

# **Sketcher**

## **Part 1**

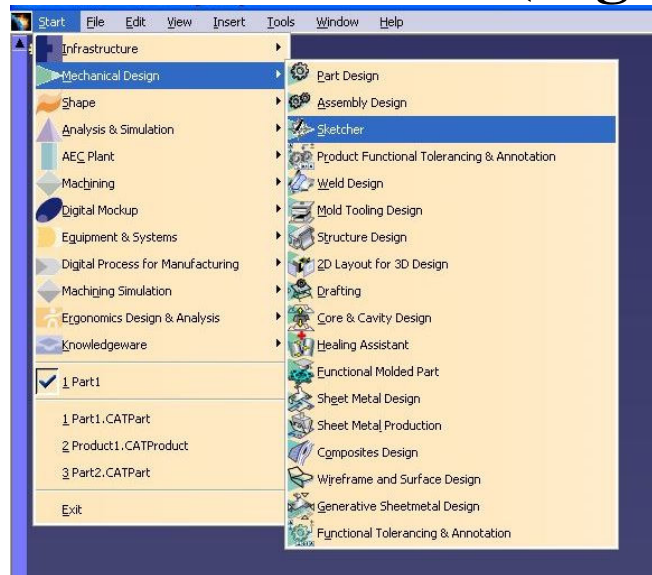
### **The Sketcher Workbench**

# **What is the Sketcher**

- **The Sketcher is a set of tools that help to quickly generate 2D geometry**
- **A completed Sketch can then be used to generate Solids and Surfaces**
- **Capability to define Constraints between elements in the Sketcher allows for quick modifications of a Sketch and consequently the Solids or Surfaces that are based on it**

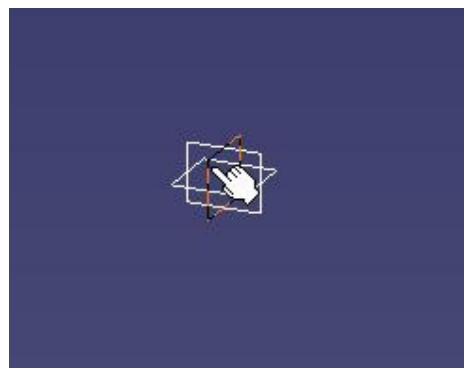
# How to enter the Sketcher workbench.

**1. Select Start -> Mechanical Design -> Sketcher from the menu bar (Fig. 1).**




**Fig.1. Menu bar**

**2. Next you have to select a plane.  
Click the desired reference plane either in the geometry area or in the specification tree (Fig. 2).**



**Fig. 2. Specification tree and reference plane**

### **3. You can also enter the Sketcher workbench by:**

- **multi-selecting two edges (to define h and v - the axis is aligned on those two edges)**
- **selecting one surface (reference plane)**
- **selecting the Sketcher icon .**
- **you can also enter the Sketcher workbench by double-clicking one sketch element.**

#### **• Sketcher Elements – Color Elements**

**Marked element – orange**

**Selected element – highlighted (red)**

**Current element – white**

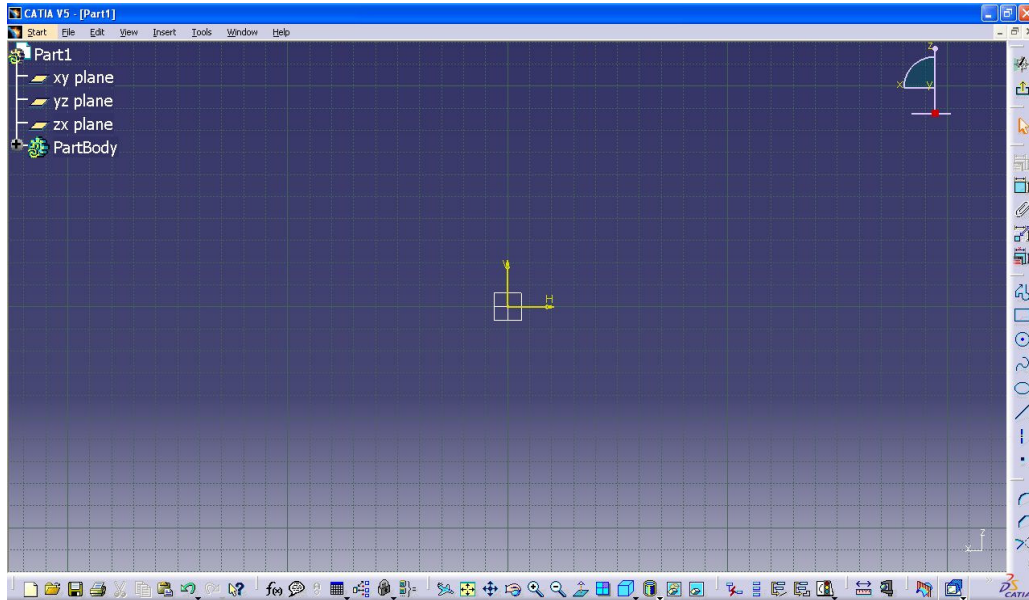
**Protected element – yellow**

**Fixed element – green**

**Over constrained element – violet**

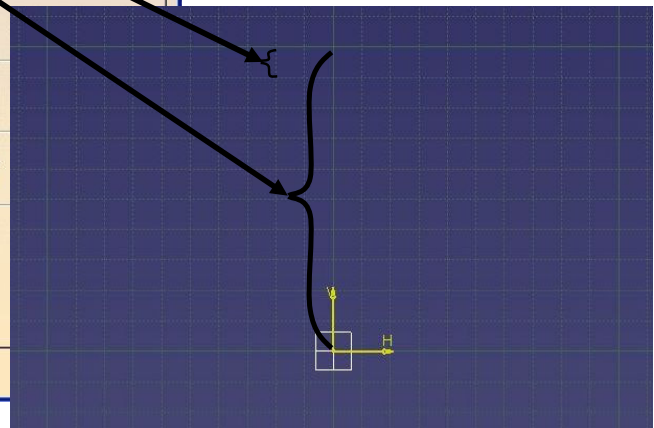
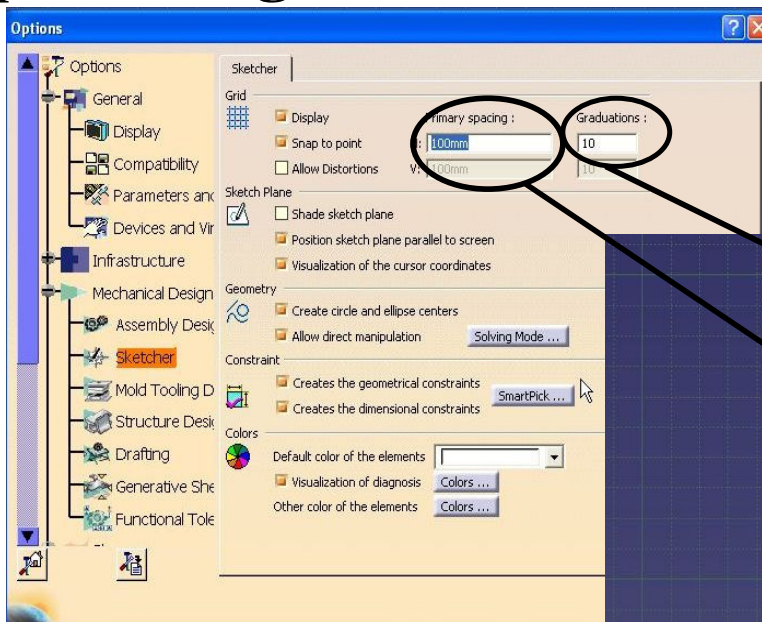
# Sketcher interface

**The Sketcher workbench looks as follows (Fig. 3):**



**Fig. 3. The Sketcher workbench.**

**A grid is displayed which is optional. You can modify grid characteristics via Tools->Options (fig. 4.).**

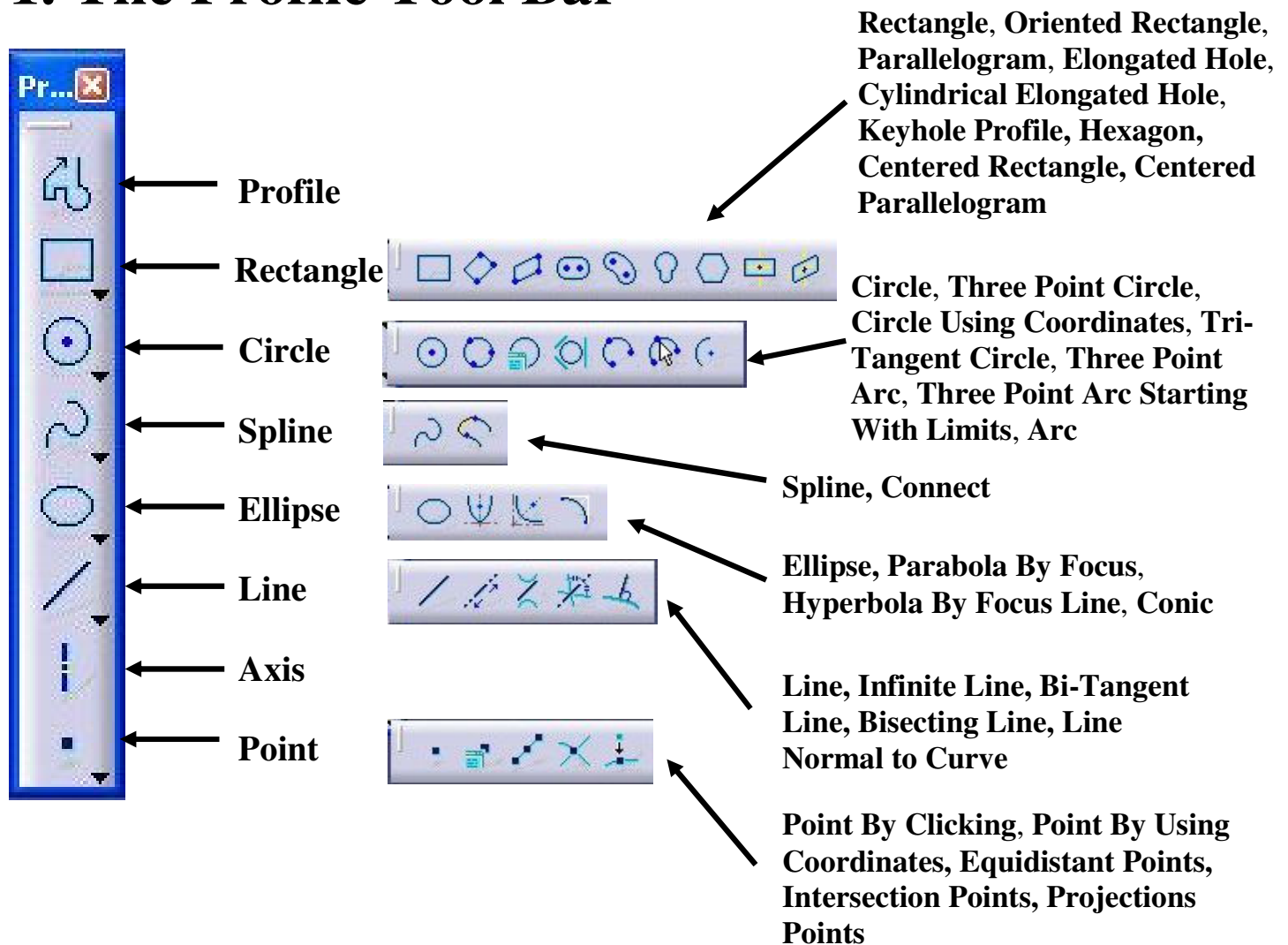


**Fig. 4. The Sketcher's options.**

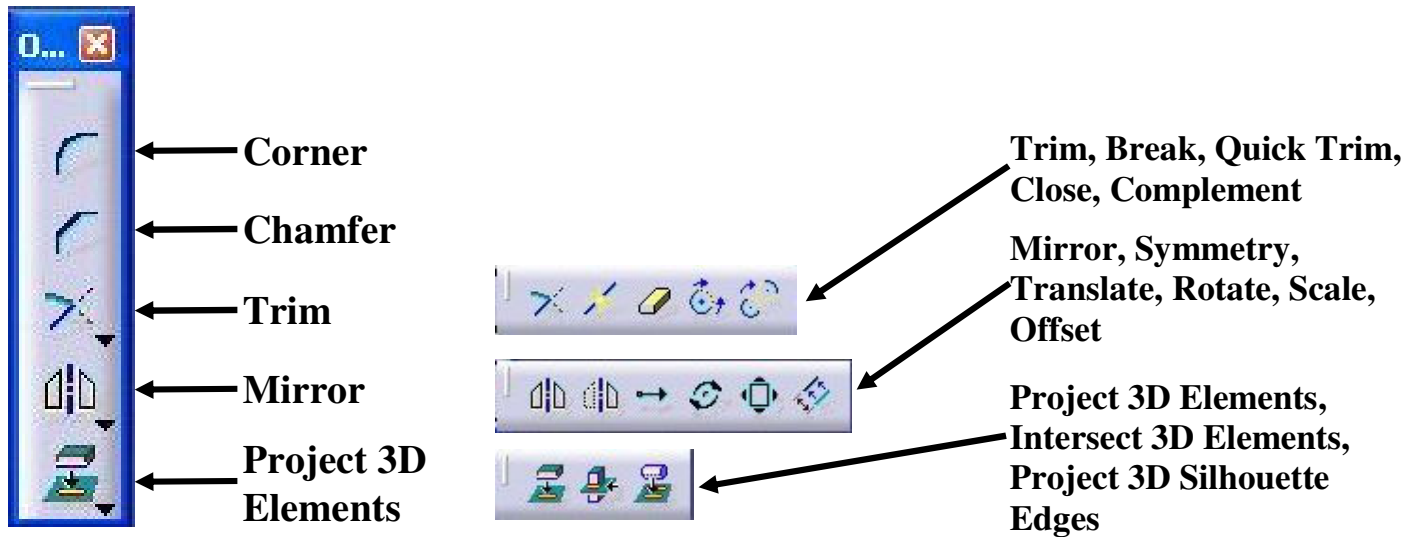
# Sketcher Tool Bars

There are three standard tool bars found in the Sketcher WorkBench. The three tool bars are shown below (Fig. 5). Some tools have an arrow located at the bottom right of the tool icon. To display the other tool options you must select and hold left mouse button on the arrow.

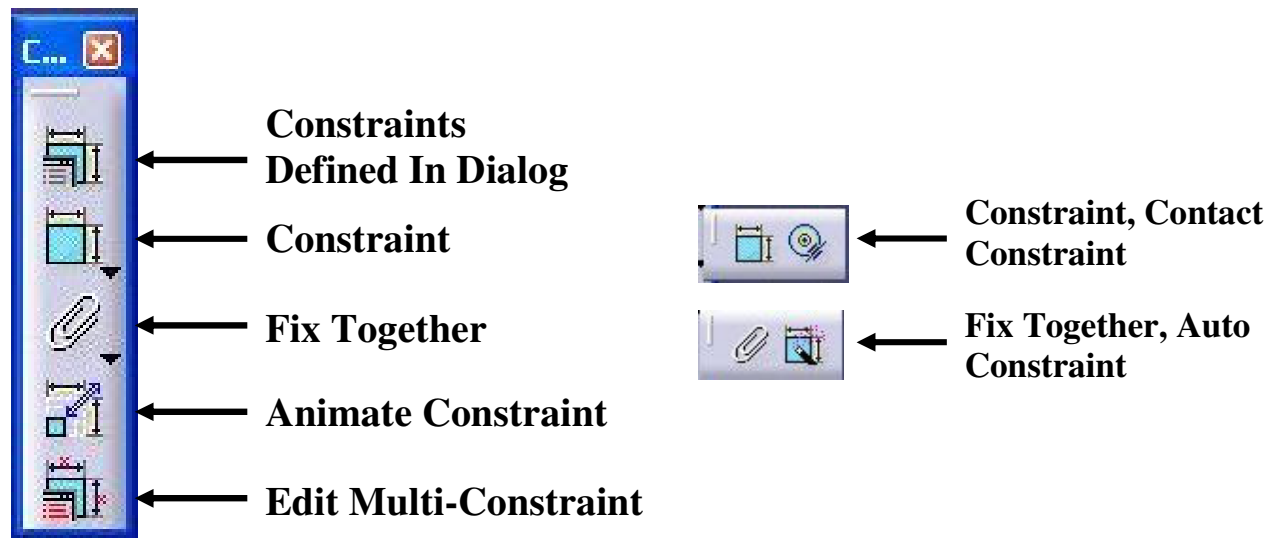
## 1. The Profile Tool Bar



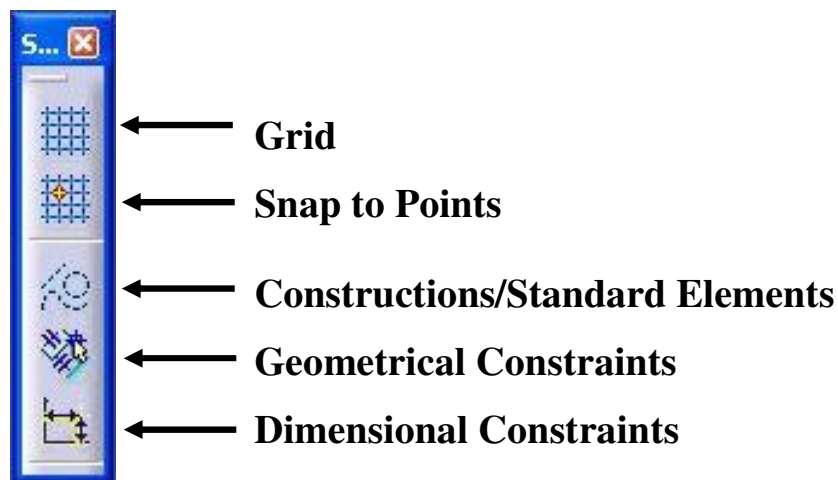
## 2. The Operation Tool Bar



## 3. The Constraints Tool Bar



## 4. The Sketch Tools Bar





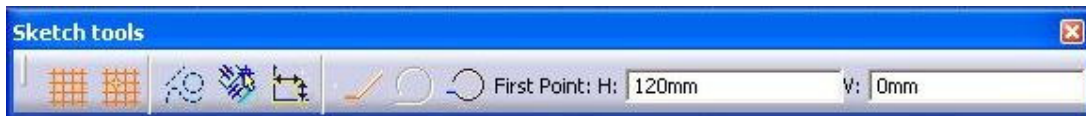
# How to Use Sketch Tools For Sketching

## Profile toolbar

### Example No. 1.

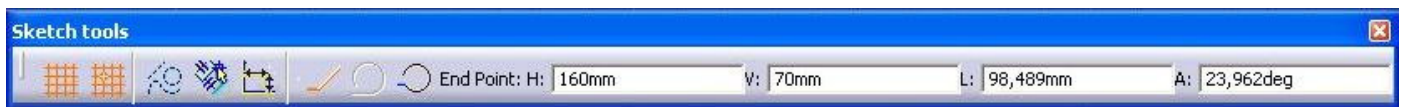
1. Select the Profile icon .

The Tools toolbar displays information in the two value fields (horizontal and vertical coordinates).



2. Enter the coordinates of the First Point (H and V) or click on the display.

The Tools toolbar displays information in the four value fields (horizontal, vertical, length and angle coordinates)



3. Enter the coordinates of the End Point (H and V) or click on the display.



**OR**

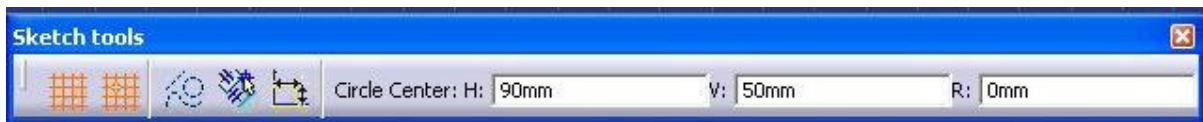
**4. Enter the length (L) of the line.**

**5. Enter the value of the angle (A) between the line to be created and the horizontal axis.**

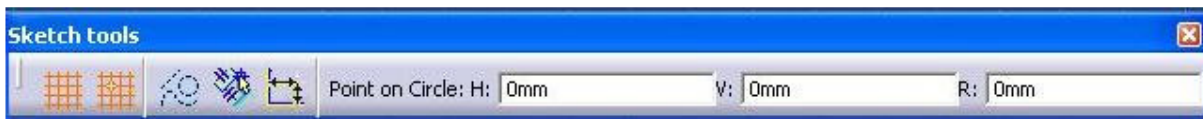
## **Example No. 2.**

**1. Select the Circle icon** .

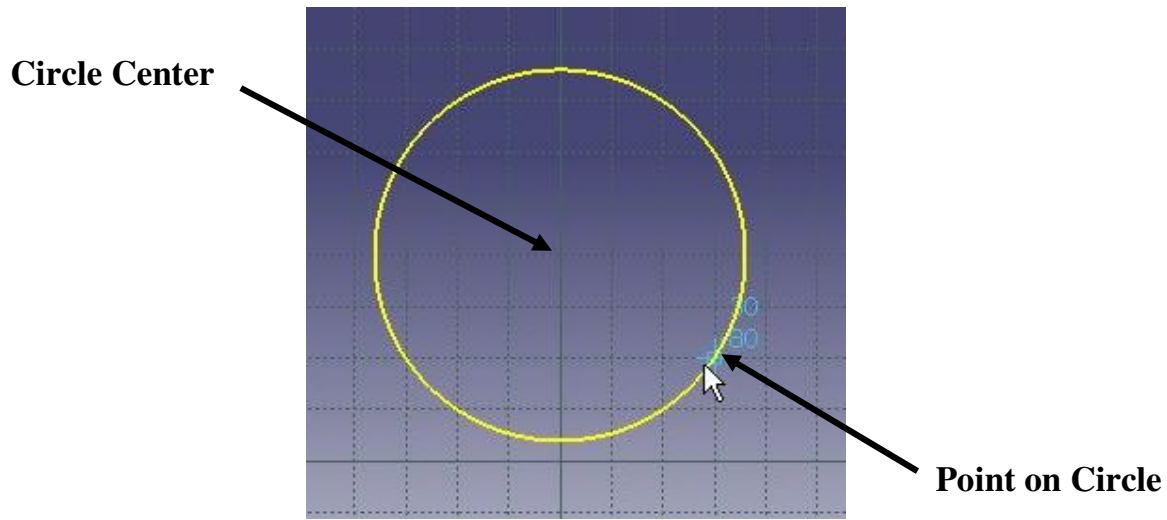
**The Tools toolbar displays information in the tree value fields (horizontal, vertical and radius coordinates).**



**2. Enter the coordinates of the Circle Center (H and V) and radius of the Circle(optional) or click on the display.**



**3. Enter the coordinates of the Point on Circle (H and V) or radius of the Circle or click on the display.**



## Example No. 3.

1. Select the Elongated Hole .

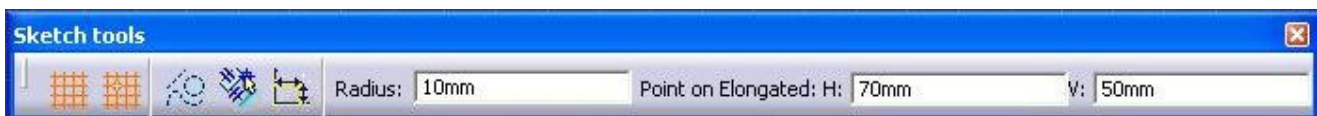
The Tools toolbar displays information in the five value fields (Radius, horizontal and vertical coordinates, Line Length and Angle between Line and Horizontal Reference).



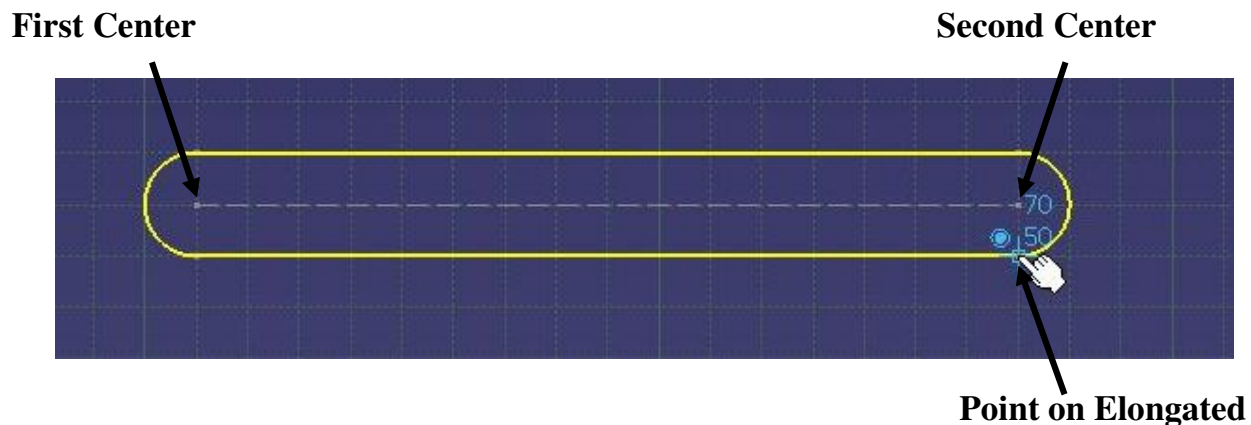
2. Enter the coordinates of the First Center (H and V) or click on the display.



3. Enter the coordinates of the Second Center (H and V) or click on the display.



## 4. Enter the coordinates of the Point on Elongated (H and V) or radius.



## Operations toolbar

### Example No. 4.

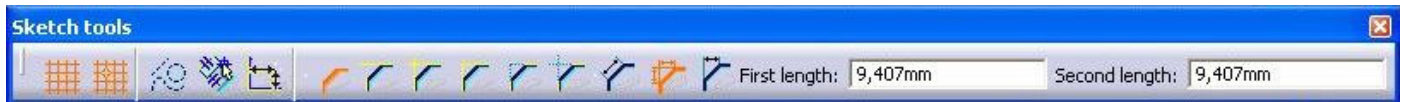
1. Create a Rectangle and select the Chamfer icon .

The Tools toolbar displays six trim options (Trim all Elements, Trim first Element, No Trim, Standard Lines Trim, Constructional Lines Trim, Constructional Lines No Trim).

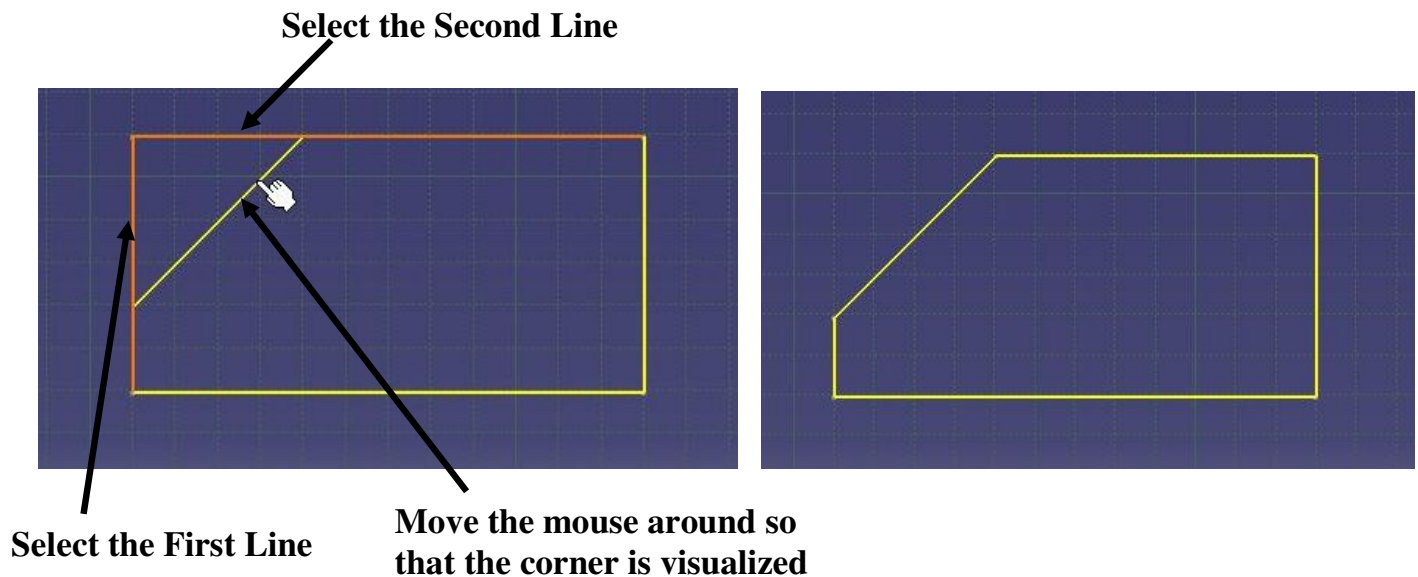


2. Select the desired chamfer trim option and then select corner (two lines) to be chamfered.

**The Tools toolbar displays six trim options and tree definition options (Angle and Hypotenuse, First and Second Length, Angle and First Length).**



**3. Select the desired chamfer definition option and enter the First length and the Second Length or click on the display.**

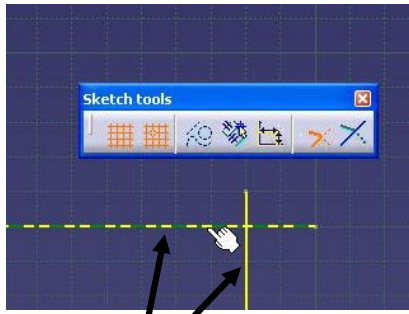


## **Example No. 5.**

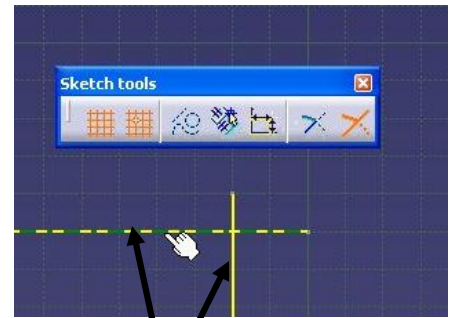
**1. Create two line and select the Trim icon . The Tools toolbar displays two trim options (Trim all Elements, Trim first Element).**



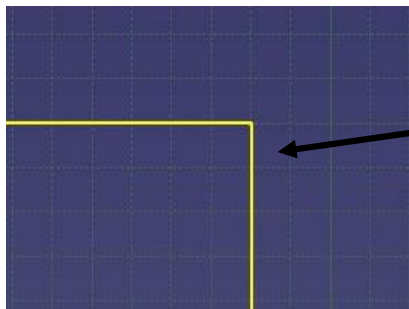
**2. Select the desired trim option and next select lines (two lines) to be trimmed.**



**Select the First and Second Line**



**Select the First and Second Line**



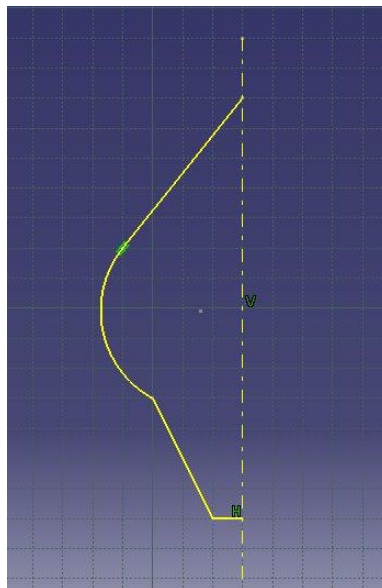
**Trim all elements**

**Trim First Element**



## **Example No. 6**

**1. Create this profile by freehand and The vertical Axis (use the Axis icon ).**

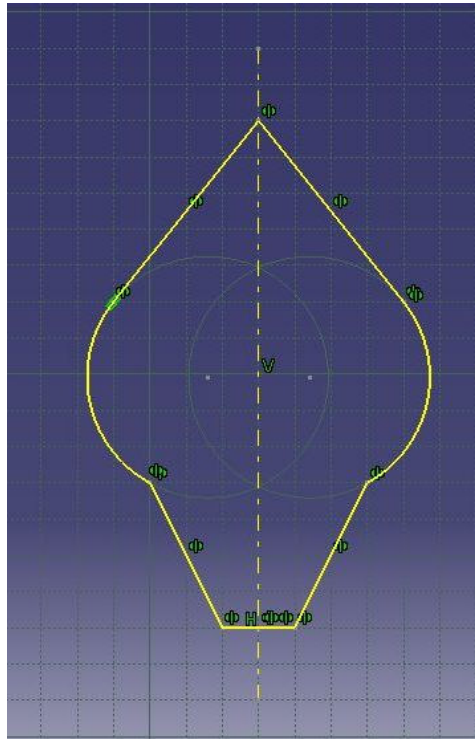




## 2. Select profile and select The Mirror icon

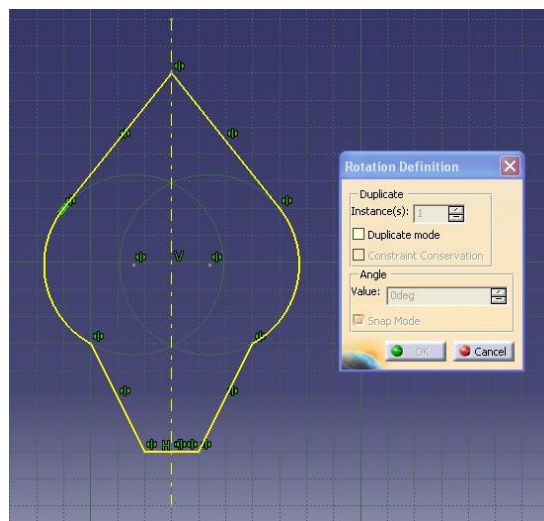


Then select the Vertical Axis.

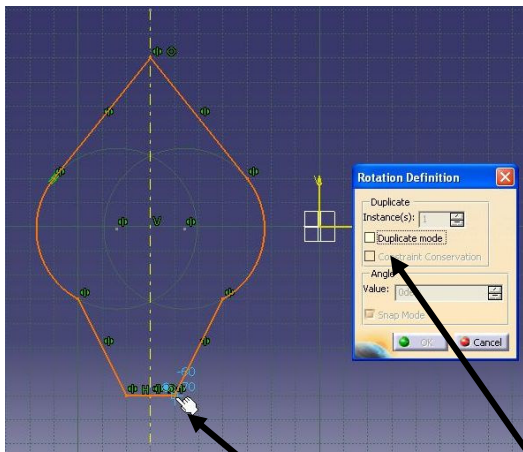


## Example No. 7.

1. Select the Rotation icon .

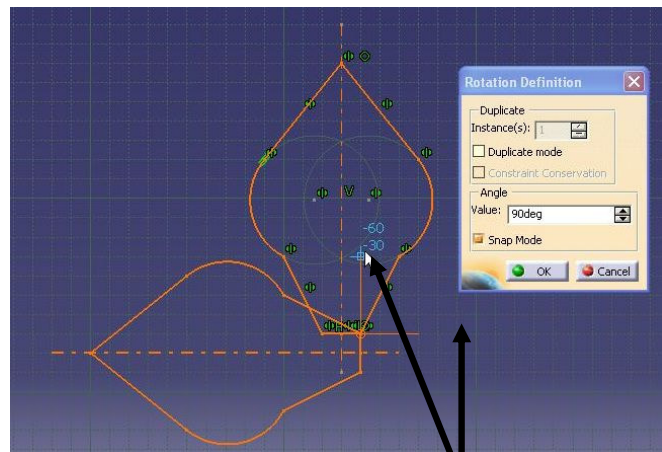


2. Next select profile with the Axis line.



**2. Select the center point for the Rotation**

**1. Unmark the Duplicate mode**




**3. Select two points on the Grid with respect to the Center to Define the angle**

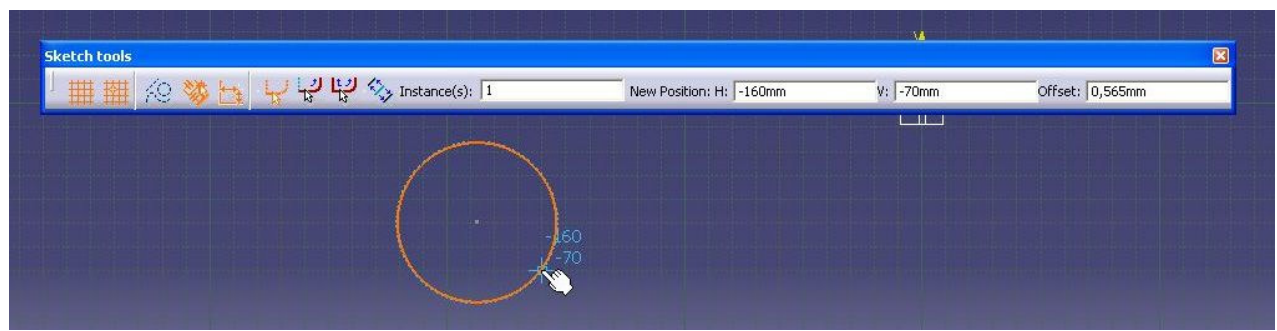
## **Example No. 8.**

**The Offset option – it is an operation which allows to duplicate elements of a profile.**

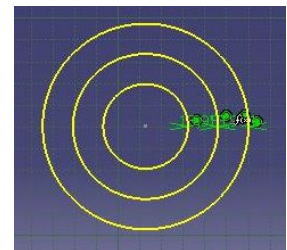
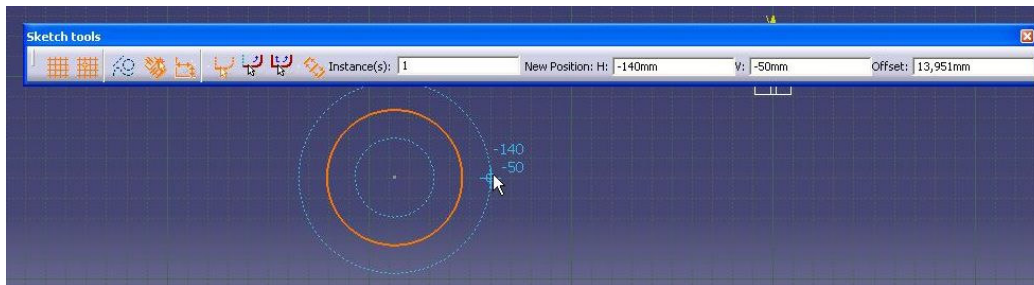
**Those elements will be duplicated keeping the parallelism between the selected elements and duplicated ones. The offset can be positive or negative to determine on which side of the profile the offset profile will be created.**

**1. Create a Circle and select the Offset icon**  **. The Tools toolbar displays information in the four value fields (No Propagation, Tangent Propagation, Point Propagation and Both side offset).**



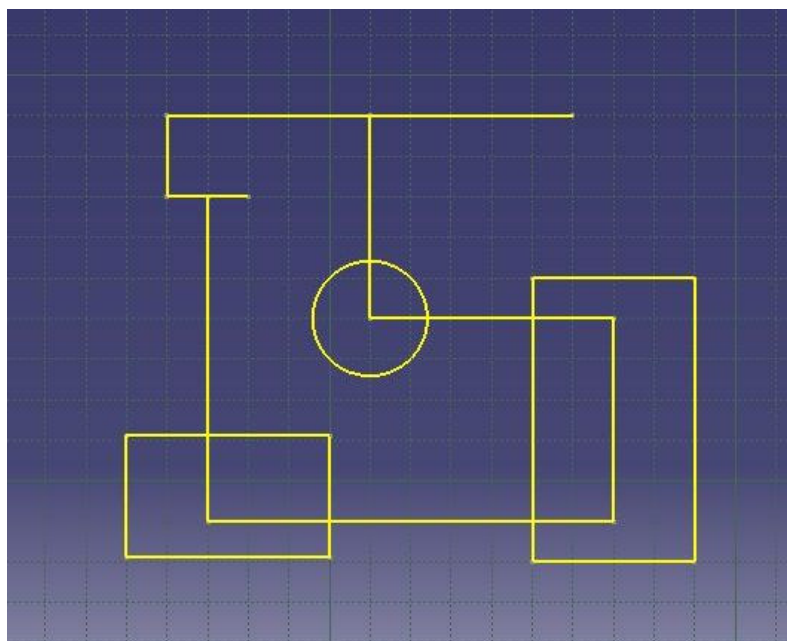


**2. Select the desired offset definition option (Both side offset). Enter the Instance(s) (one or more) and move the mouse on the display or enter the Offset and click on the display.**



## **Task No. 1.**

**Create those profile by freehand.**



**Then modify it by using Trim, Break, Chamfer and Corner options.**

