PABLO

MECH 161 – INTRO. TO COMPUTER AIDED DESIGN

INTRODUCTION TO AUTODESK AUTOCAD

DIMENSIONING

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Introduction

- A technical drawing is incomplete without **annotation.**
- Notes on a drawing are important to convey design information or clarify intent which can't be portrayed by linework alone.
- Measuring distances from a scaled, printed drawing is inaccurate.

- Dimensions allow exact values to be shown on a drawing which can then be used for construction.

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- **Dimensioning** is the process of specifying part' s information by using of lines, number, symbols and notes.

Notes

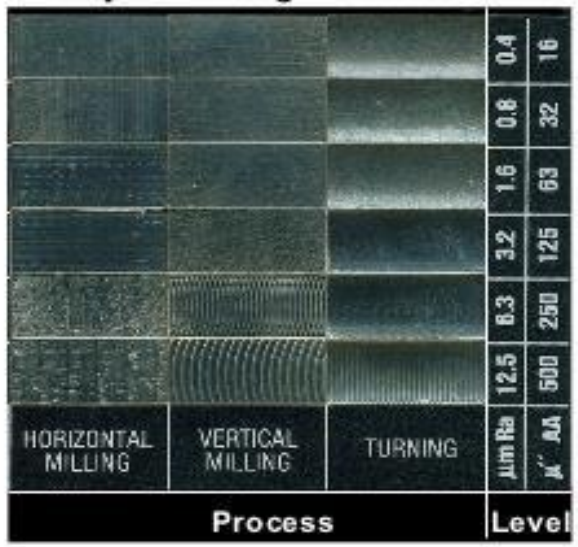
1. Lines to be used are always **thin continuous** line.
2. Symbol or abbreviation commonly found in a drawing are
   - "diameter" is represented by a symbol "ϕ".
   - "radius" is represented by a letter "R ".

Types of Information

- A basic information (this course)
  1. Sizes and location of the object's features. (this chapter)
  2. Type of material
  3. Number of piece required to assemble into a single unit of a product (or machine).

- A higher-level information
  1. Tolerances : Size and geometric
  2. Surface roughness
  3. Manufacturing or assemble process descriptions.

Example : Roughness condition



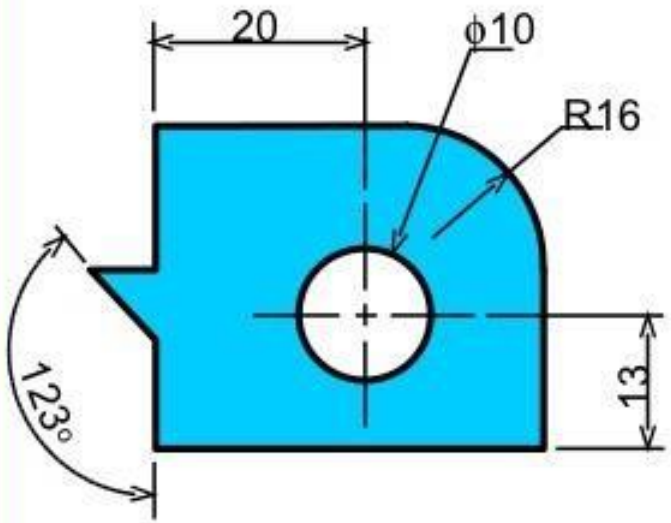
Dimensioning components :

General topics

Dimensioning Components

- **Extension lines**
  - indicate the location on the object's features that are dimensioned.
- **Dimension lines** (with arrowheads)
  - indicate the direction and extent of a dimension, and inscribe dimension numbers.
- **Dimension numbers**
  (or dimension figures)
- **Leader lines**
  - indicate details of the feature with a ***local*** note.
- **Notes**
  - local or general note

Example



App

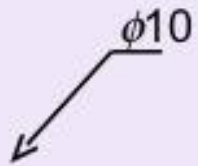
- Mostly done by using

Extension line, dimension line and dimension number

Example

Leader line and note

Example



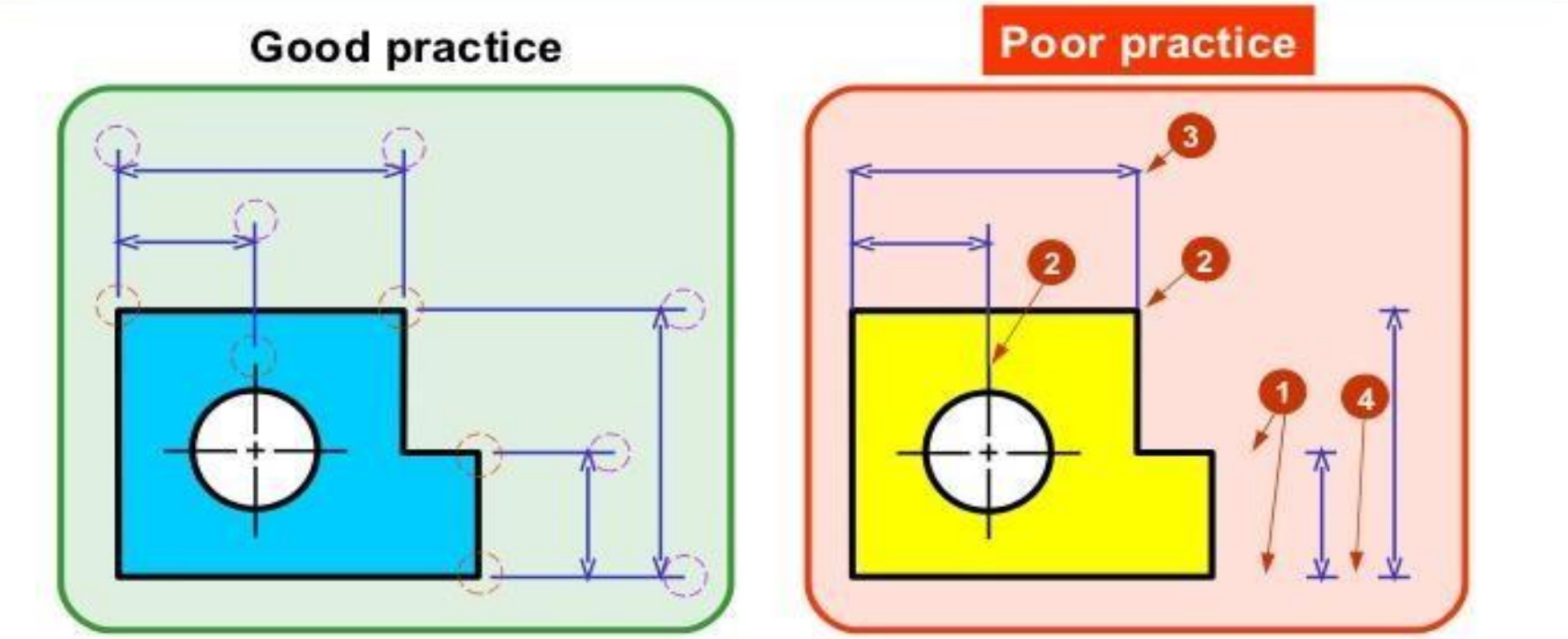
Notes

- The appropriate method depends on the object's features.
- Detail of a local note depends on the object's features.

Dimensioning components :

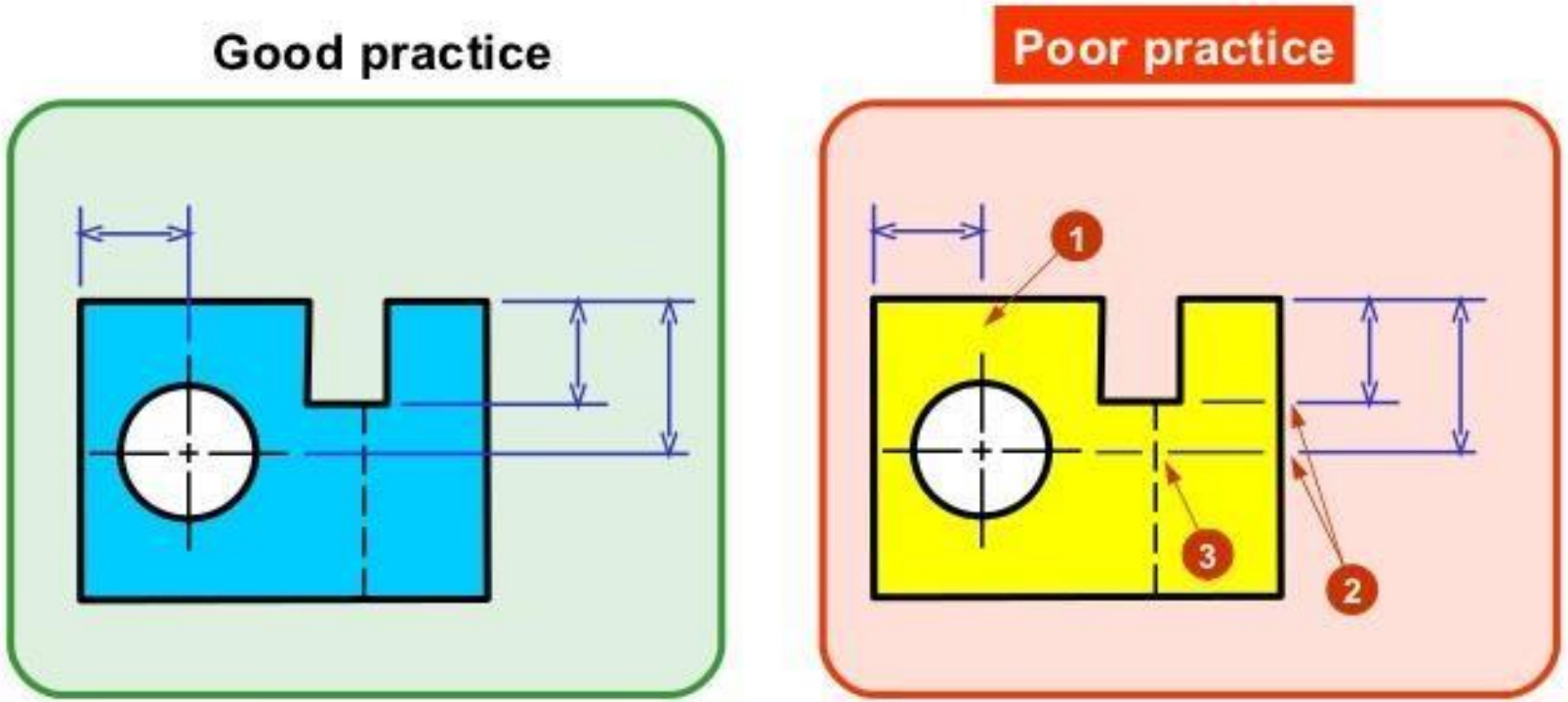
Recommended practice

- Always leave a visible gap (≈ 1 mm) from a view or center lines before start drawing a line.
- Extend the lines beyond the (last) dimension line 2-3 mm.

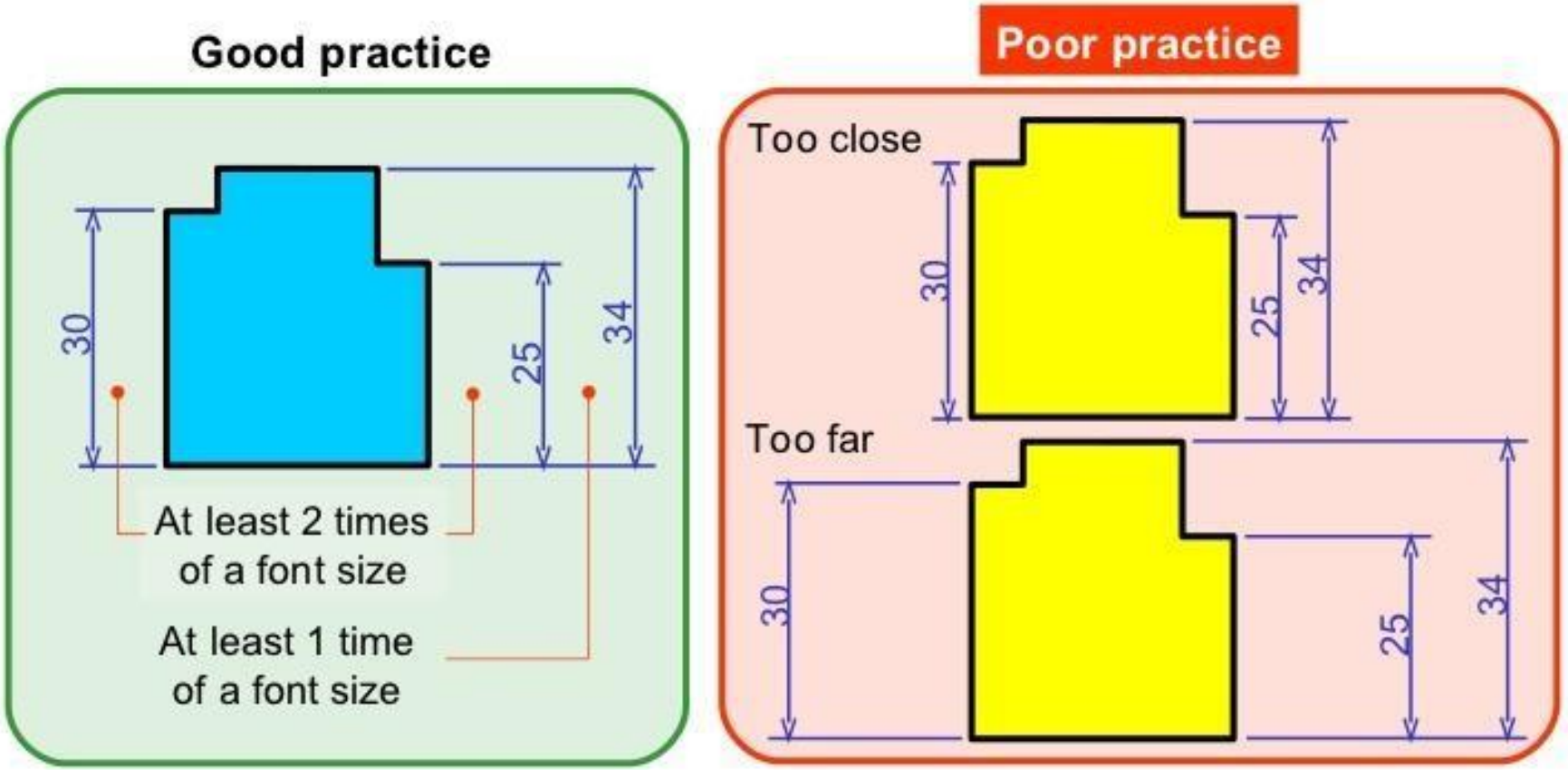


Extension Line

- **Do not** break the extension lines as they cross any line types, e.g. visible line, hidden line or center line, i.e. extension line always a continuous line.

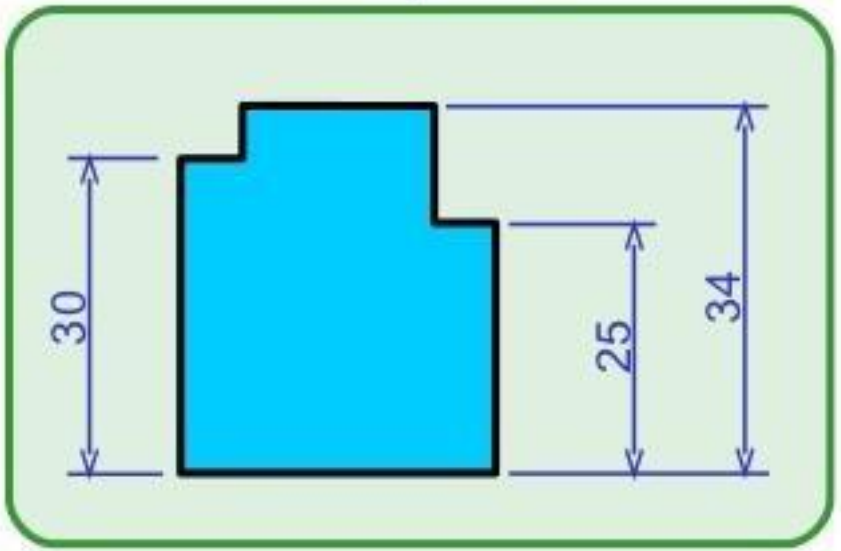


- Dimension lines should be appropriately spaced apart from each other and the view.

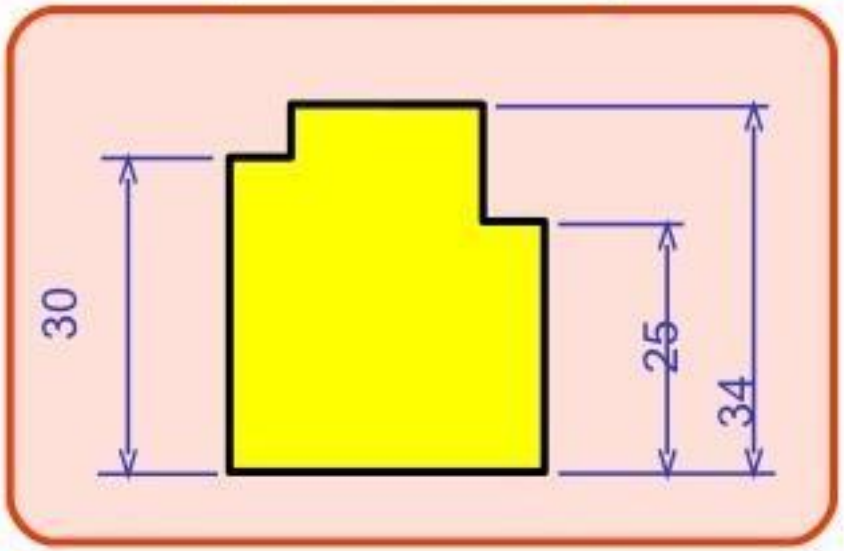


- The height of numbers is suggested to be 2.5~3 mm.
- Place the numbers at about 1 mm *above* and *at a middle* of a dimension line.

Good practice



Poor practice



Dimension Number (Number System)

1. Metric system (This course)

(ISO and JIS standards etc.)

Examples 32, 32.5, 32.55, 0.5 *(not .5)* etc.

2. Decimal-inch system

(ANSI standard)

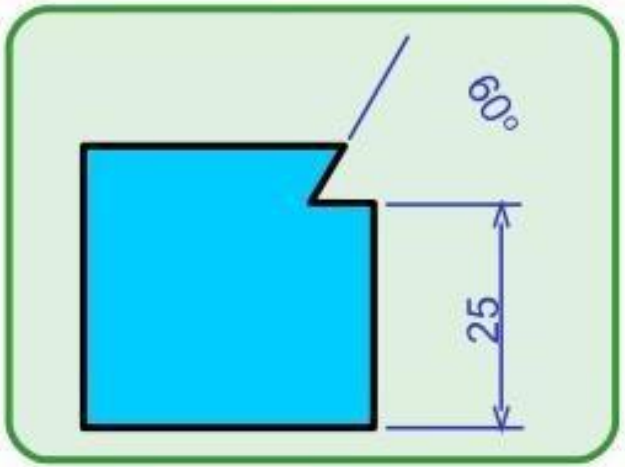
Examples 0.25 *(not .25)*, 5.375 etc.

3. Fractional-inch system

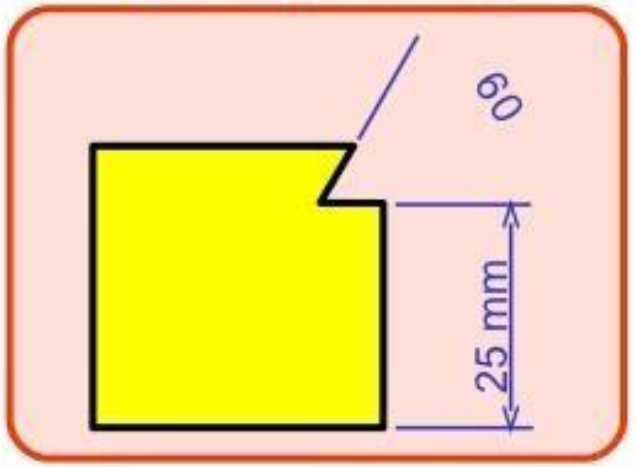
Examples $\frac{1}{4}$, $5\frac{3}{8}$ etc.

- **Length** dimension is expressed in **millimeters without** a necessity to specify a unit symbol “mm”.
- **Angular** dimension is expressed in **degree** with a symbol “o” places behind the number (and if necessary **minutes** and **seconds** may be used together).

Good practice

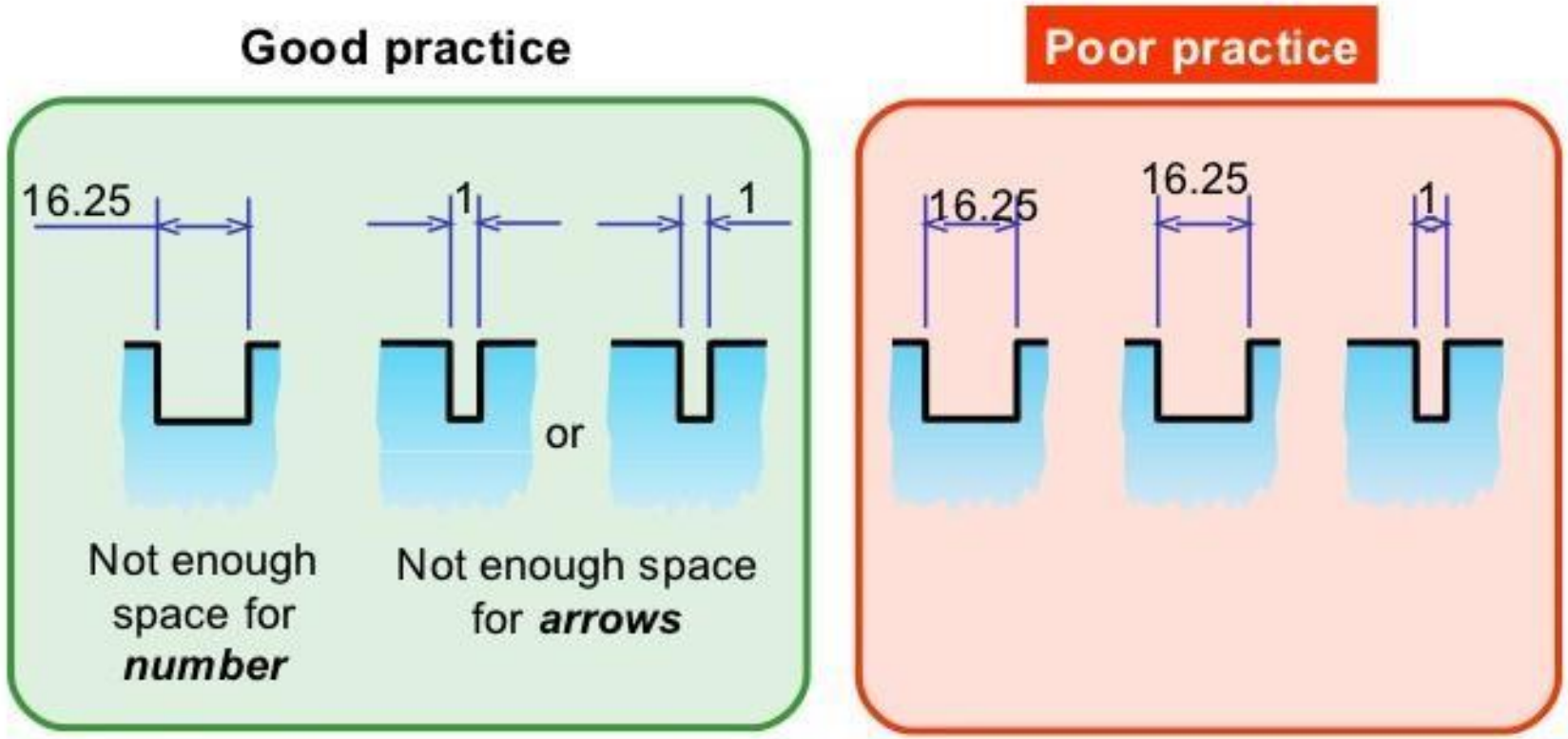


Poor practice



Dim

- If there is **not** enough space for number or arrows, put it **outside** either of the extension lines.



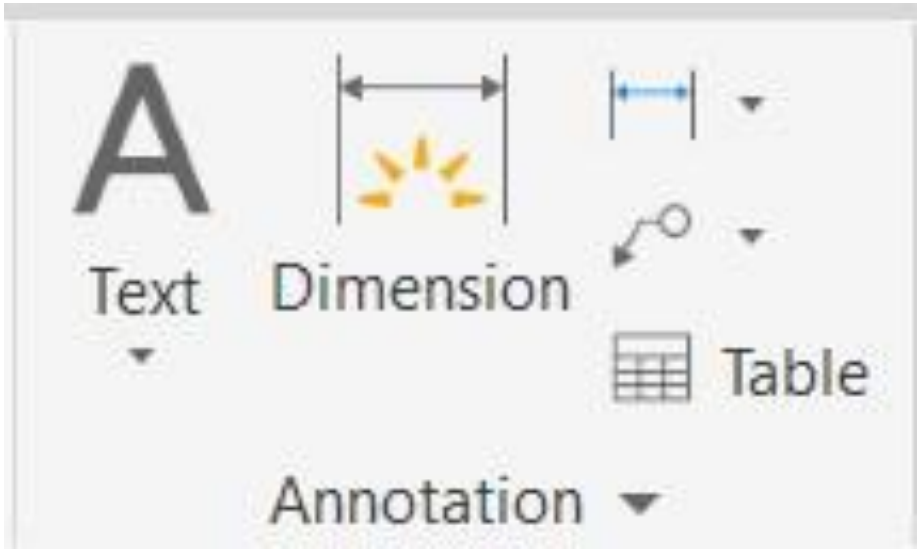
Situation)

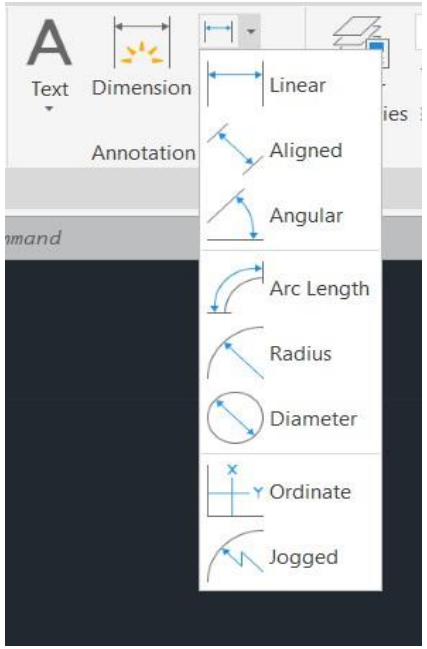
Dimensioning in AutoCAD

- You can access the dimensioning tools from the **Ribbon Annotate tab** > **Dimension panel.**

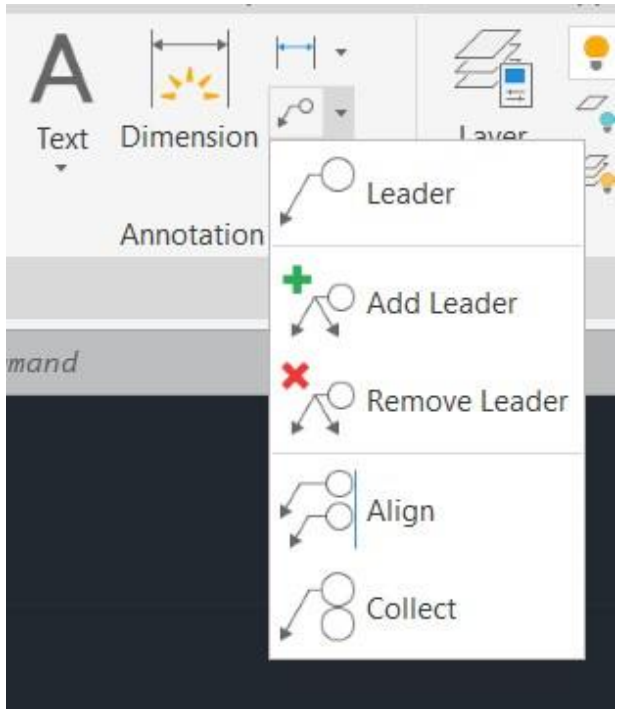
Dimensioning in AutoCAD

- The required dimension tool can be chosen from the **Dimension dropdown.**





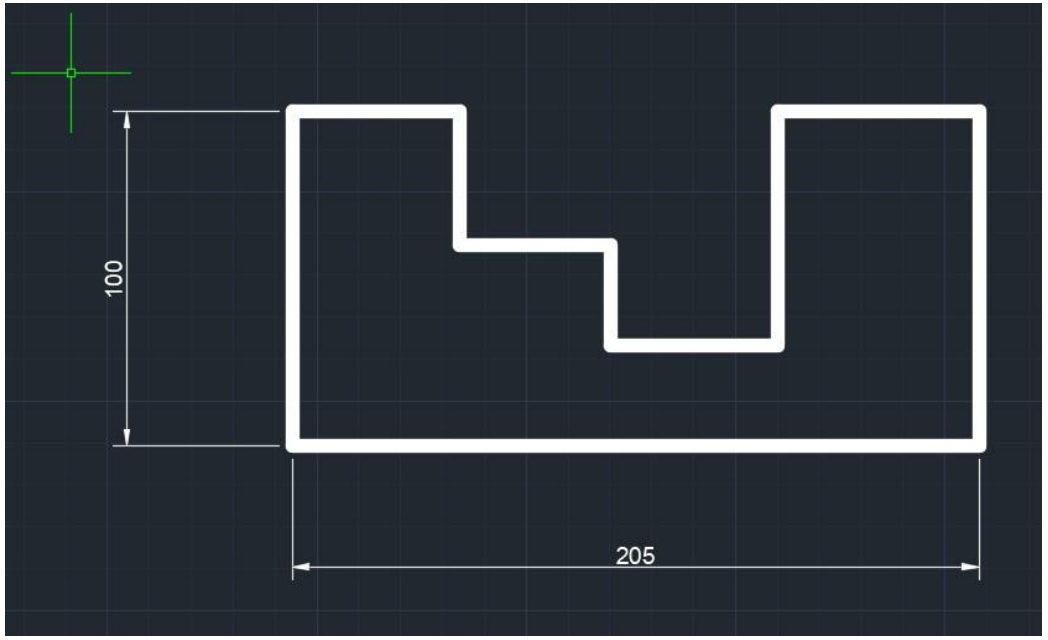
Dimensioning in AutoCAD

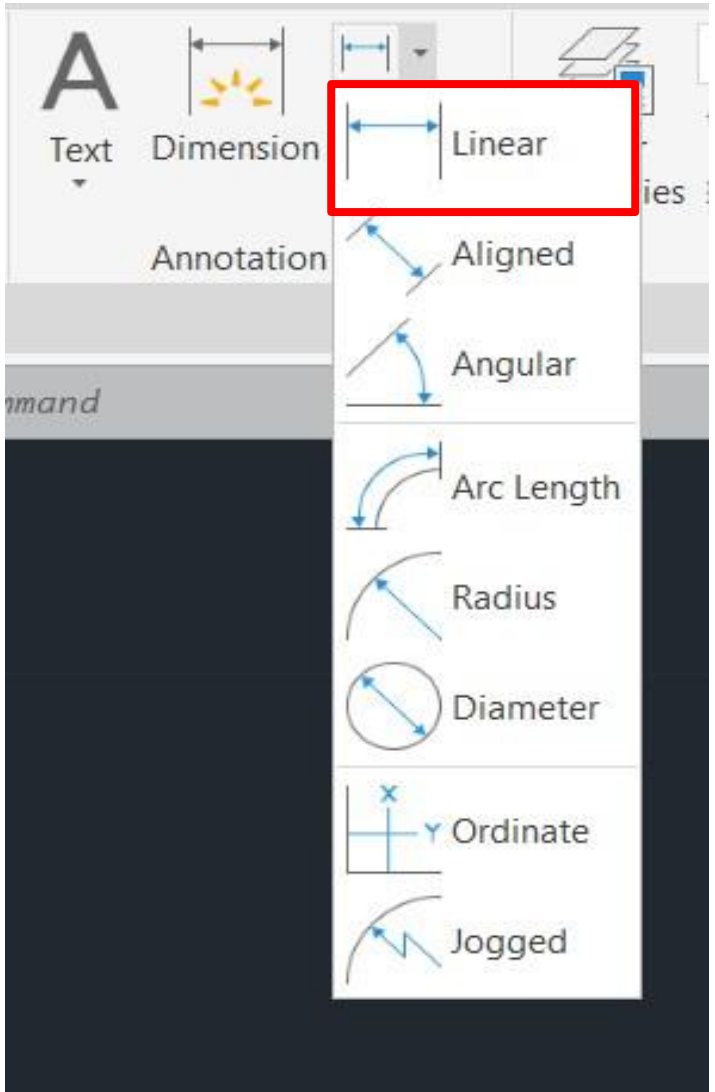


- **LINEAR**: The Linear dimension tool measures horizontal or vertical distances.

Dimensioning in AutoCAD

- *Command line: To start the Linear Dimension tool from the command line, type **"DIMLIN"** and press **[Enter].***

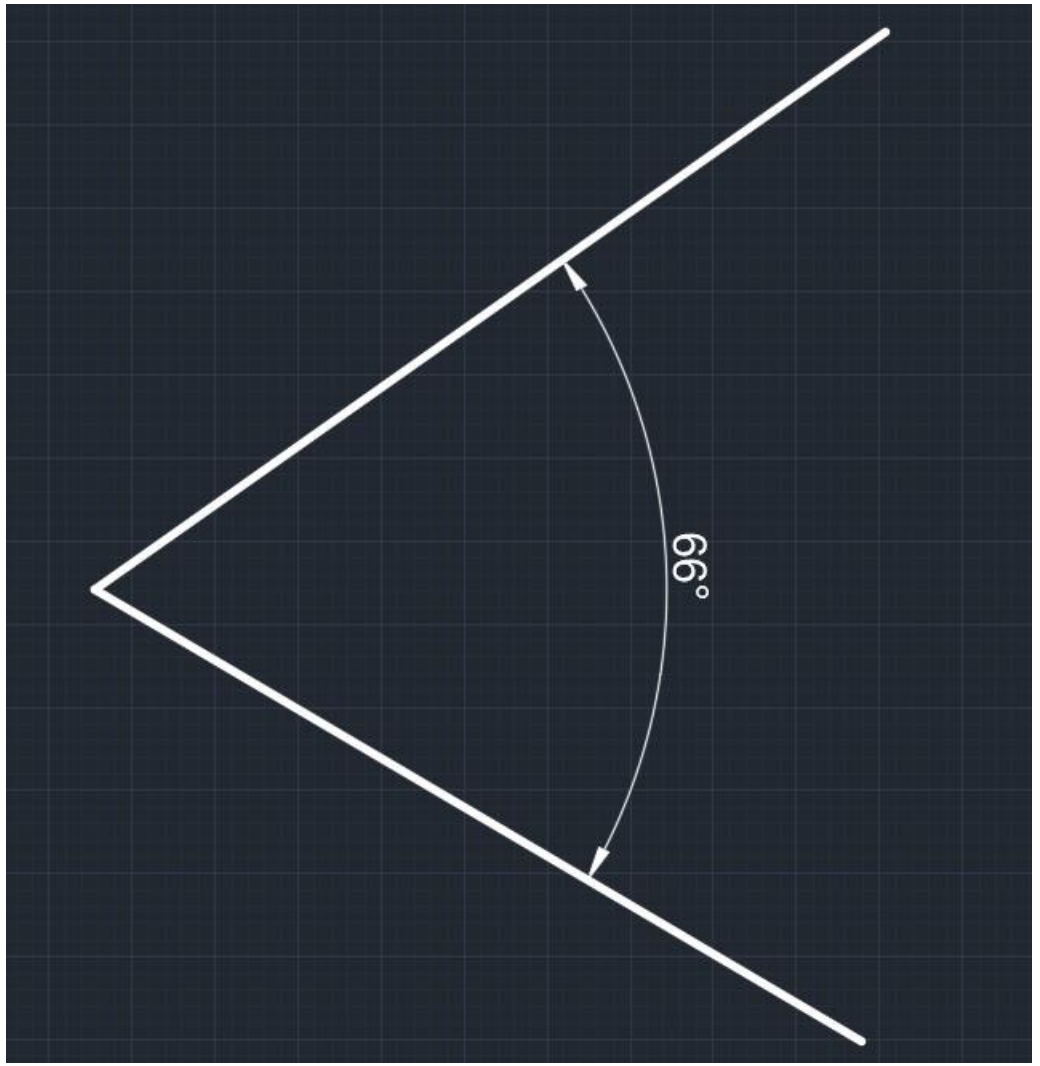


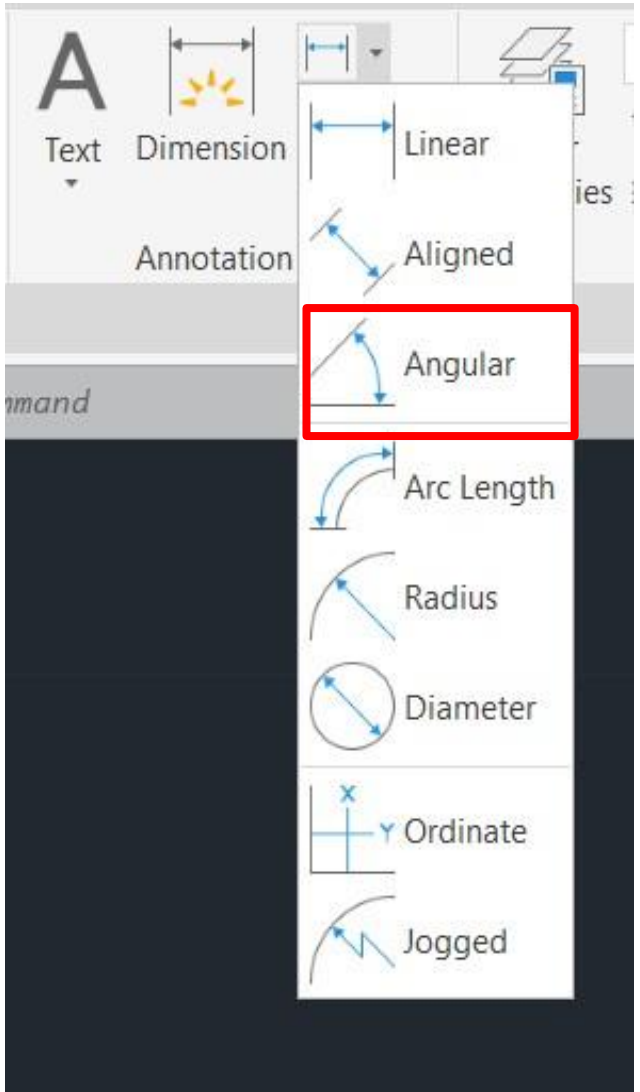


Dimensioning in AutoCAD

- **ANGULAR:** The Angular dimension tool measures an angle between two objects.

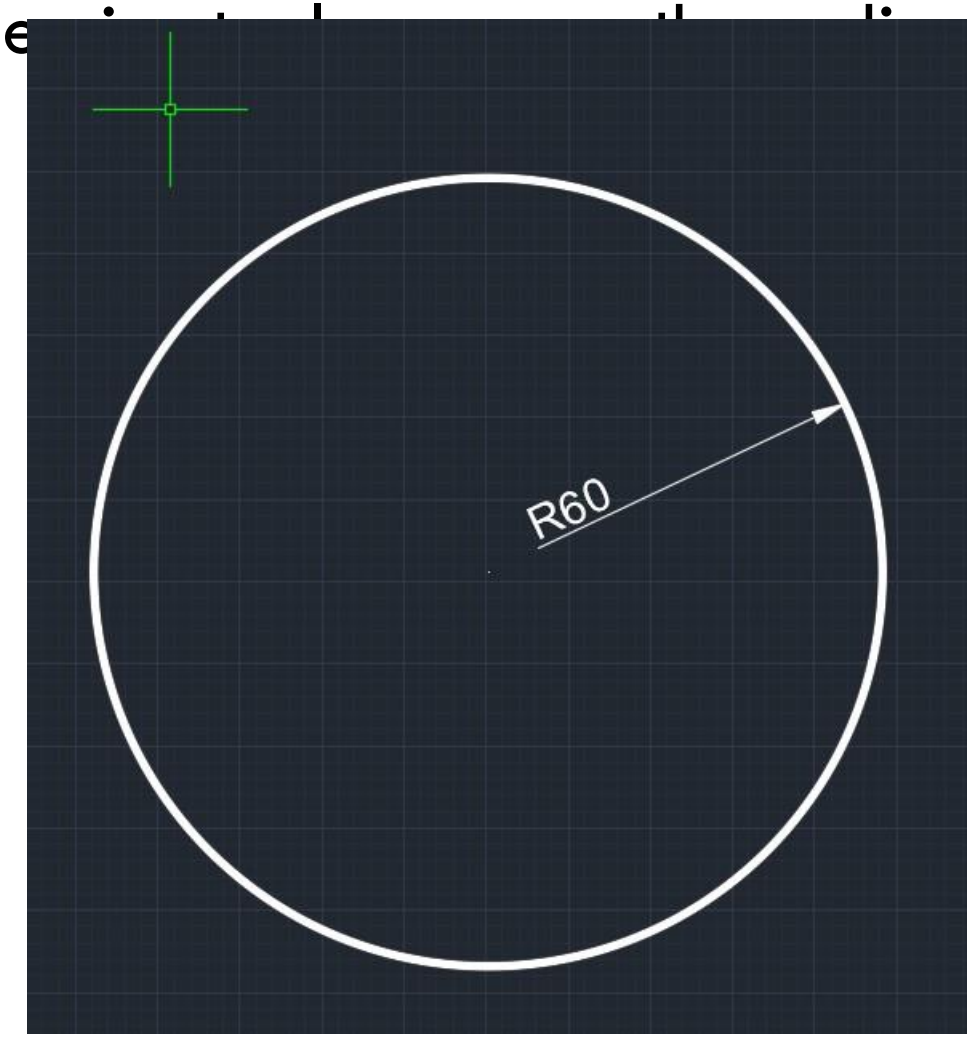
- *Command line: To start the **Angular Dimension** tool from the command line, type "**DIMANG**" and press [**Enter**].*





Dimensioning in AutoCAD

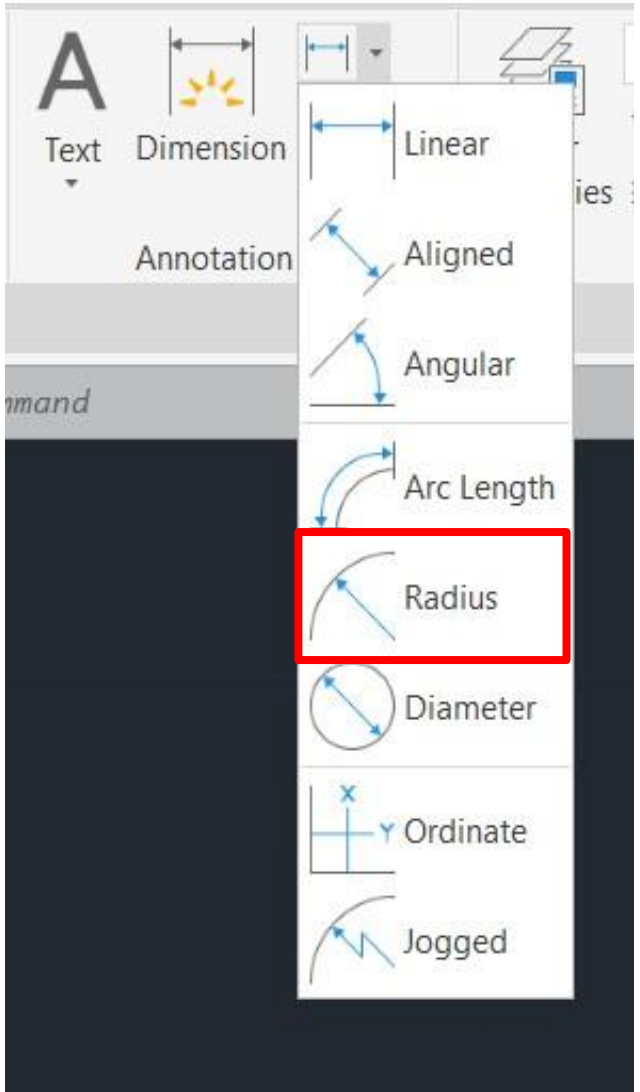
- **RADIUS:** The Radius dime of an



Dimensioning in AutoCAD

arc or circle.

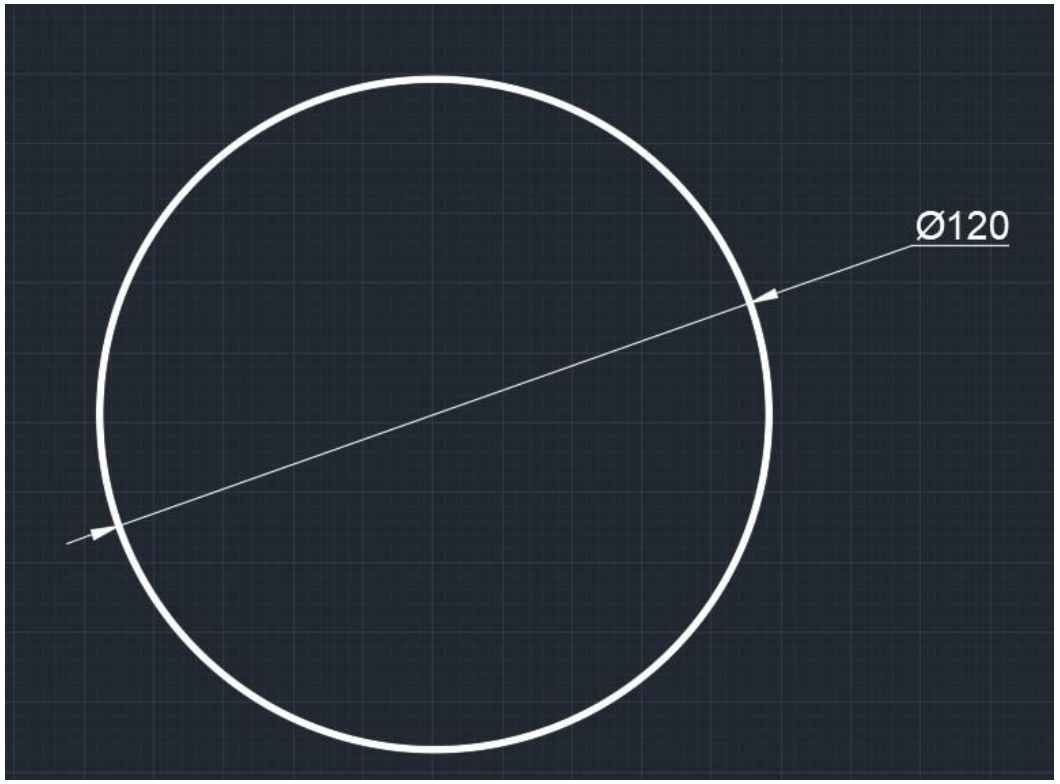
- *Command line: To start the **Radius Dimension** tool from the command line, type "**DIMRAD**" and press [**Enter**].*

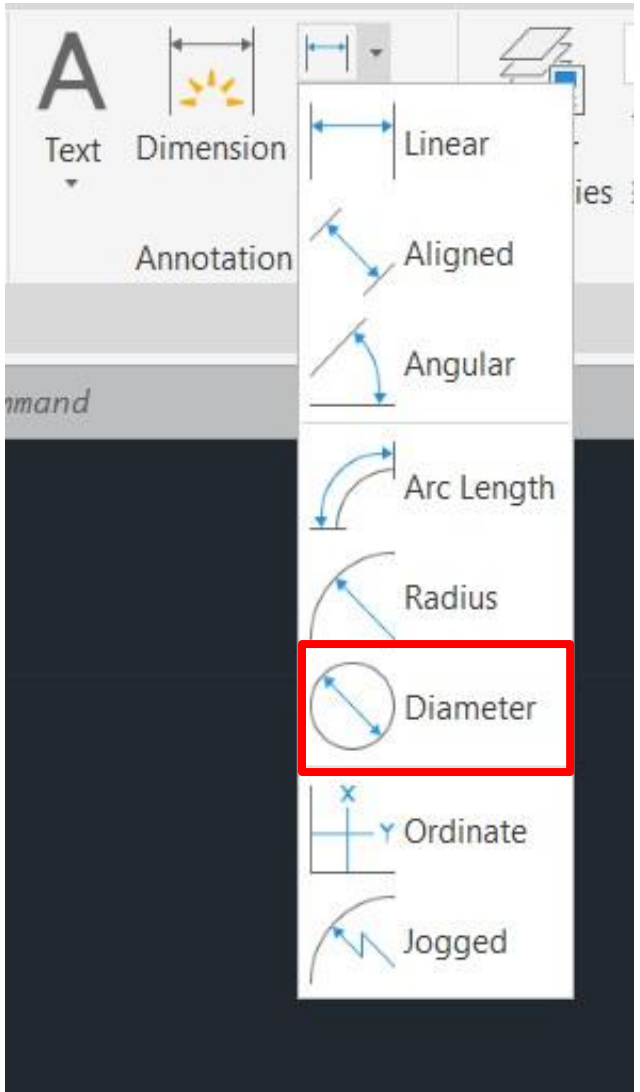


Dimensioning in AutoCAD

- **DIAMETER:** The Diameter dimension tool measures the diameter of an arc or circle.

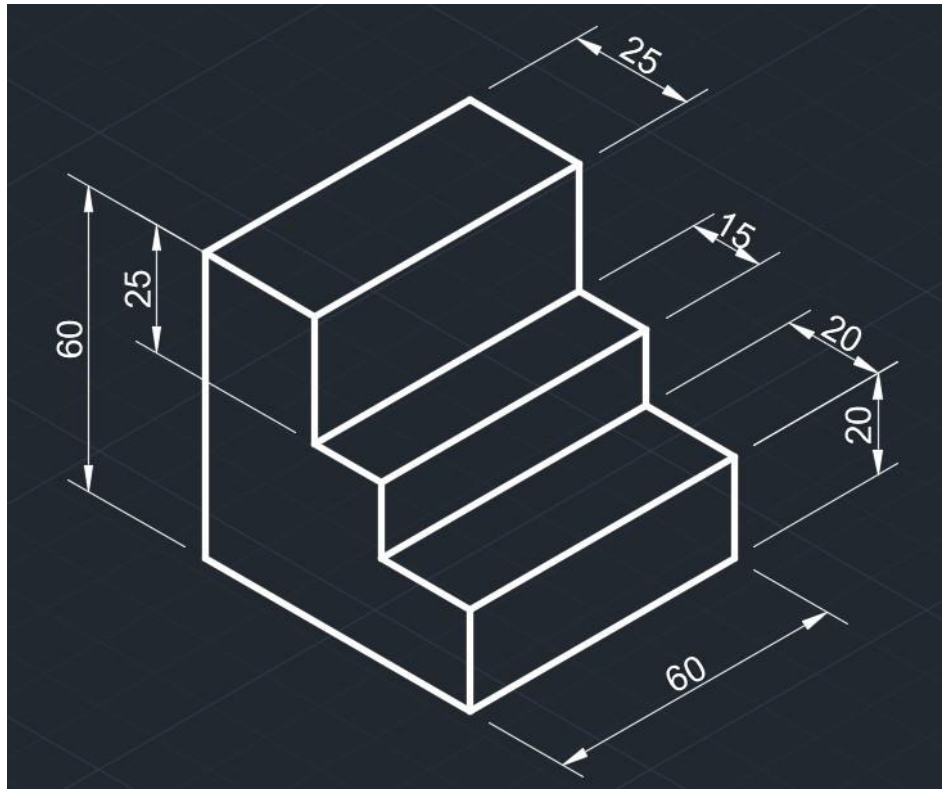
- *Command line: To start the **Diameter Dimension** tool from the command line, type "**DIMDIA**" and press [**Enter**].*

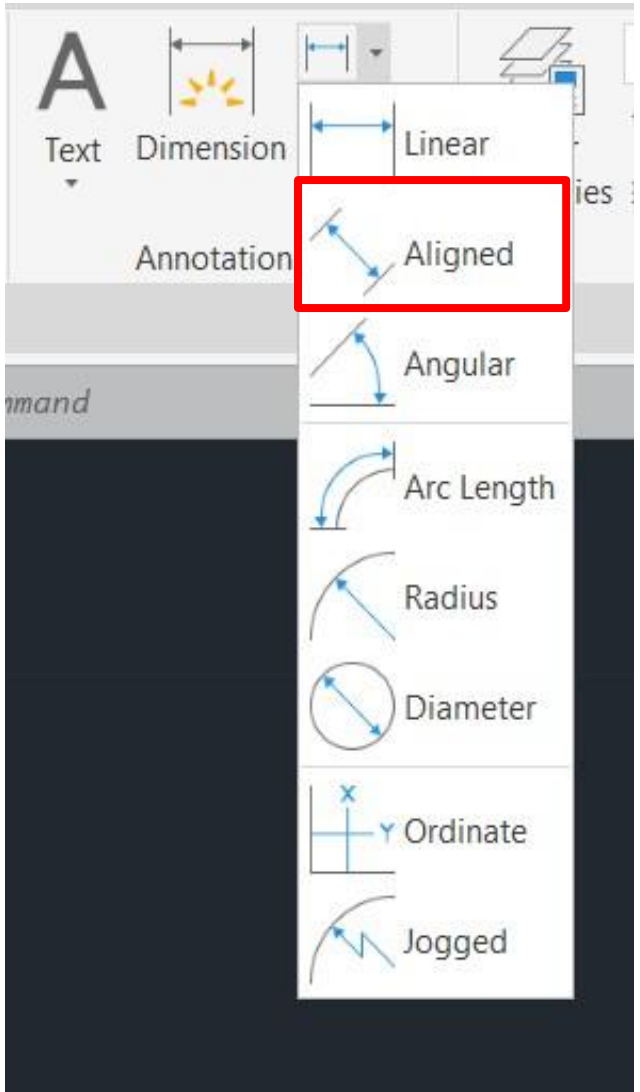


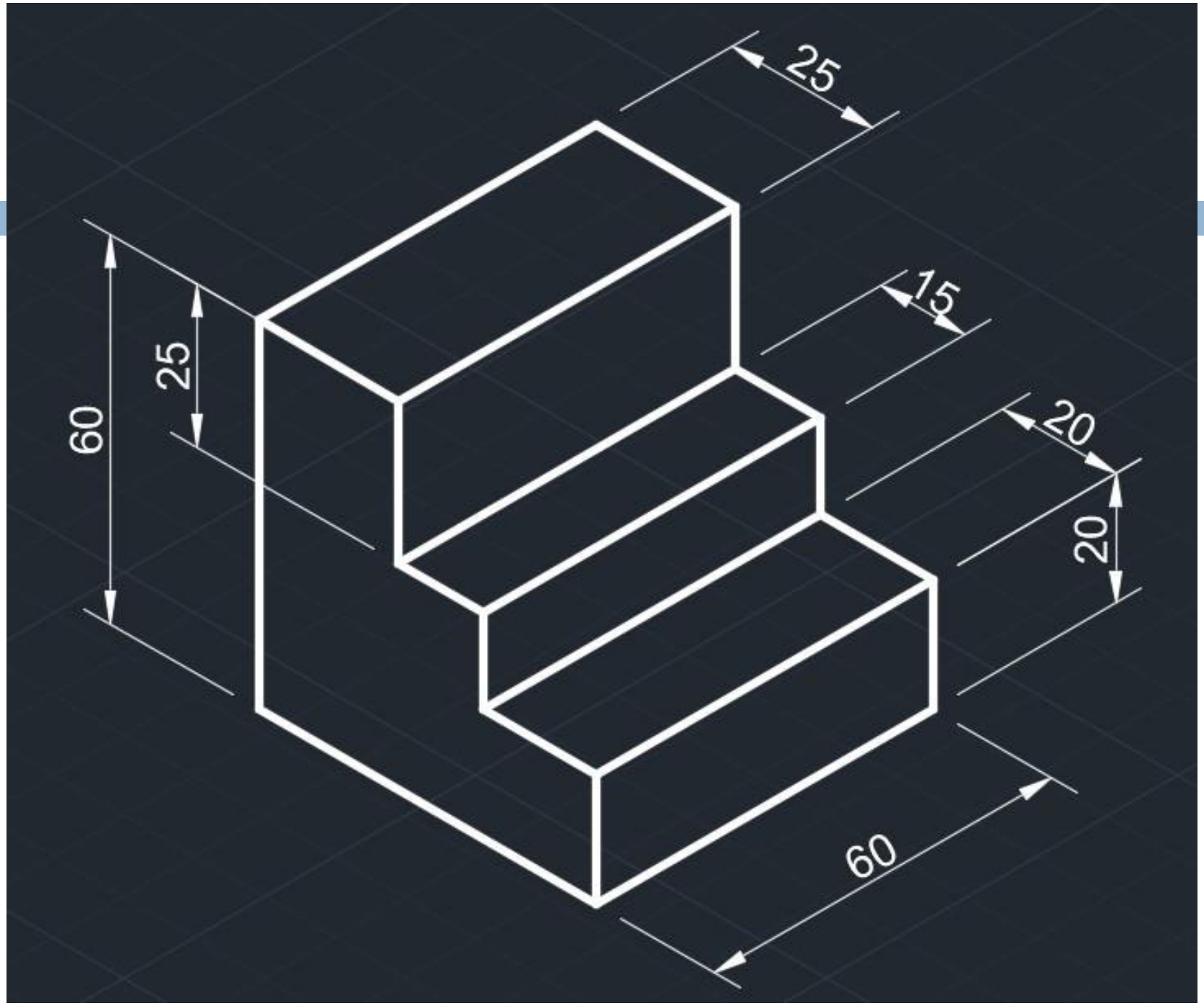


Dimensioning in AutoCAD

- **ALIGNED:** The Aligned dimension tool measures the length along an object.
- Mostly used in *isometric drawings.*
- *Command line: To start the Aligned Dimension tool from the command line, type "DIMALI" and press [Enter].*
- Type *"DIMEDIT" and press* to *[Enter]. Choose oblique to* align your dimensions properly.



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Questions