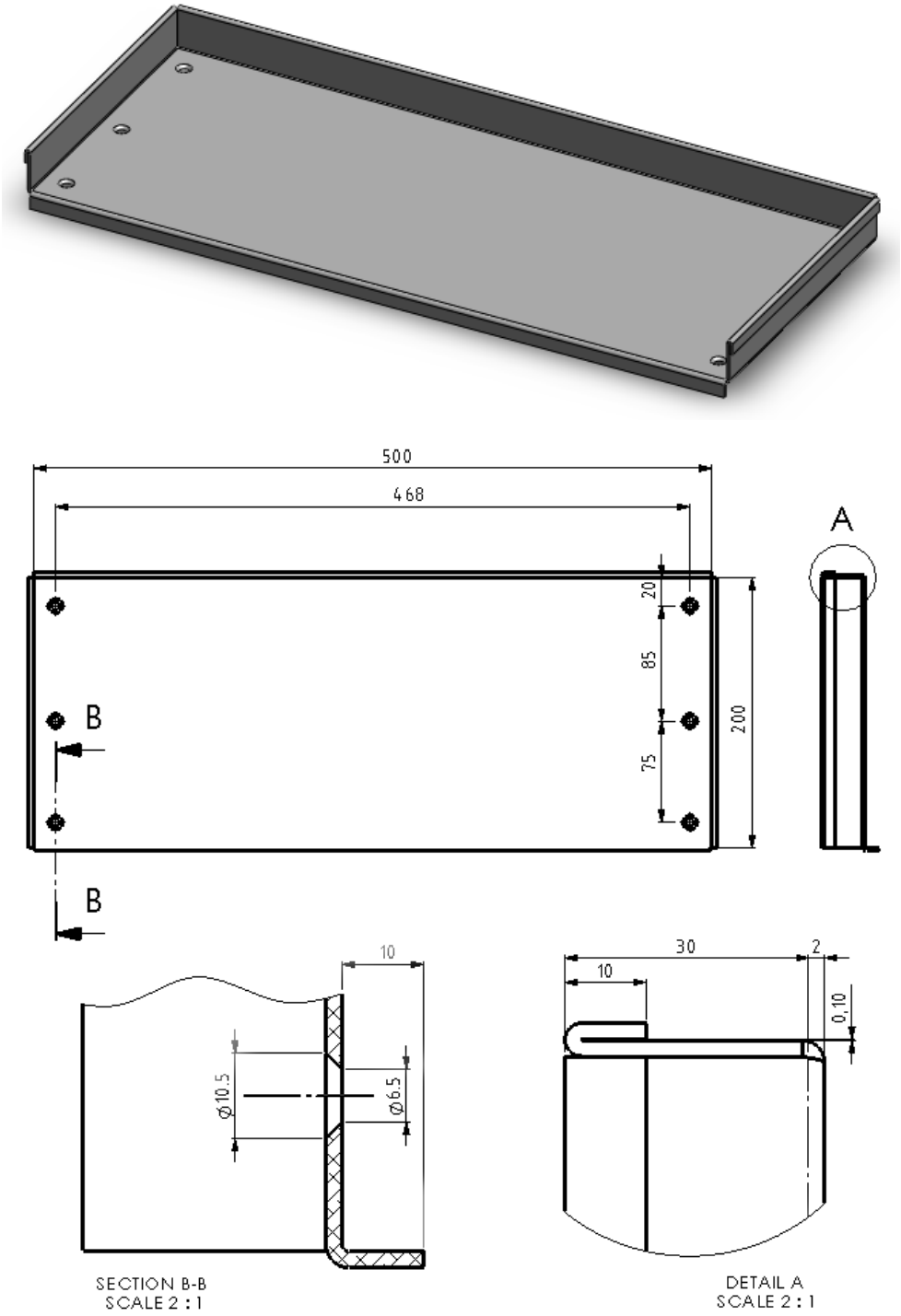
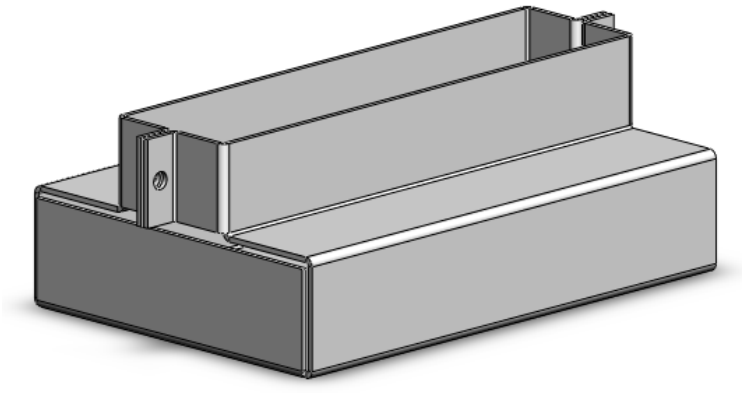
Exercise 3-20	
Exercise 3-21	

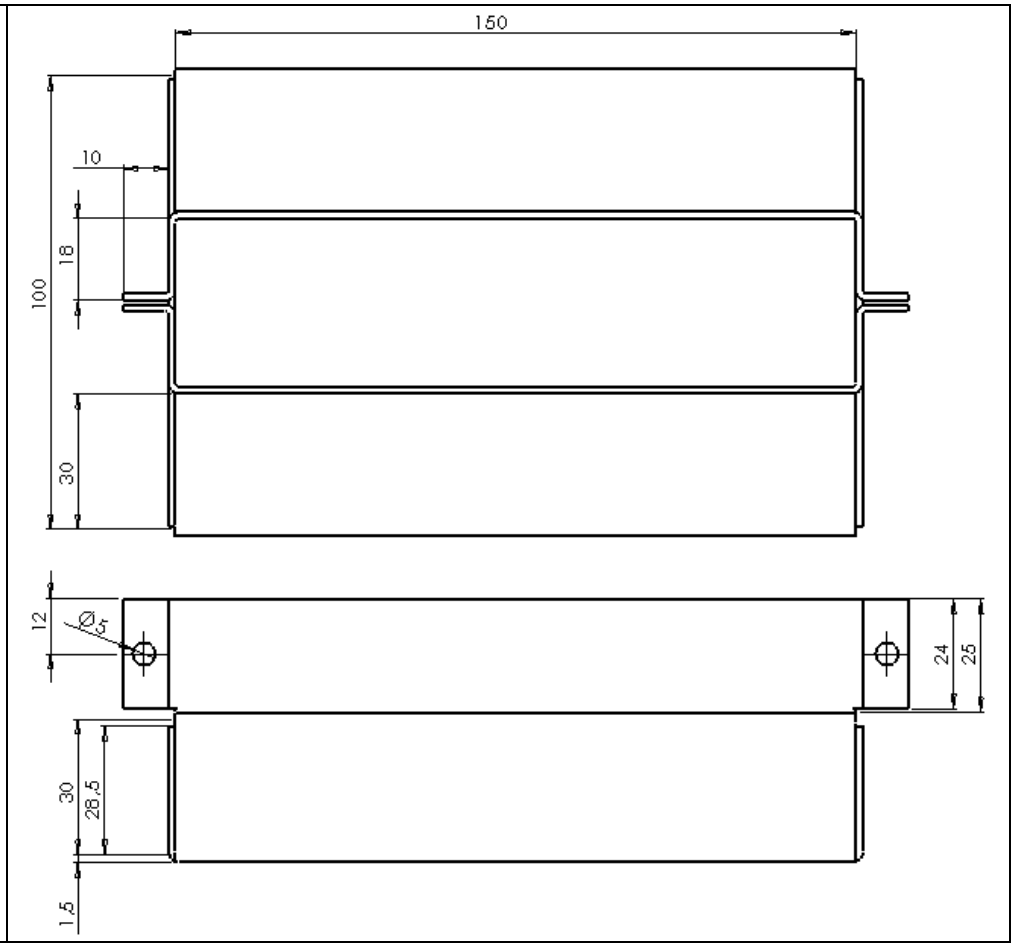
Exercise 3-22 Make an assembly out of parts 3-19 through 3-21. Use a hex head screw (ISO 4014) M12x65 and a hex nut (ISO 4034) to secure the pin.	

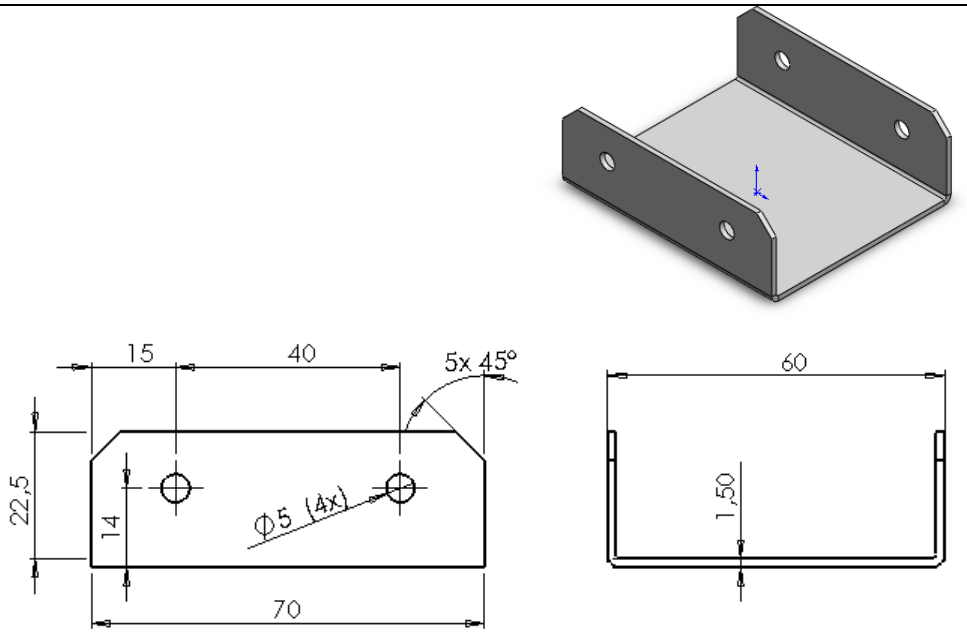
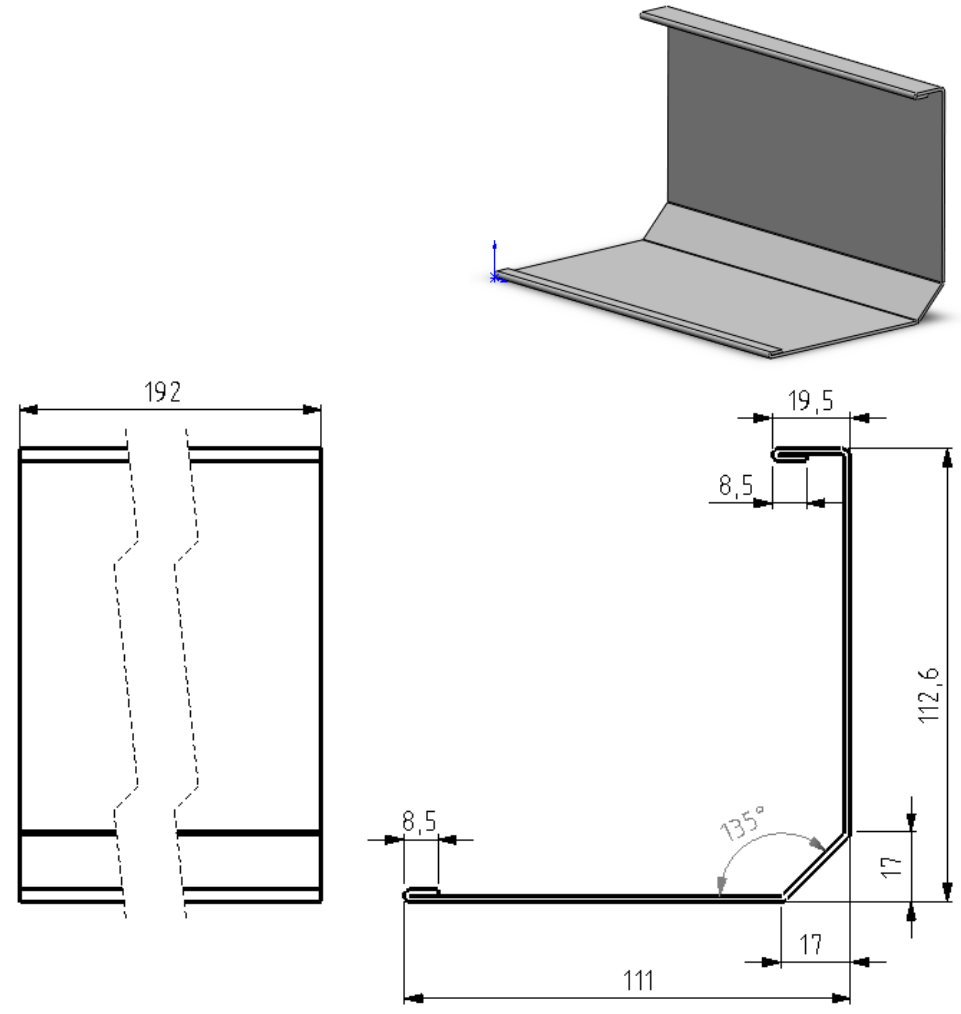
Tutorial 4 Exercises

Exercise 4-1

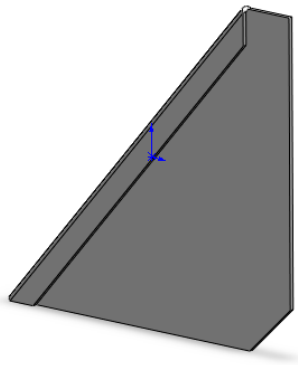


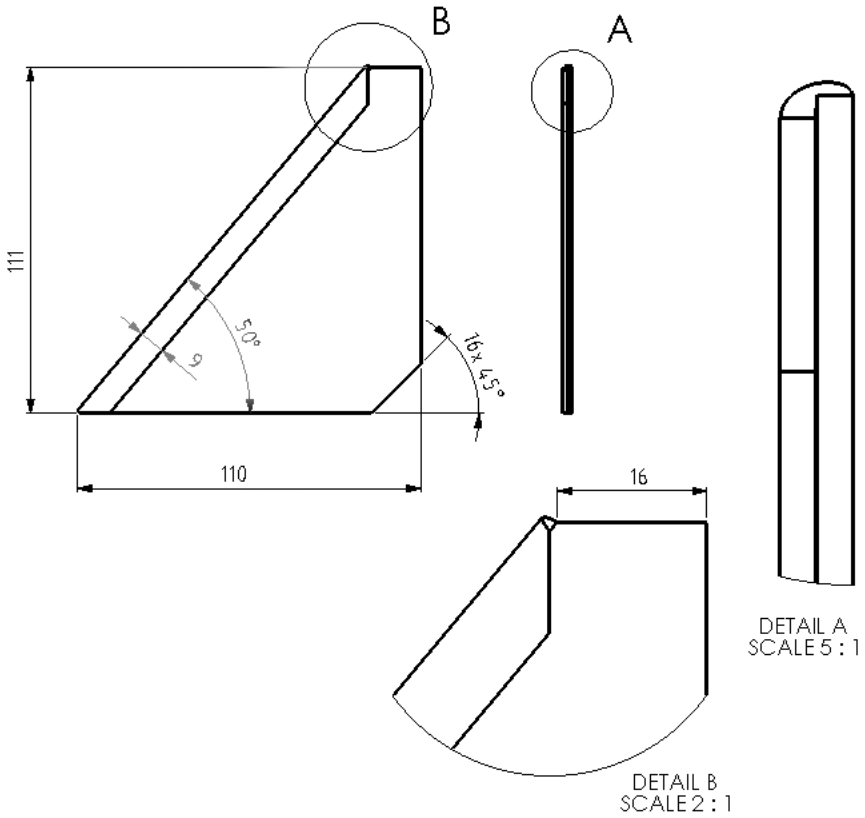
Exercise 4-2	
Exercise 4-3	


150
10
18
100
30
12
24
25
30
28.5
1.5

Exercise 4-4	
Exercise 4-5	

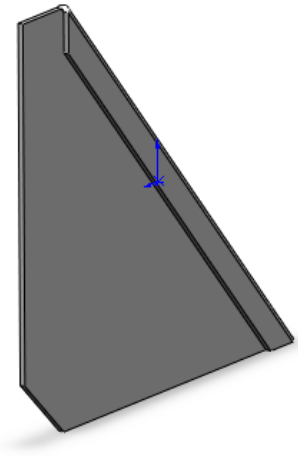
Exercise 4-6a



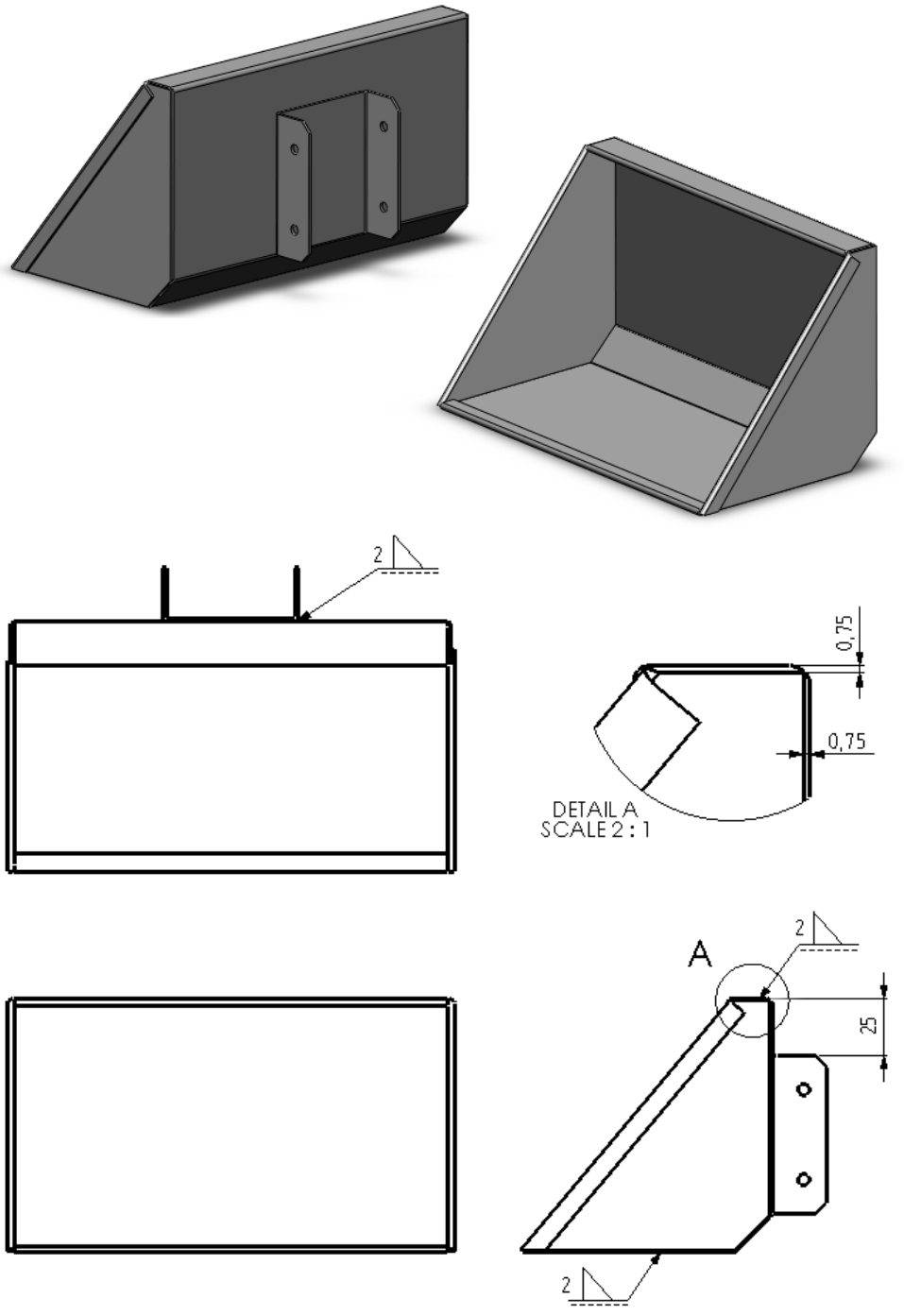


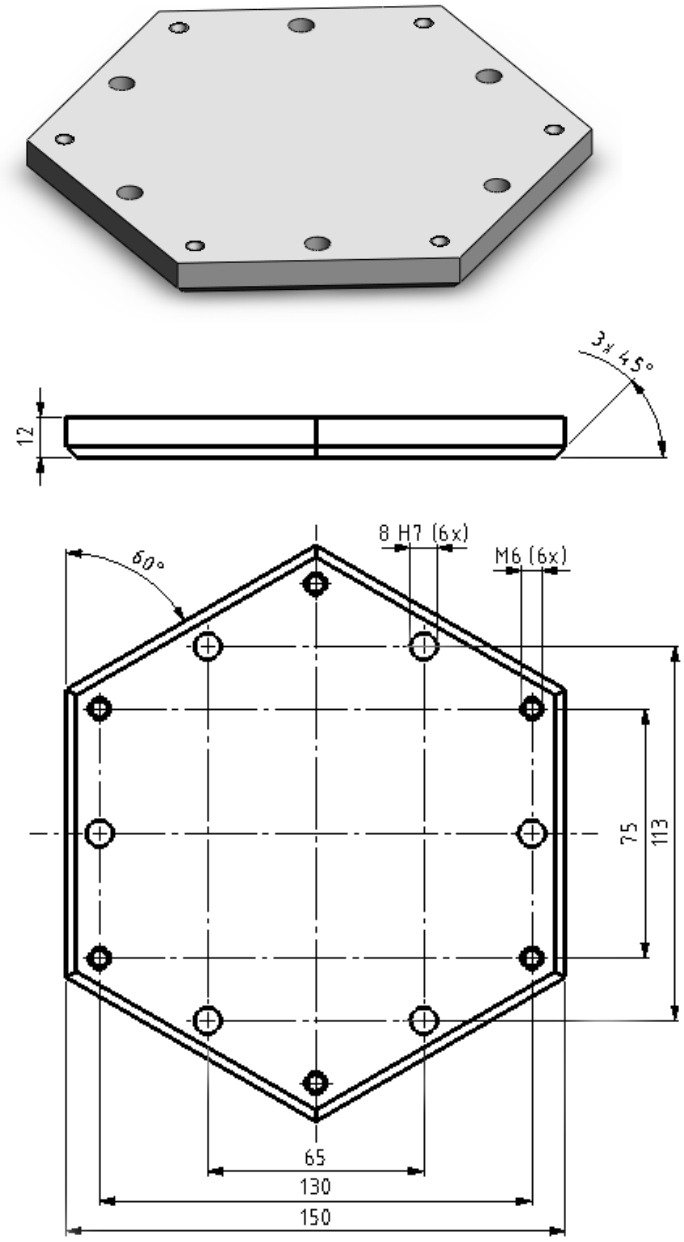
Exercise 4-6b

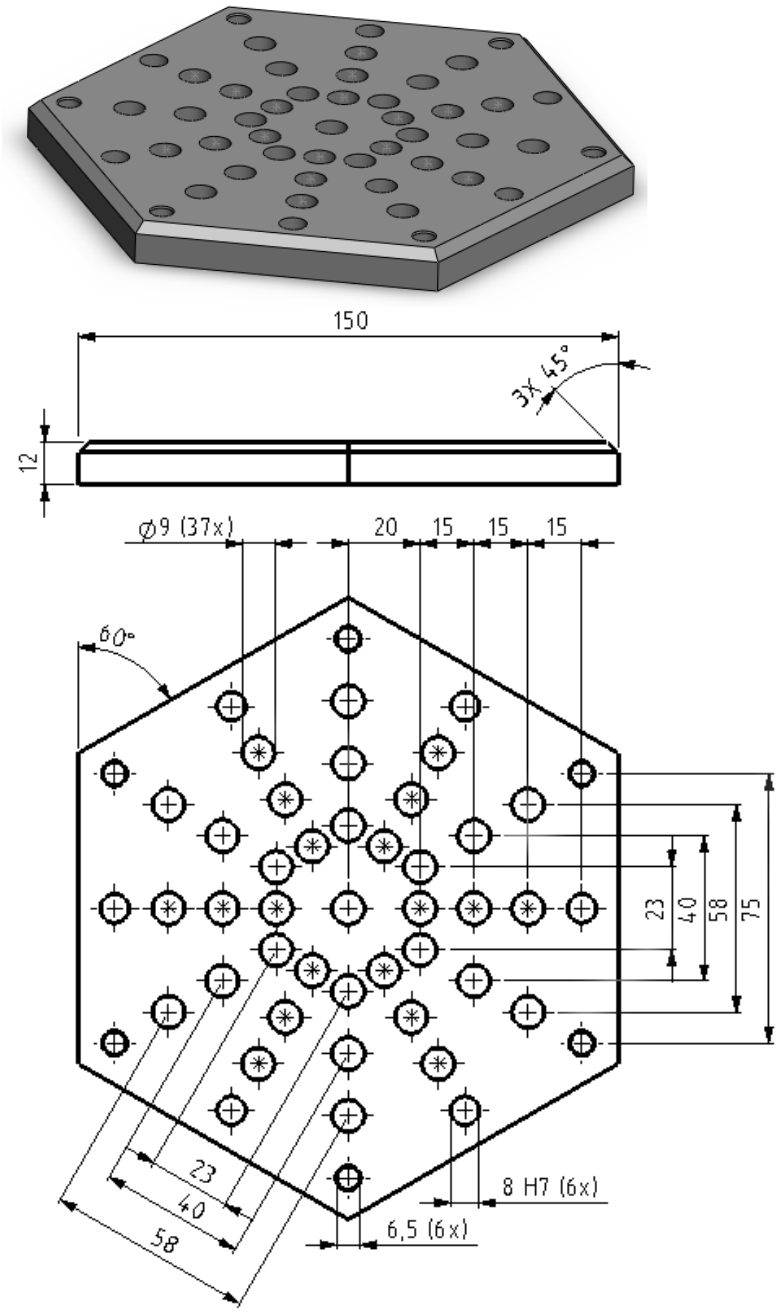
Make a mirror image version of part 6a. The folded edge is now on the other side.

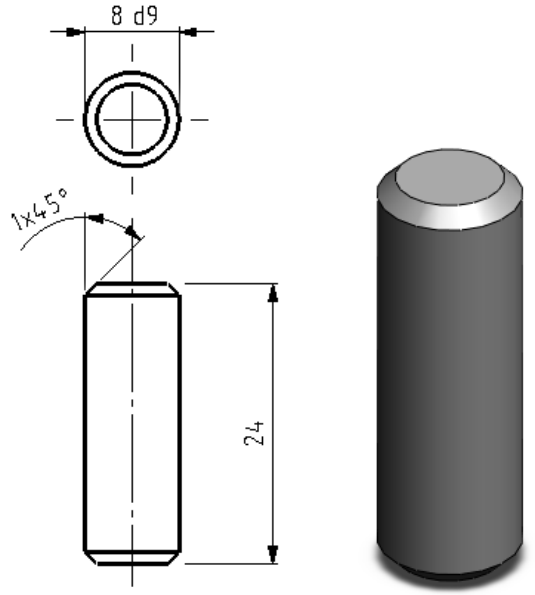
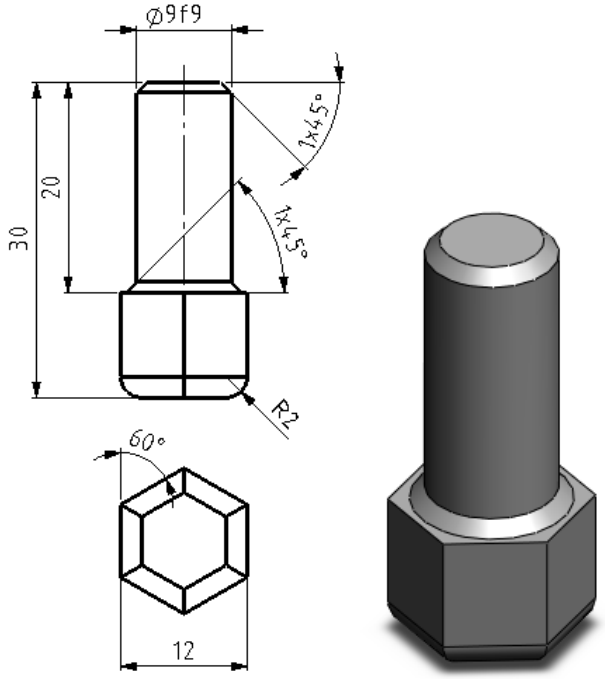


Exercise 4-7
Use parts 4-4, 4-5, 4-6a and 4-6b to construct the assembly as shown on the right.



	Tutorial 5 Exercises
Exercise 5-1	

Exercise 5-2	 150 3X 45° 12 ⌀9 (37x) 20 15 15 15 60° 23 40 58 75 23 40 58 8 H7 (6x) 6,5 (6x)

Exercise 5-3	
Exercise 5-4	

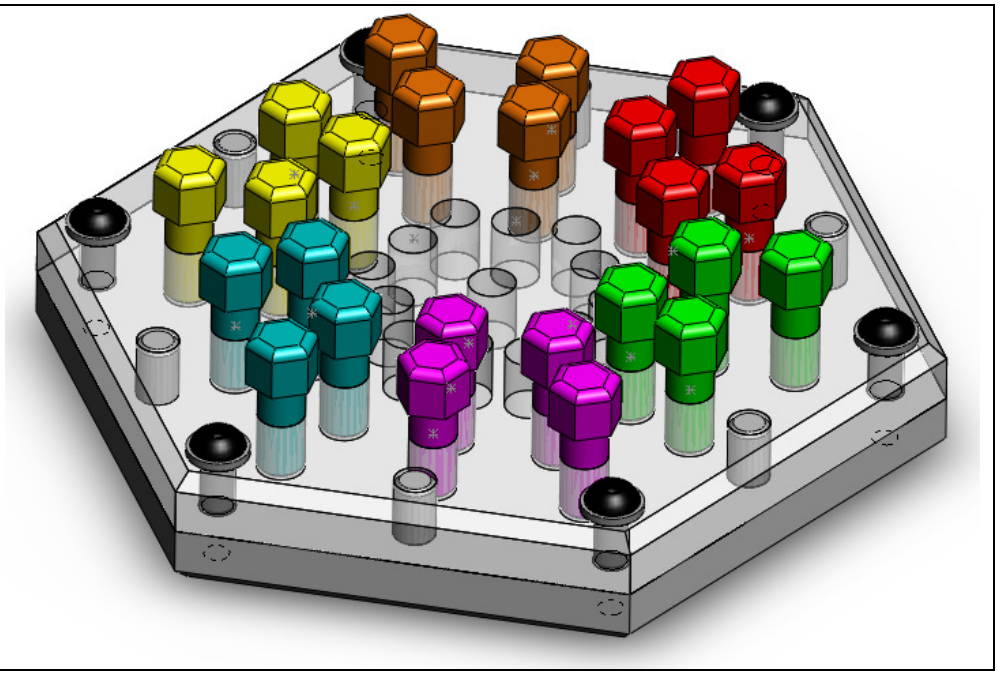
Exercise 5-5

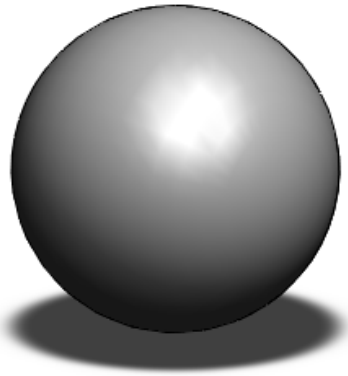
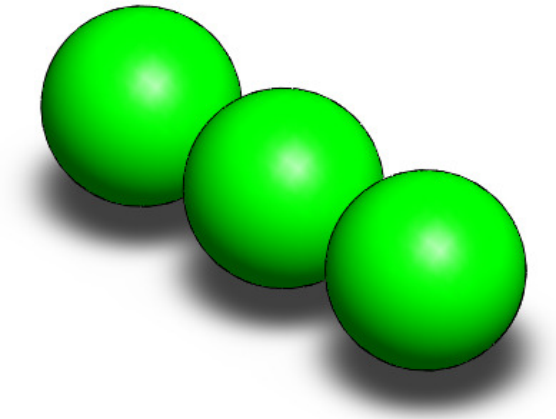
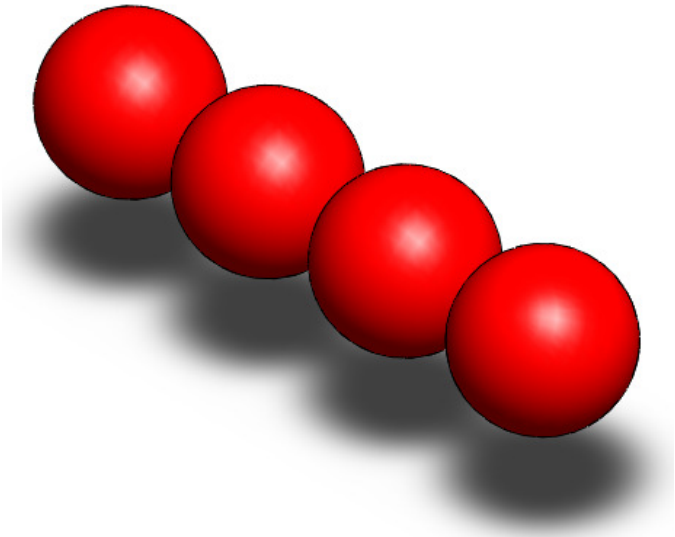
Make an assembly using parts 5-1 through 5-4 as shown on the right.

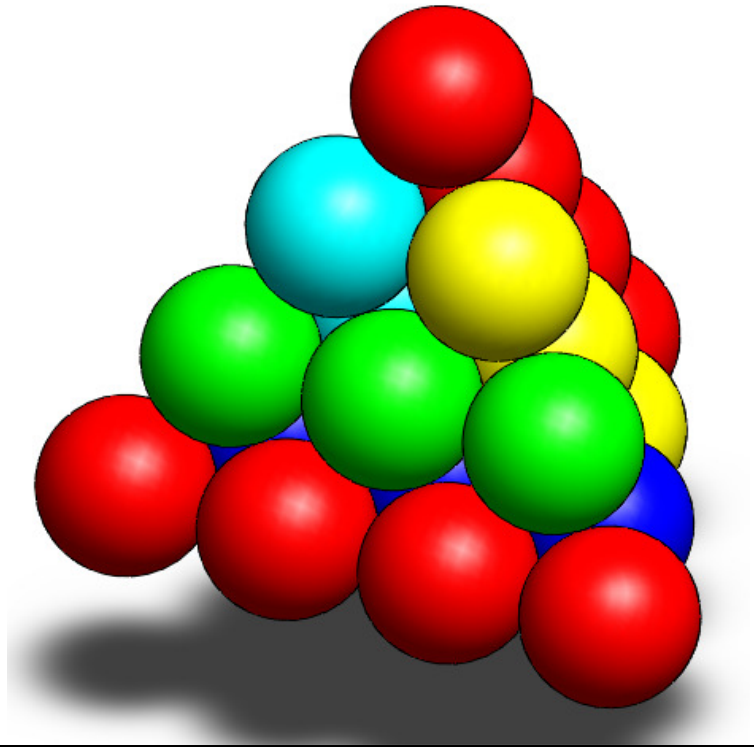
The two plates are positioned with dowel pins (5-3) and then secured using:

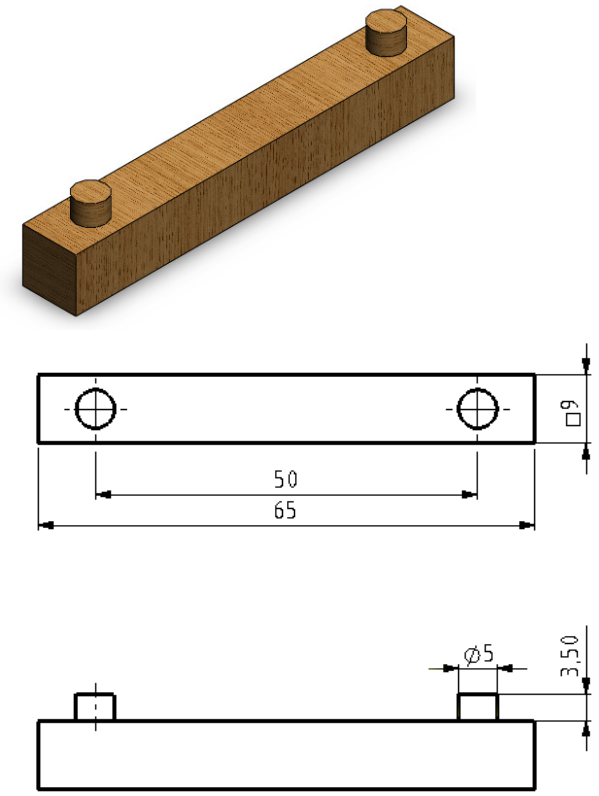
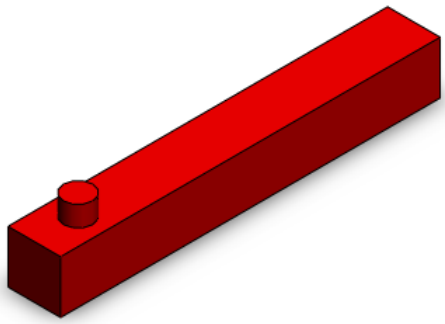
- Plain washer, Normal Grade A, ISO 7089-6 (M6)
- Socket Button Head Screw, ISO 7380 – M6x25

You will find both parts in the Toolbox.

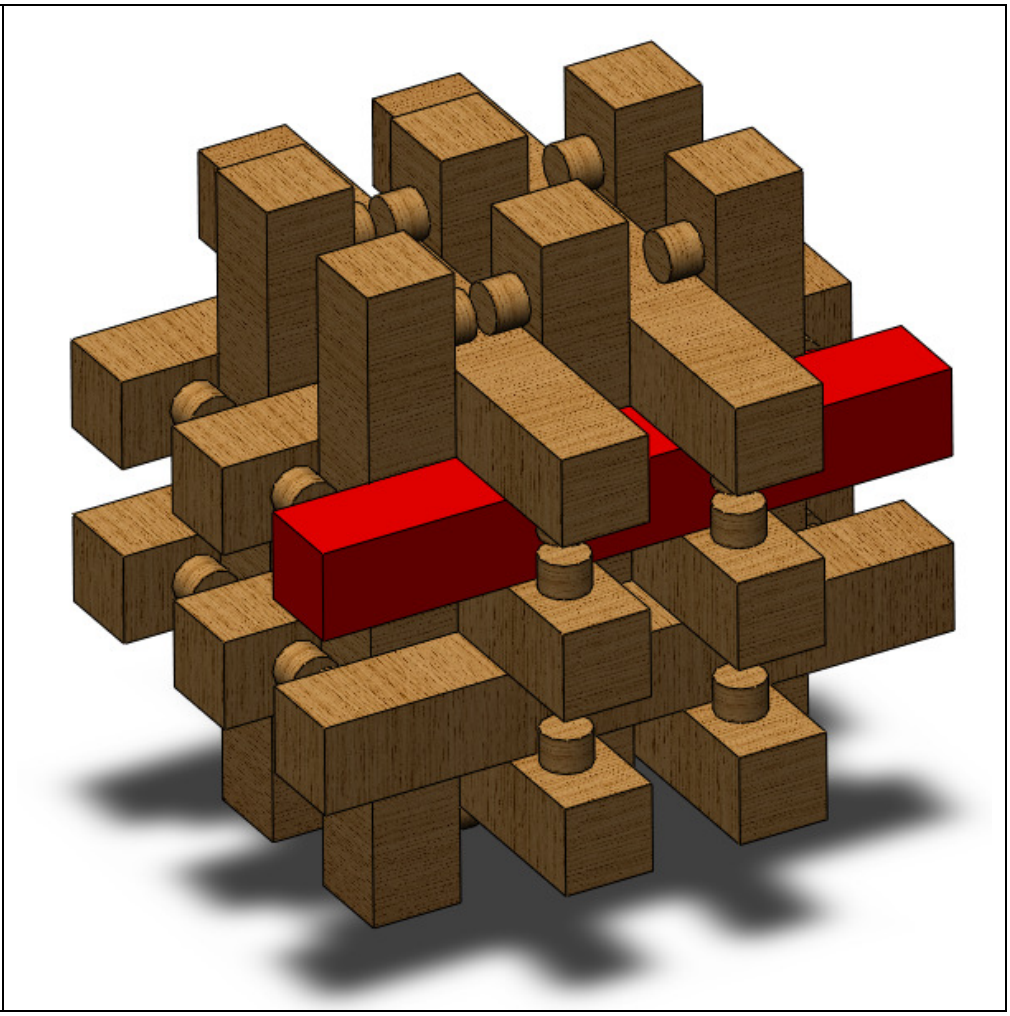


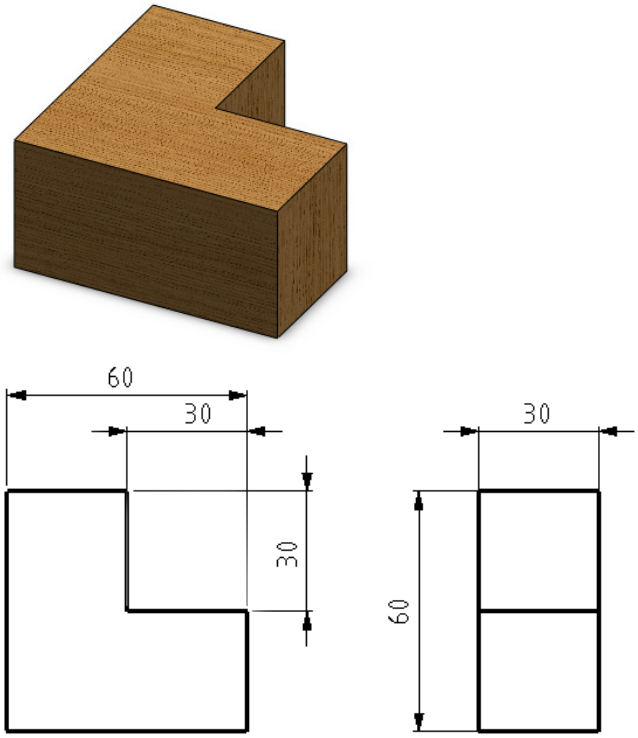
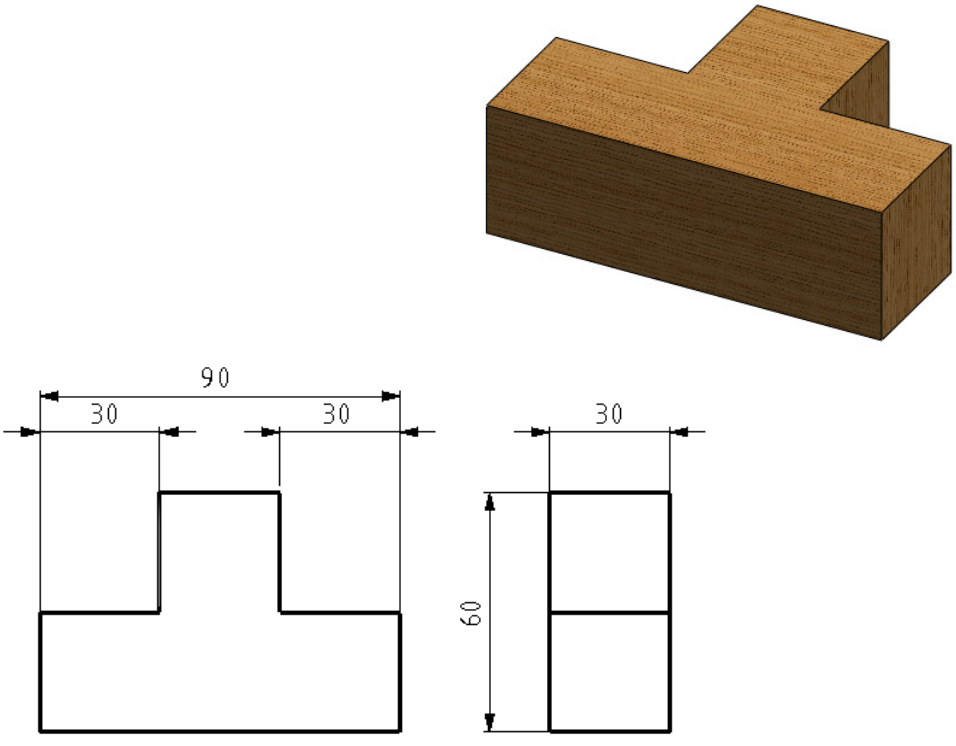
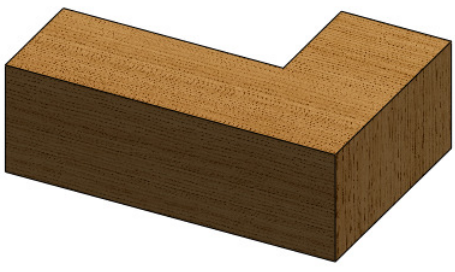
Exercise 5-6a Model a sphere with a diameter of 60mm.	
Exercise 5-6b Make an assembly using the sphere from exercise 5-6a three times. The spheres should all sit in a row and touch each other.	
Exercise 5-6c Make an assembly using the sphere from exercise 5-6a four times. The spheres should all sit in a row and touch each other.	

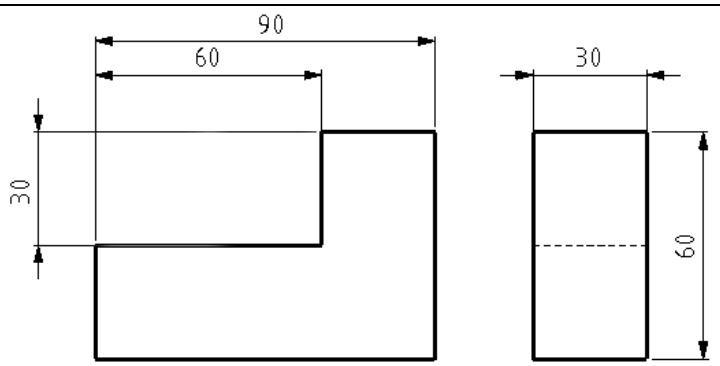
Exercise 5-7 Make the assembly shown on the right. Use: - 4 x assembly 5-6b - 2 x assembly 5-6c A different color is used for each occurrence of assembly 5-6b in the image on the right.	

Exercise 5-8	
Exercise 5-9 Make a new configuration for exercise 5-8 with just one pin.	

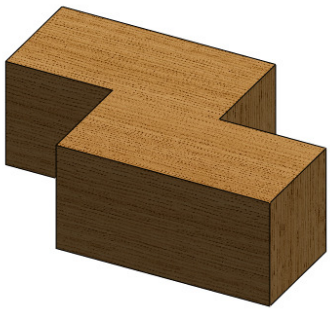
Exercise 5-10
Make the assembly. Use:
- 17 x exercise 5-8
- 1 x exercise 5-9

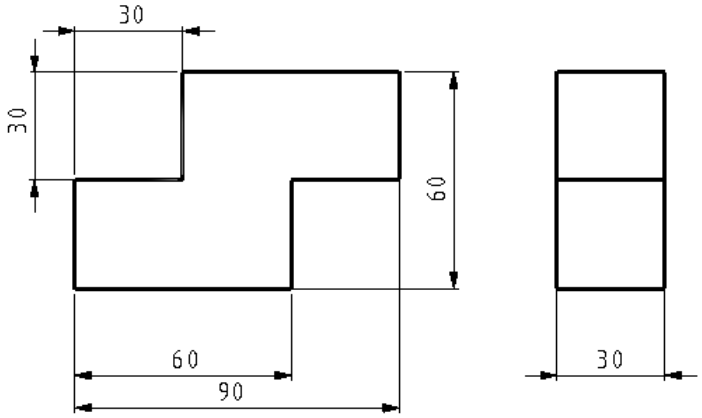


Exercise 5-11	
Exercise 5-12	
Exercise 5-13	



Exercise 5-14



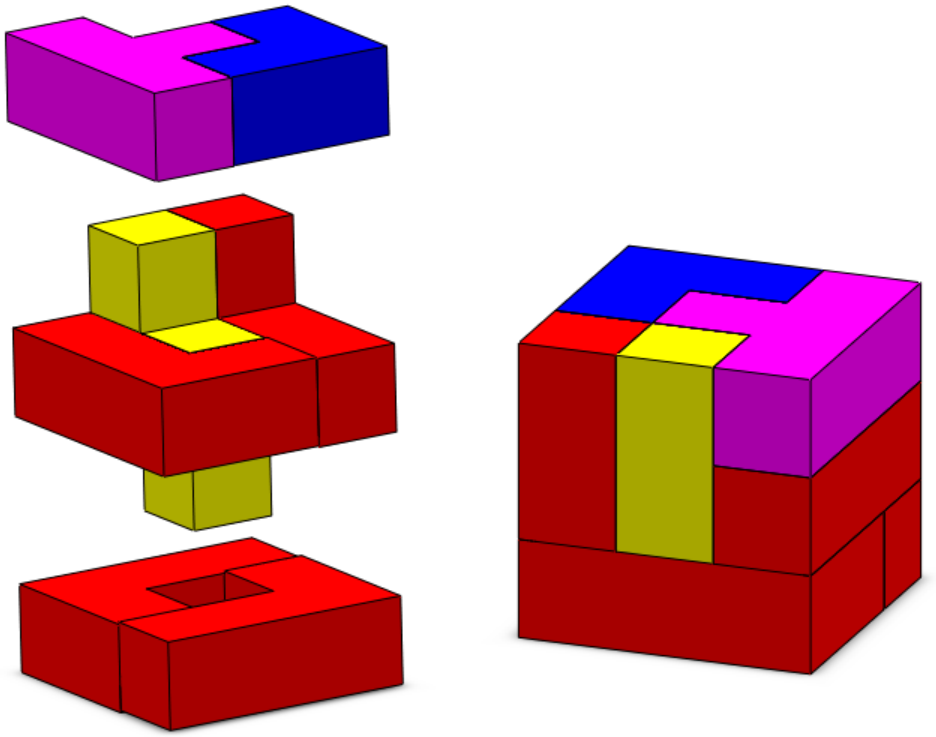


Exercise 5-15

Make the assembly as shown on the right. Use:

- 1 x exercise 5-11
- 1 x exercise 5-12
- 4 x exercise 5-13
- 1 x exercise 5-14

For the sake of clarity, a different color has been used for the various components shown on the right.



SolidWorks is active in education

3D CAD is an indispensable part of today's technical world. Whether you specialize in the field of mechanical engineering, metal, metal electronics, industrial product design or car engineering: 3D CAD is *the* tool for today's designers and engineers.
In the Benelux countries, SolidWorks is the most popular 3D CAD software on the market. This is thanks to a unique combination of characteristics: great ease of use, wide usability and outstanding support. User requirements are always included in the software in the annual updates, which leads to an annual extension of functionality, but also to optimization of existing functions in the software.

Education

A large number of educational organizations, ranging from organizations for secondary technical education to technical universities, have already chosen SolidWorks. Why?

For the ***lecturer***, SolidWorks means choosing a user-friendly piece of software that pupils or students can master quickly. SolidWorks is therefore excellently suited to problem-driven education or competence-oriented education. Free tutorials in Dutch are available for various levels of education, such as a series of tutorials for junior and senior secondary technical education, which explain the basic principles of SolidWorks, or the Advanced Modeling tutorial, which deals with more complex topics, such as modeling complex double-curved surfaces. All of the tutorials are in Dutch and can be downloaded for free from www.solidworks.nl.

For the ***pupil or student***, learning SolidWorks is above all fun and challenging. SolidWorks makes technology much clearer and more accessible, so that working on tasks and projects is much more realistic and fun. Furthermore, every pupil or student knows that their employment prospects increase significantly if they can put SolidWorks, the most commonly used piece of 3D CAD software in the Benelux countries, on their CV. A large number of the vacancies and internships advertised at www.cadjobs.nl, for example, require knowledge of SolidWorks. This increases the motivation to learn how to use SolidWorks even more.
A Student Kit is available to make SolidWorks even easier to use. All students following a course that uses SolidWorks can download the Student Kit **for free**. The Student Kit is a full version of SolidWorks that may only be used for educational purposes. Your lecturer will provide you with the information needed to download the Student Kit.

For the ***IT department***, choosing SolidWorks means that investments in new computers can be postponed, as SolidWorks has relatively modest hardware requirements. SolidWorks is very simple to install and manage in a network environment, thanks to the use of network licenses, among other things. Should you still experience problems, our qualified help desk team will get you back on track quickly.

Certification

When you have mastered SolidWorks sufficiently, you can take the CSWA exam. CSWA is short for Certified SolidWorks Associate. On successful completion of the exam, you will be awarded a certificate, which you can use to show that you have mastered SolidWorks sufficiently. This is useful when applying for jobs or internships.
After working through this series of tutorials for junior and senior secondary technical education, you will have sufficient knowledge of SolidWorks to take the CSWA exam.

Finally

SolidWorks committed itself to education a long time ago. By supporting lecturers where possible, by publishing teaching material and adapting it for the newest version of the software every year and by issuing the Student Kit. Choosing SolidWorks means choosing the future. The future of education, which is guaranteed comprehensive support, and the future of pupils and students, who want the best opportunities after completing their education.

Contact

Should you have any more questions about SolidWorks, please contact your reseller.

Further information about SolidWorks is available on the website: http://www.solidworks.nl

SolidWorks Benelux
RTC Building
Jan Ligthartstraat 1
1800 GH Alkmaar, Netherlands
Tel: +31 (0)72 514 3550