

Field of education:  
**Mechanical engineering**

Professional qualification:  
**CNC operator**

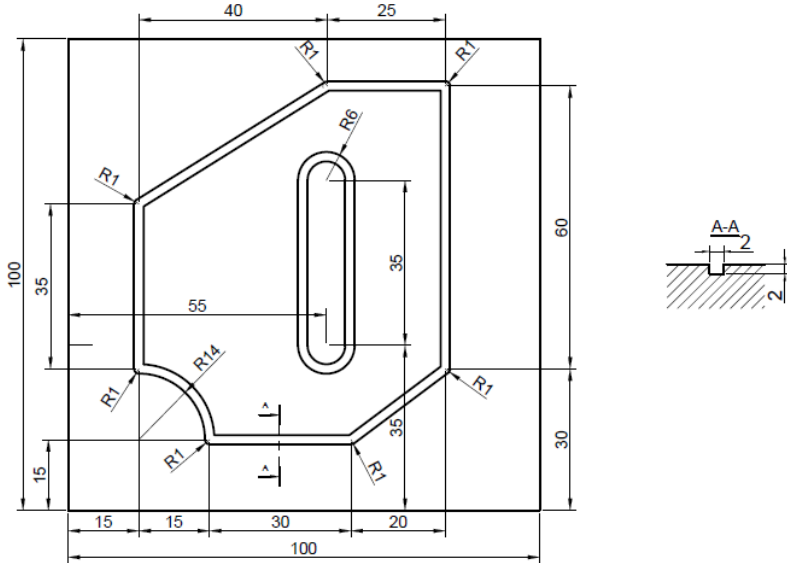
Exercise:  
**Programming of CNC machine**

Variant:  
Task 22 – Support plate 2.2.

**Instructions for exercise:**

According to the given workshop drawing make the following tasks:

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



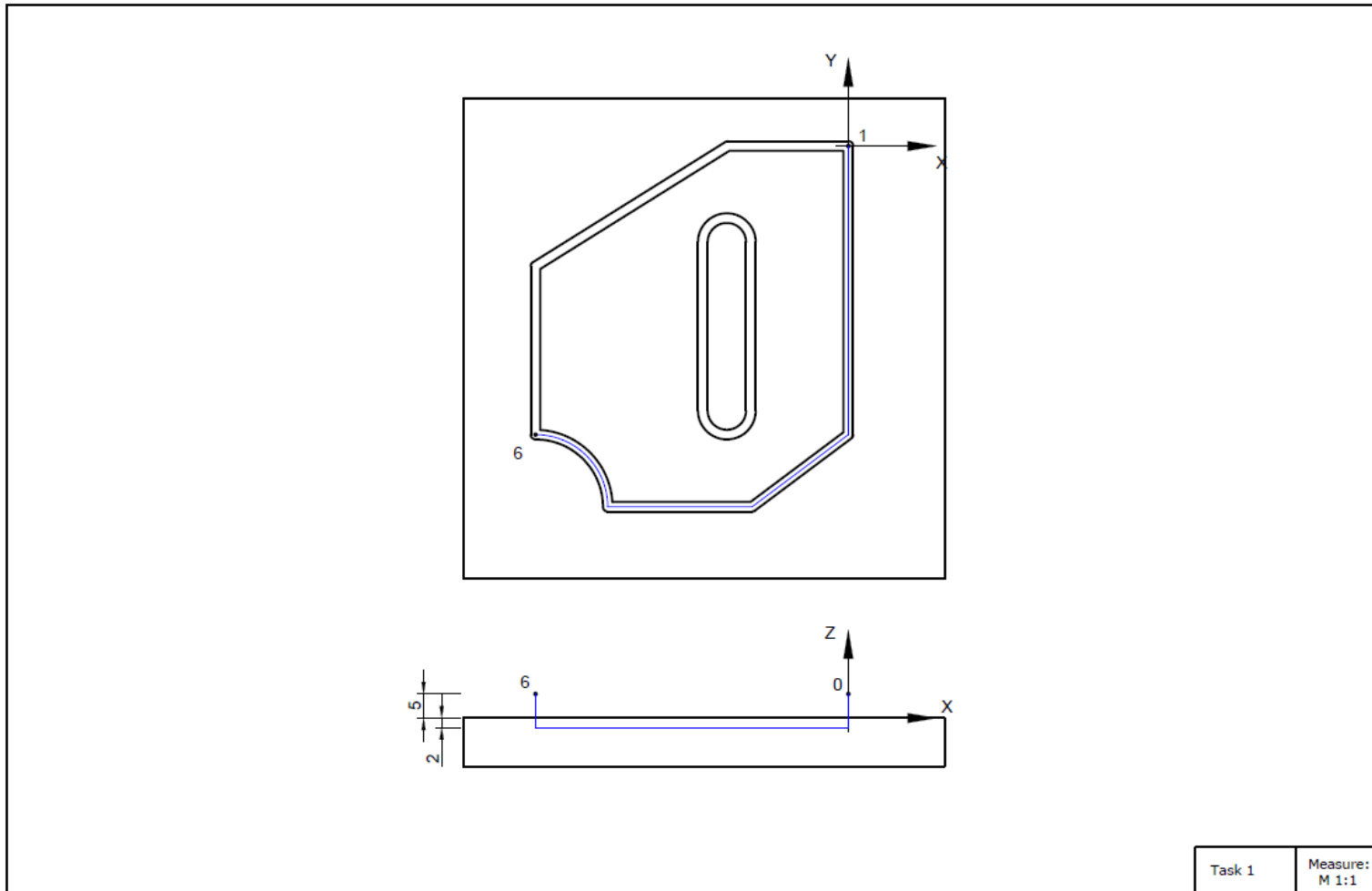
The drawing shows a technical drawing of a load-bearing plate. The main view is a top-down view of a rectangular plate with a total width of 100 and a total height of 100. The plate has a complex shape with several fillets and a central slot. The dimensions are as follows:

- Total width: 100
- Total height: 100
- Left side: 15 (bottom), 15 (middle), 35 (top)
- Right side: 20 (bottom), 35 (middle), 60 (top)
- Bottom edge: 15 (left), 15 (middle), 30 (right)
- Top edge: 40 (left), 25 (right)
- Central slot: 55 (width), 35 (height)
- Fillet radii: R1 (at corners and junctions), R14 (at bottom-left corner), R6 (at top-right corner of slot)

A section view AA-2 is shown to the right, indicating a thickness of 2 units.

Measure: M 1:1	Date:	Surname and name:	Strukovna škola ĐURĐEVAC
Position -	Assembly drawing (number): -	Material :	-
Number of drawings: -	Name: Load-bearing Plate 2		

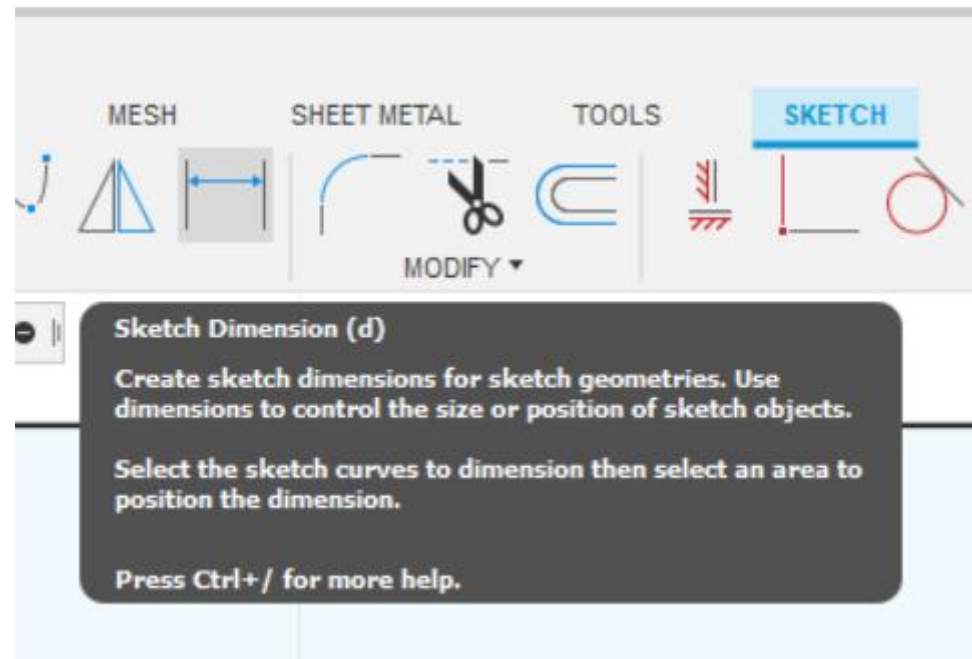
- According to the given path and the given start or end point (blue line), determine the other necessary points.



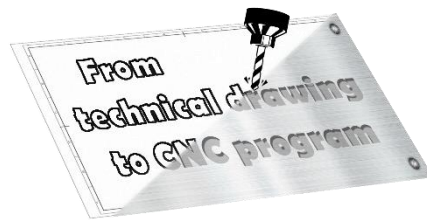
The image shows a technical drawing of a part with a path and coordinate systems. The top part is a 2D view of a part with a central slot and a curved bottom-left corner. A path is shown starting at point 1 on the top-right edge and ending at point 6 on the bottom-left corner. The coordinate system has X and Y axes. The bottom part is a 3D view of the part, showing a rectangular block with a central slot. The path is shown starting at point 6 on the top-left edge and ending at point 0 on the top-right edge. The coordinate system has X and Z axes. Dimensions 5 and 2 are indicated on the left side of the 3D view.

Task 1	Measure: M 1:1
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- 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