



Field of education:
Mechanical engineering

Professional qualification:
CNC operator

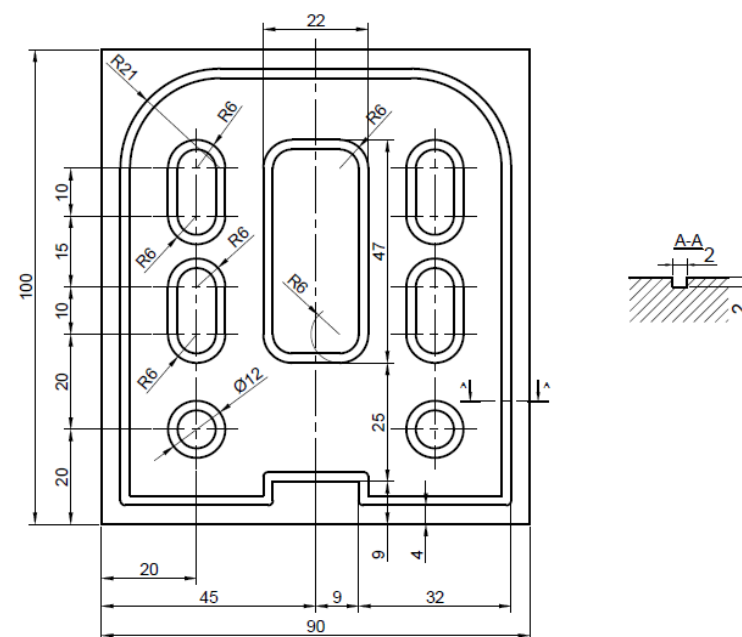
Exercise:
Programming of CNC machine

Variant:
Task 32 – Support plate 5.2.

Instructions for exercise:

According to the given workshop drawing make the following tasks:

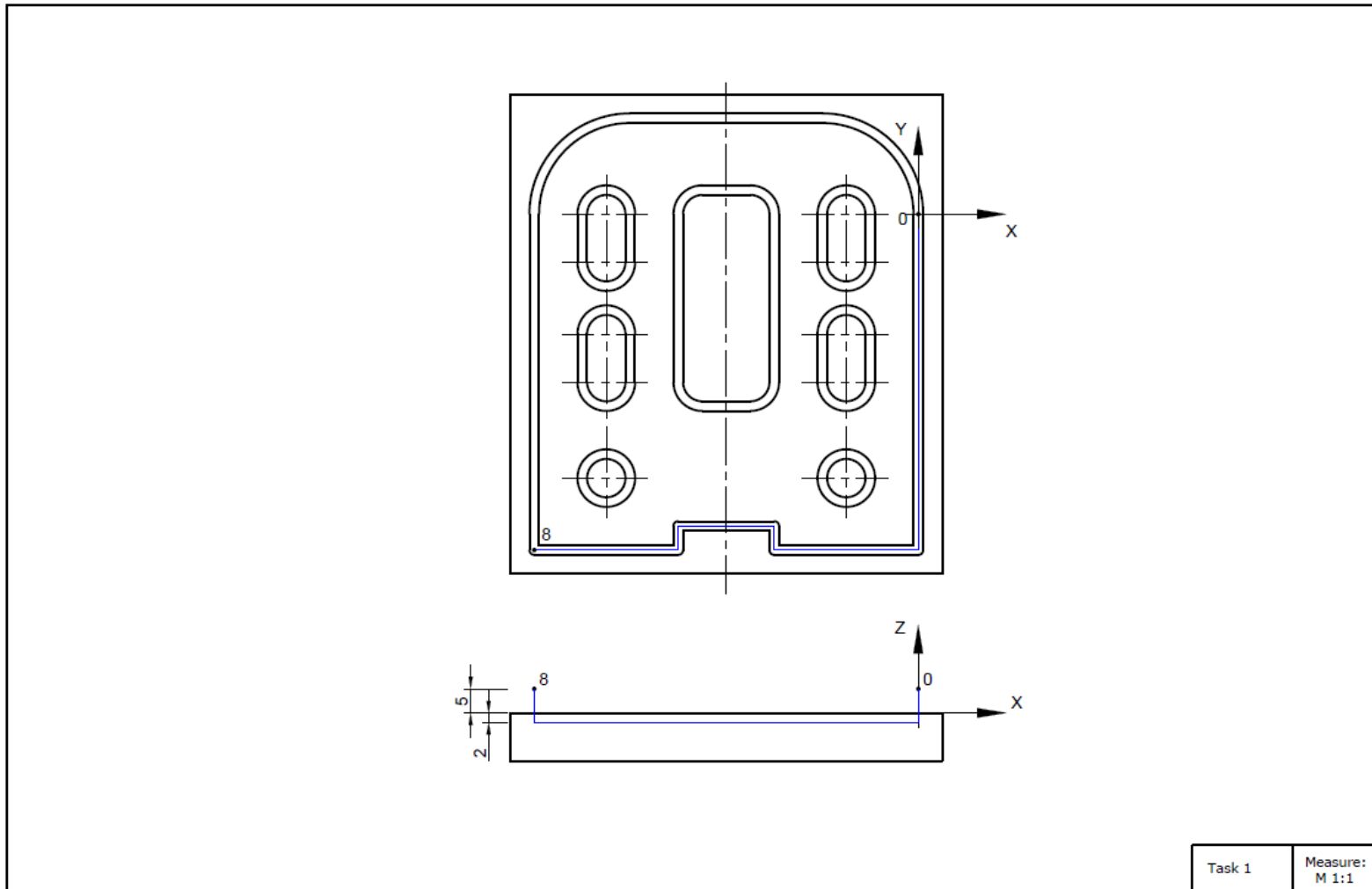
- Draw the appearance of the 3D model in Fusion 360.



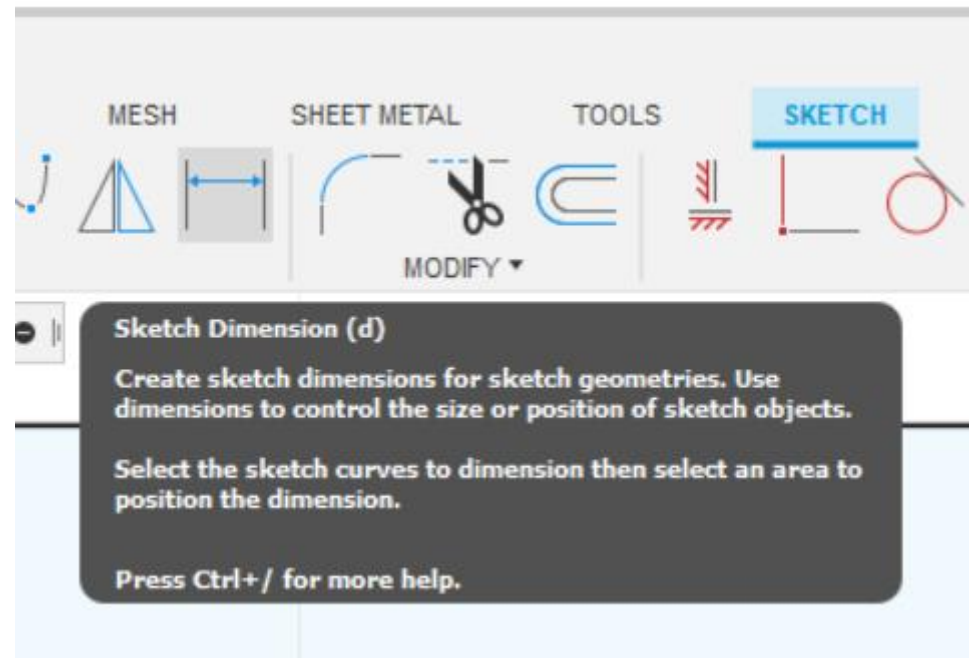
The drawing shows a technical drawing of a load-bearing plate. The main view is a top view with dimensions: overall width 90, overall height 100, and a central slot width of 22. The plate has rounded corners with a radius of R21. There are four elongated slots, each with a width of 10 and a height of 15. The distance between the centers of the two outer slots is 45, and the distance between the centers of the two inner slots is 32. The distance from the center of the inner slot to the center of the outer slot is 9. The plate has a thickness of 4. A section view A-A shows a cross-section of the plate with a thickness of 2 and a fillet radius of R6. A table at the bottom right contains the following information:

Measure: M 1:1	Date:	Surname and name:	Strukovna škola ĐURĐEVAC
Position -	Assembly drawing (number): -	Material :	-
Number of drawings: -	Name: Load-bearing Plate 5		

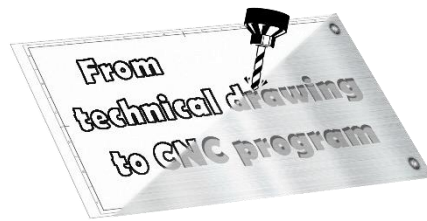
- According to the given path and the given start or end point (blue line), determine the other necessary points.



- To make it easier to determine the coordinates, use Sketch Dimension option in the drawn sketch for precise G-code writing.



- Consider the position of your coordinate system.
- Write a G-code.
- Tighten the workpiece on the machine.
- Set the coordinate system on the machine (reset all coordinates to 0).
- Load the program into the machine control unit.
- Move the machine via the control unit to perform operations.



Brief description of commands in G-code:

- G0 - fast pace, straight movement, when we are not in contact with the object of processing

The command for programming the high-speed movement is modal, and the form of programming is:

G0 X ... Y ... Z ... - in a rectangular coordinate system,

where X, Y, Z are the coordinates of the point which the tool should reach.

- G1 - working stroke, straight movement, when processing the object

It is used for processing, i.e. we enter the material with a tool. The tool moves in a straight line with an offset which is specified before or in the block with the G1 command. The command is modal. Form of programming in a rectangular coordinate system is:

G1 X ... Y ... Z ...

where X, Y, Z are the coordinates of the point to which the tool should reach.

- G2 - circular clockwise movement
- G3 - circular motion counterclockwise
- In addition to linear interpolation, the control unit also allows circular interpolation. The first piece of information is the point where the tool is currently located, and that is the starting point of circular arc. The other two data are a logical combination of the following data:

X, Y, Z - coordinates of the end point of the circular arc,

R - radius of a circular arc, or

I, J, K - coordinates of the center of the circular arc