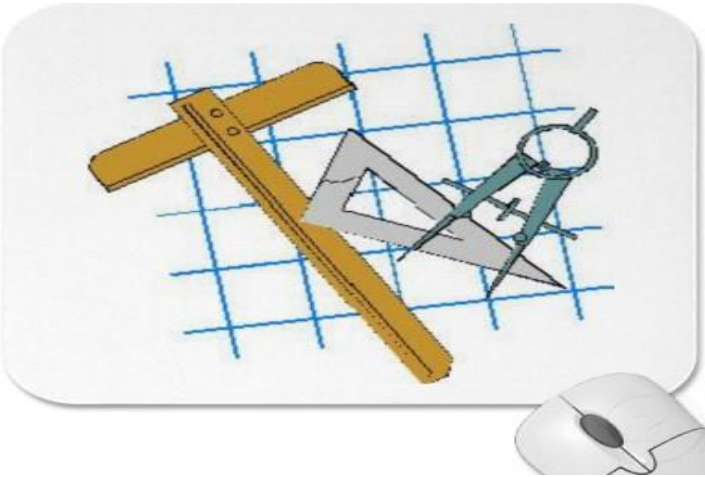
Dimensioning



Contents

- Introduction
- Dimensioning components & their recommended practices
- Dimensioning the object’ s features
- Placement of dimensions.

Introduction

Definition

- **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 ".

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)

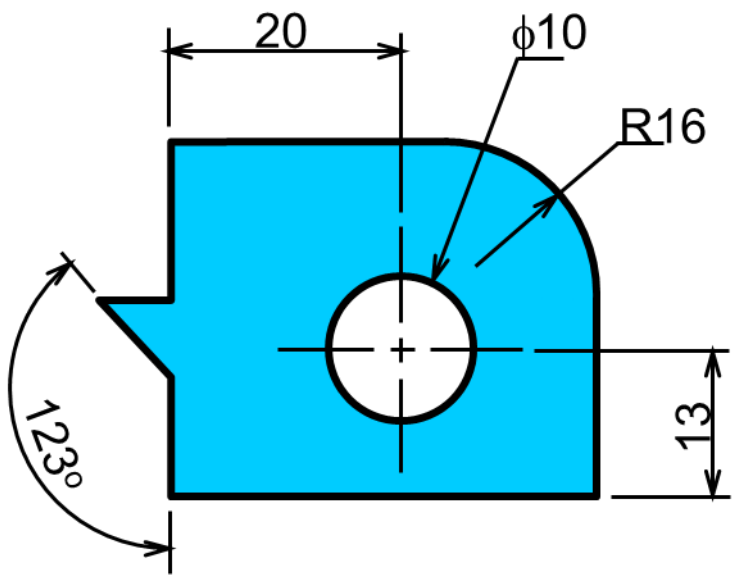
- **Leader lines**

  - indicate details of the feature with a ***local*** note.

- **Notes**

  - local or general note

Example

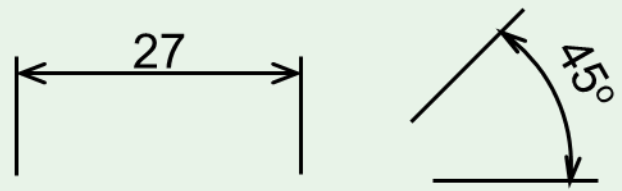


Applying the dimensioning components

- Mostly done by using

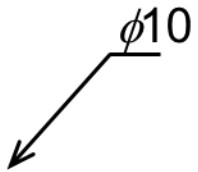
Extension line, dimension line and dimension number

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.

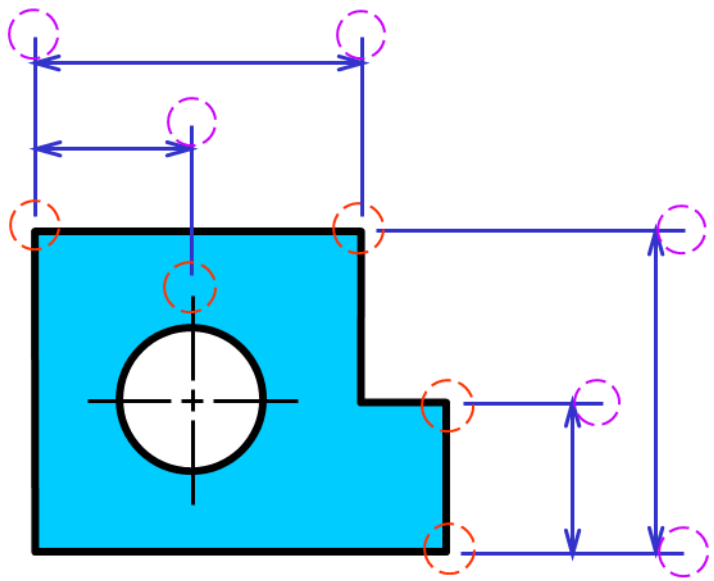
Dimensioning components :

Recommended practice

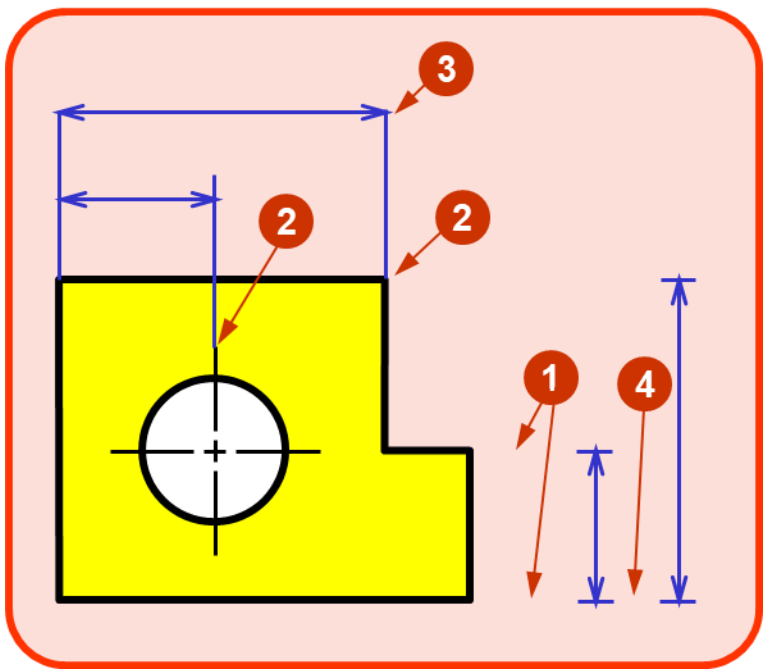
Extension line

- 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.

Good practice



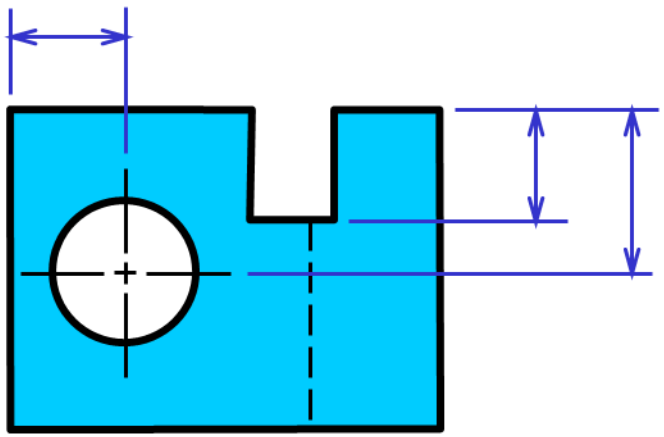
Poor practice



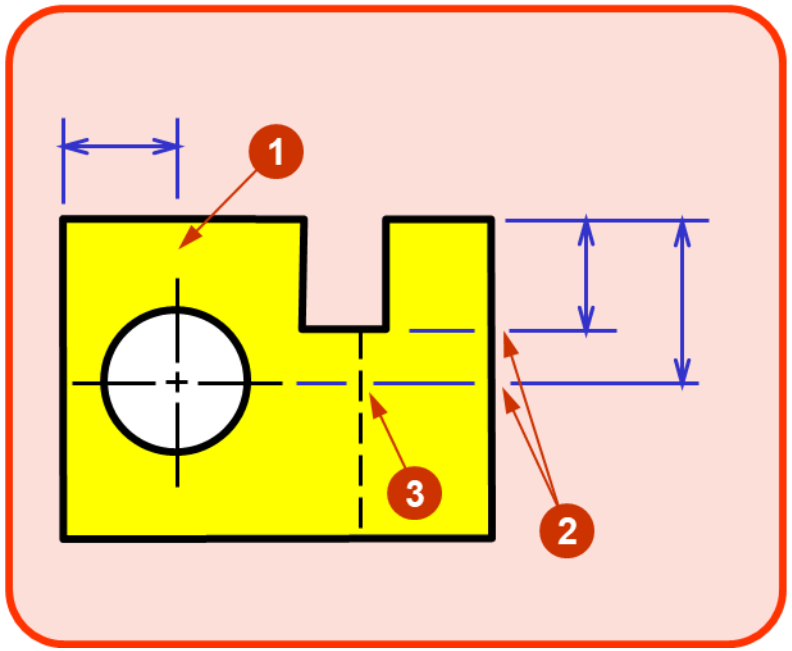
Extension line

- **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.

Good practice



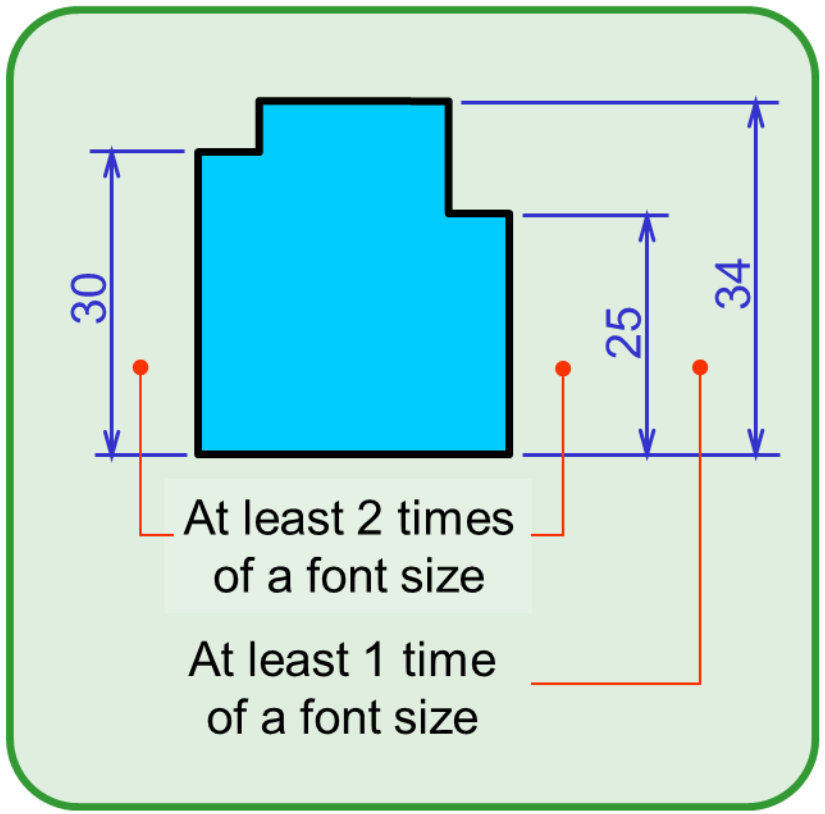
Poor practice



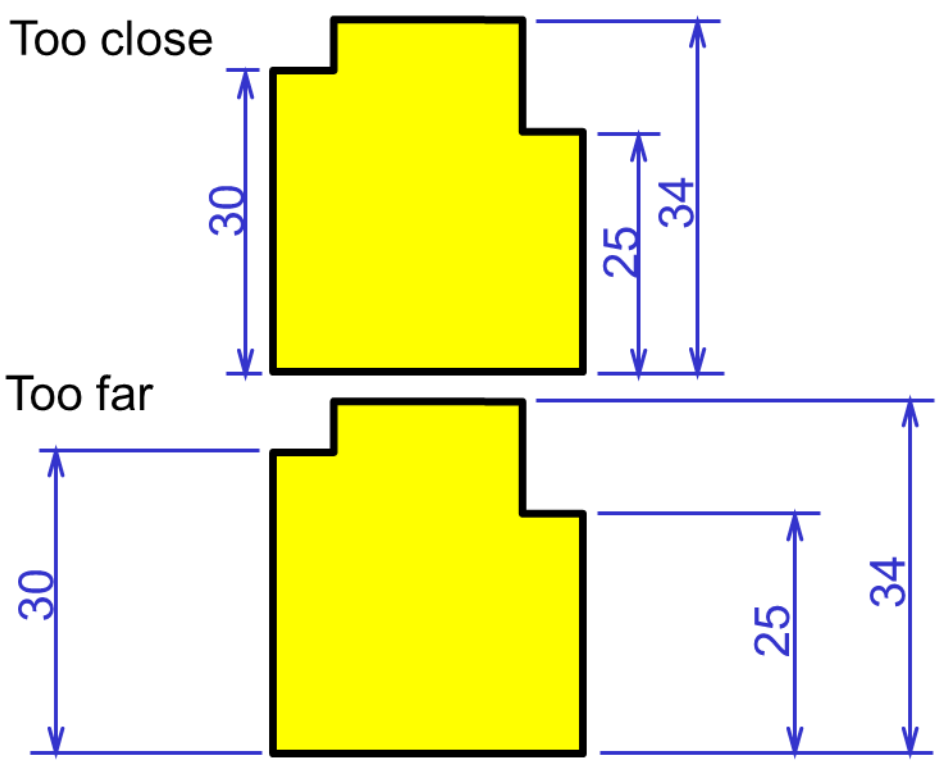
Dimension line

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

Good practice



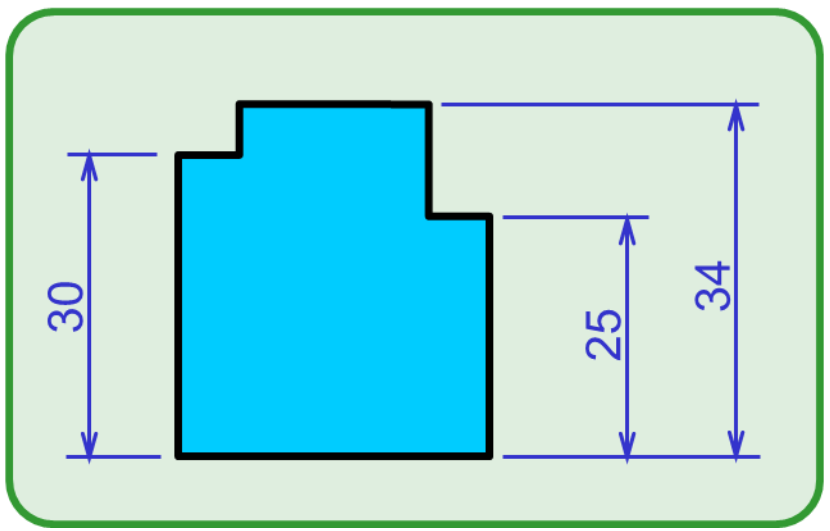
Poor practice



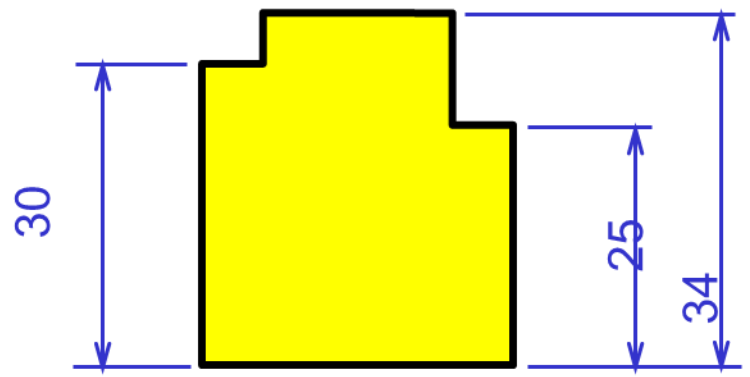
Dimension number : General

- Lettered with **2H** or **HB** pencil.
- 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



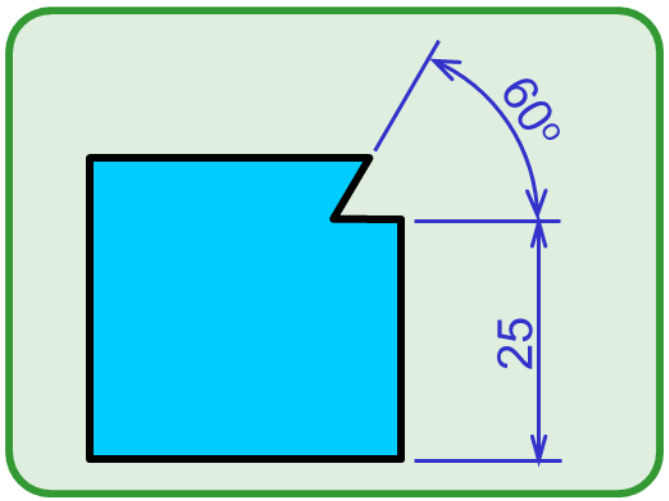
Poor practice



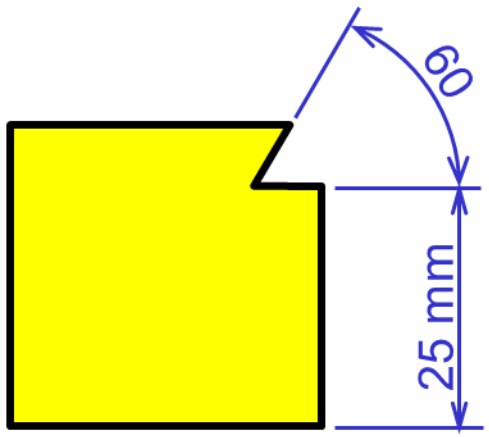
Dimension number : Unit

- **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

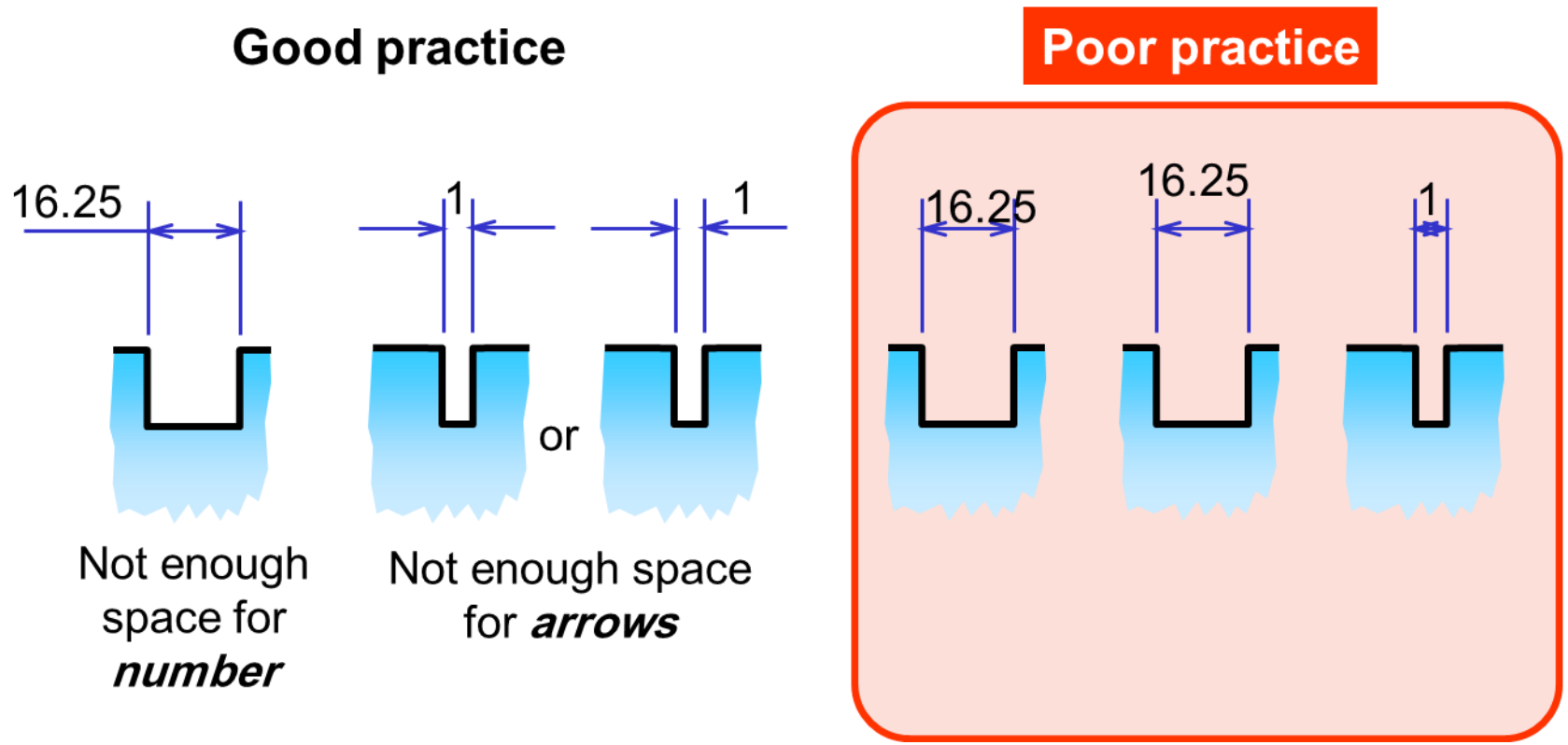


Poor practice



Dimension number : Narrow space situation

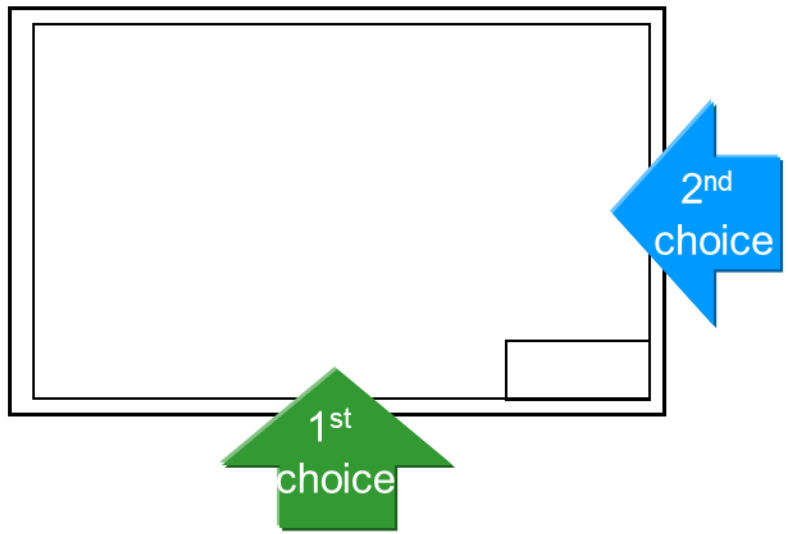
- If there is **not** enough space for number or arrows, put it **outside** either of the extension lines.



Dimension number : Orientation

1. Aligned method (This course)

The dimension figures are placed so that they are readable from the **bottom** or **right side** of the drawing.



2. Unidirectional method

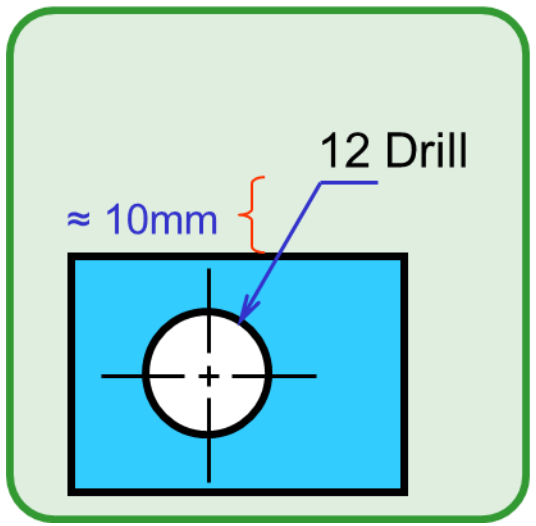
The dimension figures are placed so that they can be read from the **bottom** of the drawing.

Do not apply both systems on the same drawing or on the same series of drawing (JIS Z8317).

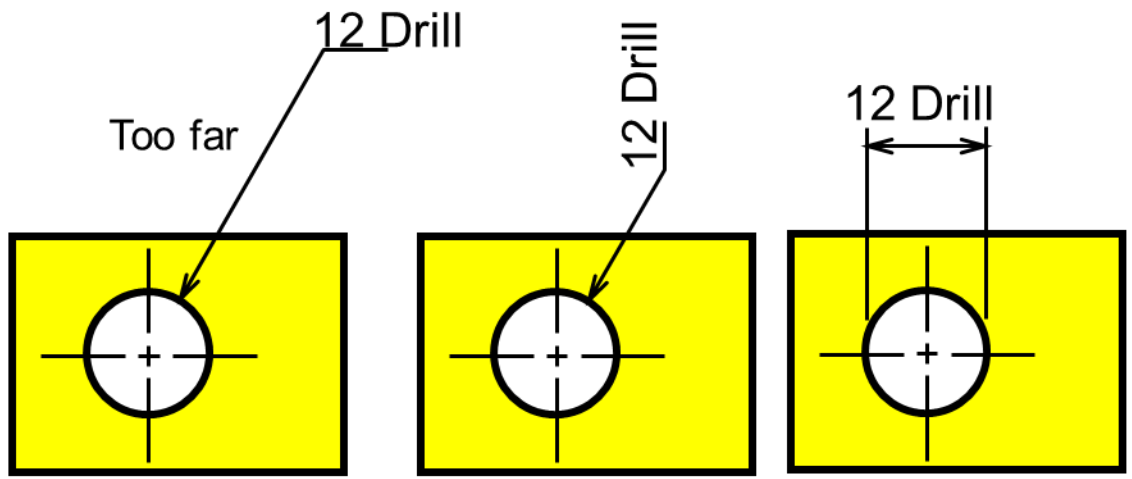
Local notes

- Lettered with **2H** or **HB** pencil and the height of 2.5~3 mm.
- Must be used in a combination with a leader line.
- Place near to the feature which they apply but should be placed outside the view.
- Placed above the bent portion of a leader line. (This course)
- Always be lettered **horizontally**.

Good practice



Poor practice

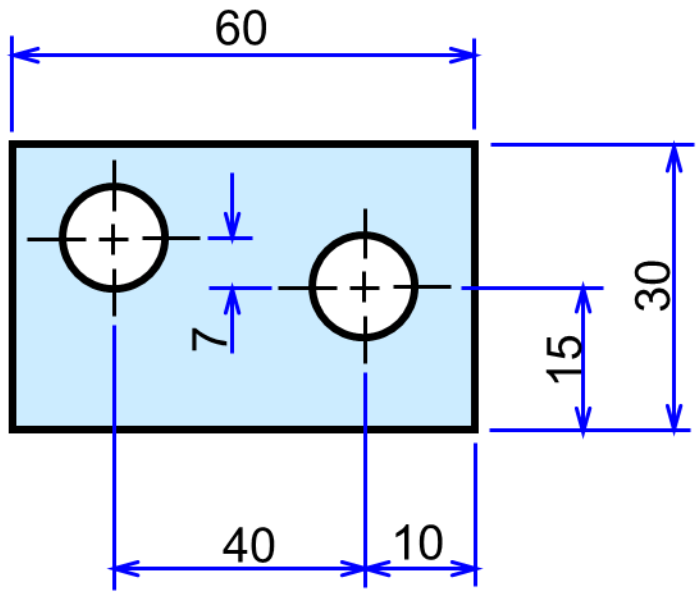


Dimensioning the object's features

Length

Information to be dimensioned	Dimensioning components
- *Length* of an edge - *Distance* between features	Extension and dimension lines, and dimension number

Example

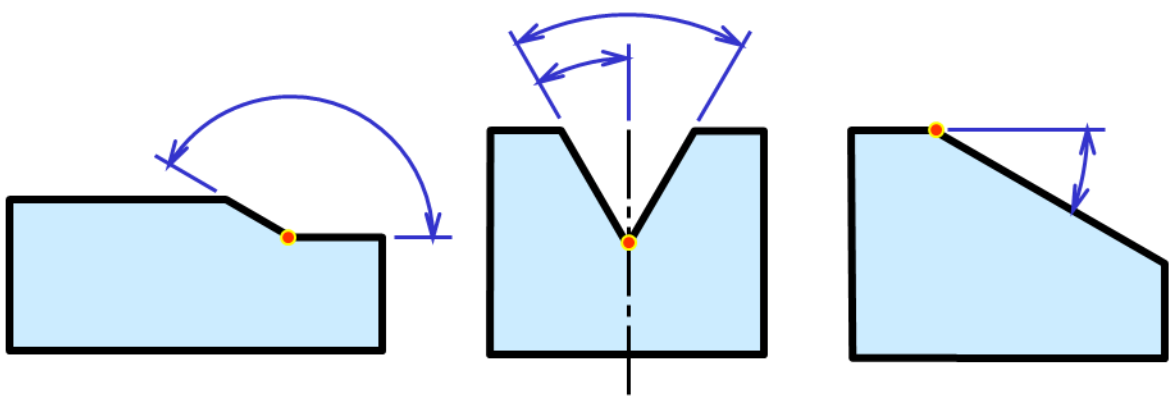


Angle

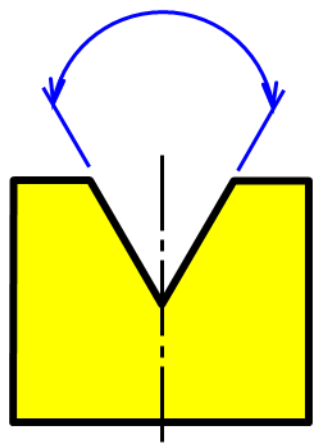
Information to be dimensioned	Dimensioning components
- *Angle* between edges.	Extension and *circular* dimension lines, and dimension number

- A **circular dimension line must** have its center at the vertex of the angle.

Example



Poor practice

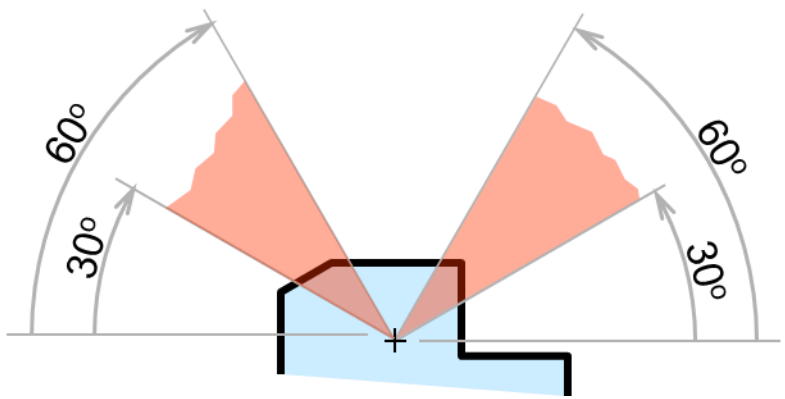


Arc

Information to be dimensioned	Dimensioning components
- *Radius*	Leader line and local note
- *Location* of its *center*	Extension and dimension lines, and dimension number

- The letter “R” is written in front of a number to emphasize that the number represents radius of an arc.

- Leader line must be aligned with a radial line and has an inclined angle between 30 ~ 60 degs to the horizontal.

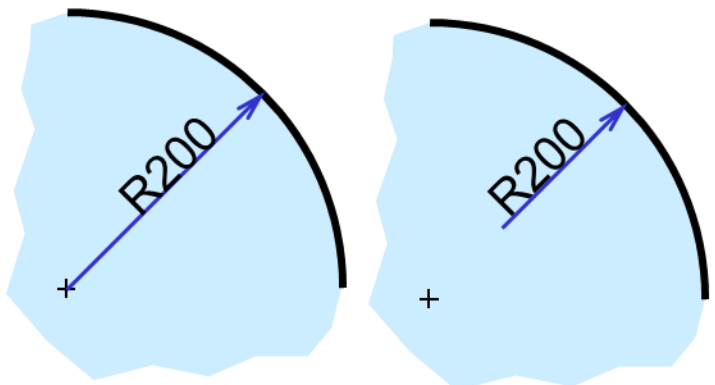


Arc

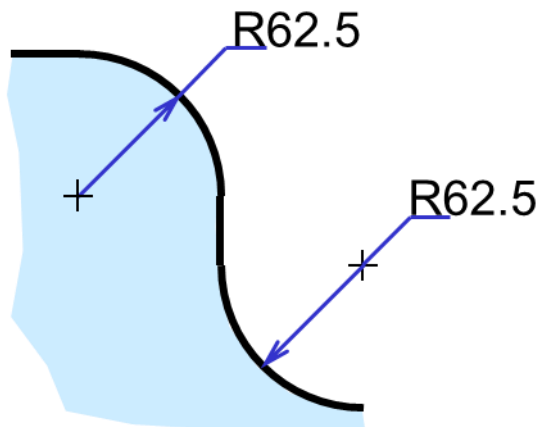
- The note and the arrowhead **should be placed in a concave side** of an arc, whenever there is a sufficient space.

Example : Radius of an arc

Sufficient space for both.

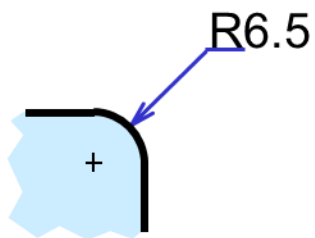


Sufficient space for arrowhead only



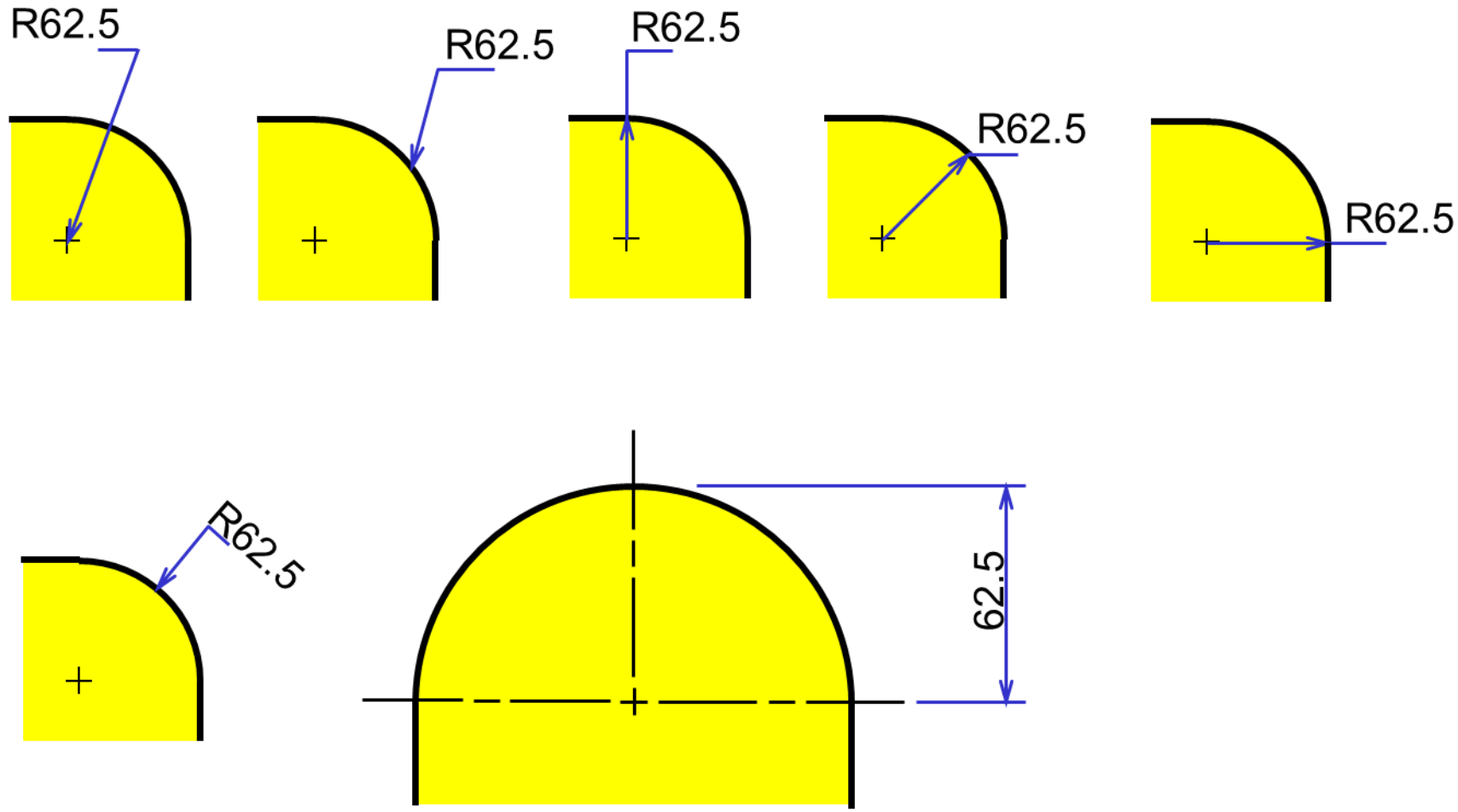
Place a note outside

Insufficient space for both



Place a note and an arrow outside

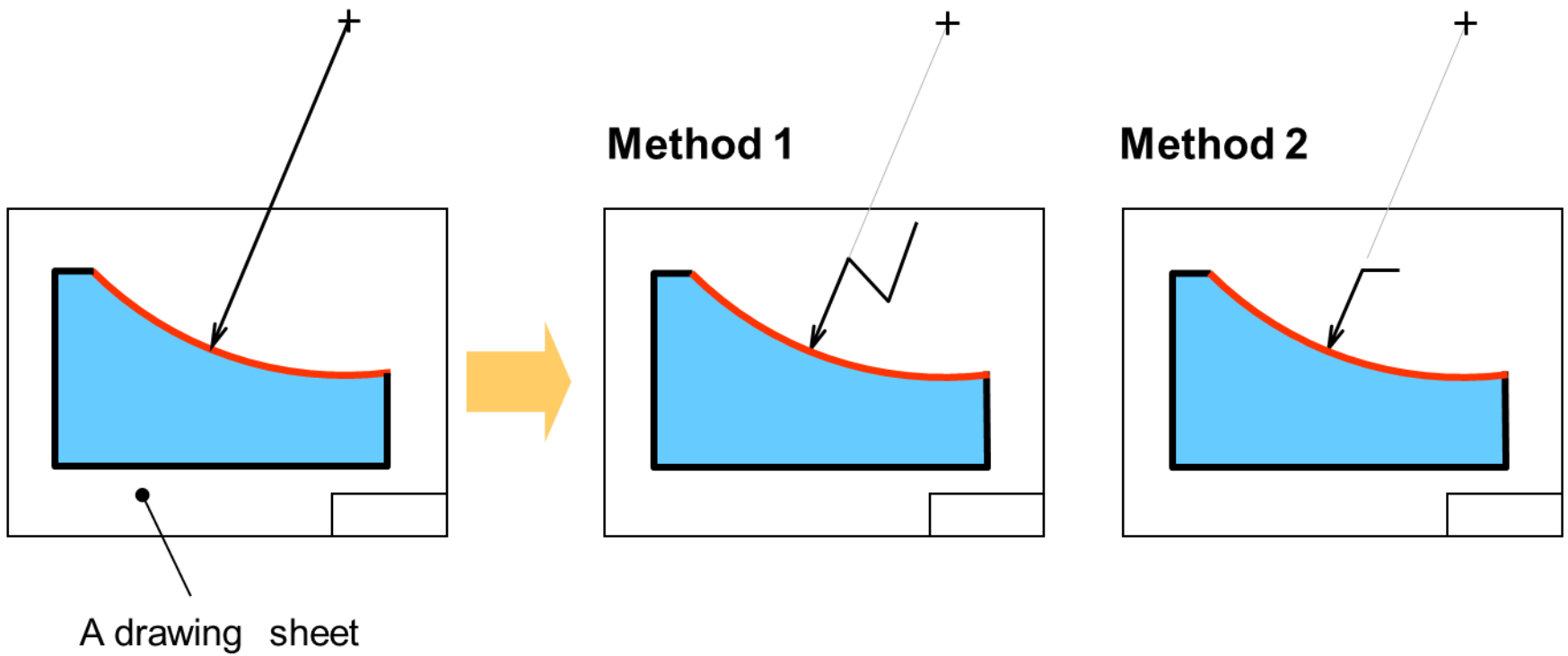
Arc : Common mistakes



Arc

- If the arc has its center lies outside the sheet or interfere with other views, use the **foreshortened radial dimension line**.

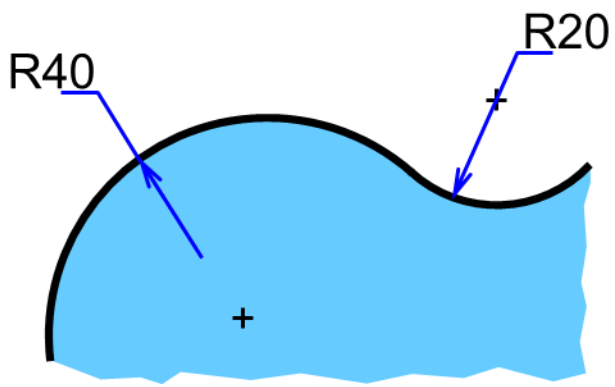
Example



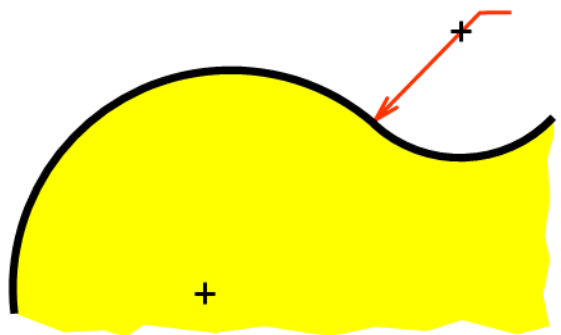
Curve (A combination of arcs)

Information to be dimensioned	Dimensioning components
- *Radius*	Leader line and local note
- *Location* of its *center*	Extension and dimension lines, and dimension number

Example : Radius of the arcs



Poor practice

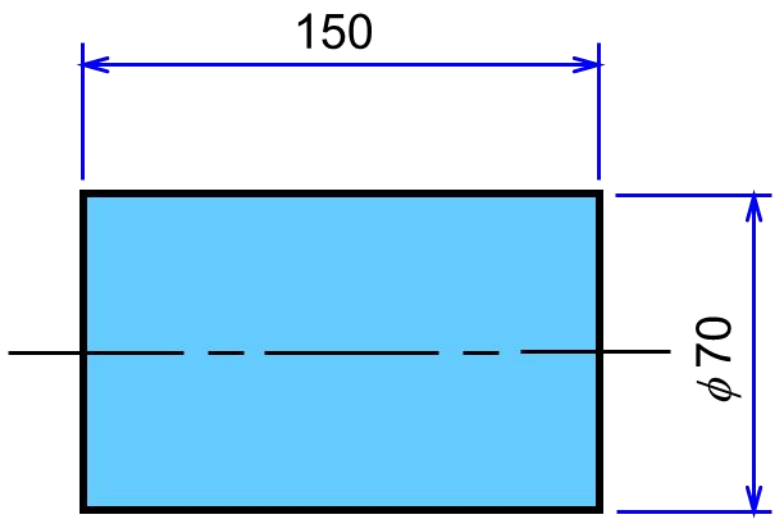


Cylinder

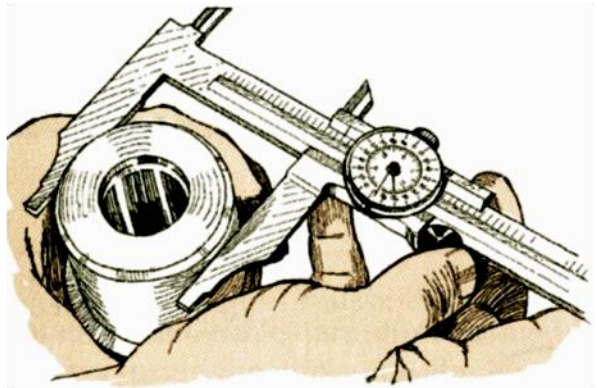
Information to be dimensioned	Dimensioning components
- *Diameter* - *Length*	Extension and dimension lines, and dimension number

- Diameter should be given in a longitudinal view with the symbol "ϕ" placed in front of a number.

Example

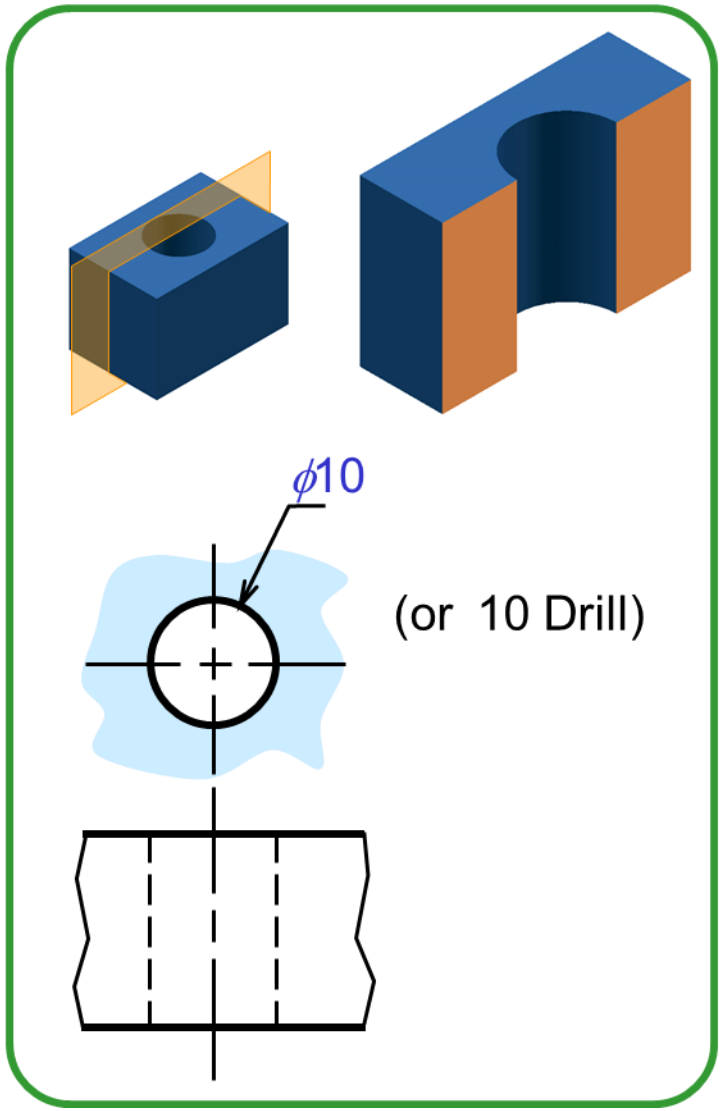


Measurement of object's diameter

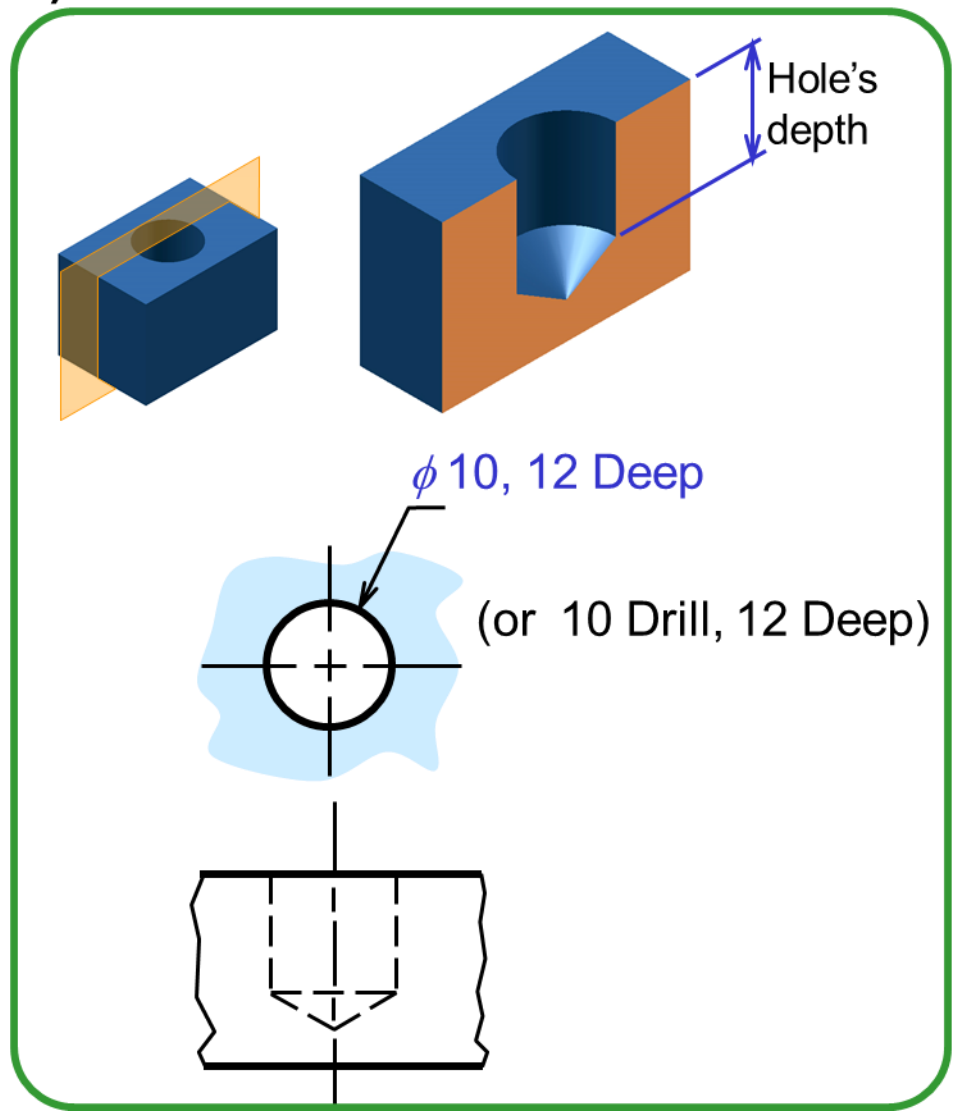


Small hole : Specifying a diameter and a depth

1) Through hole



2) Blinded hole



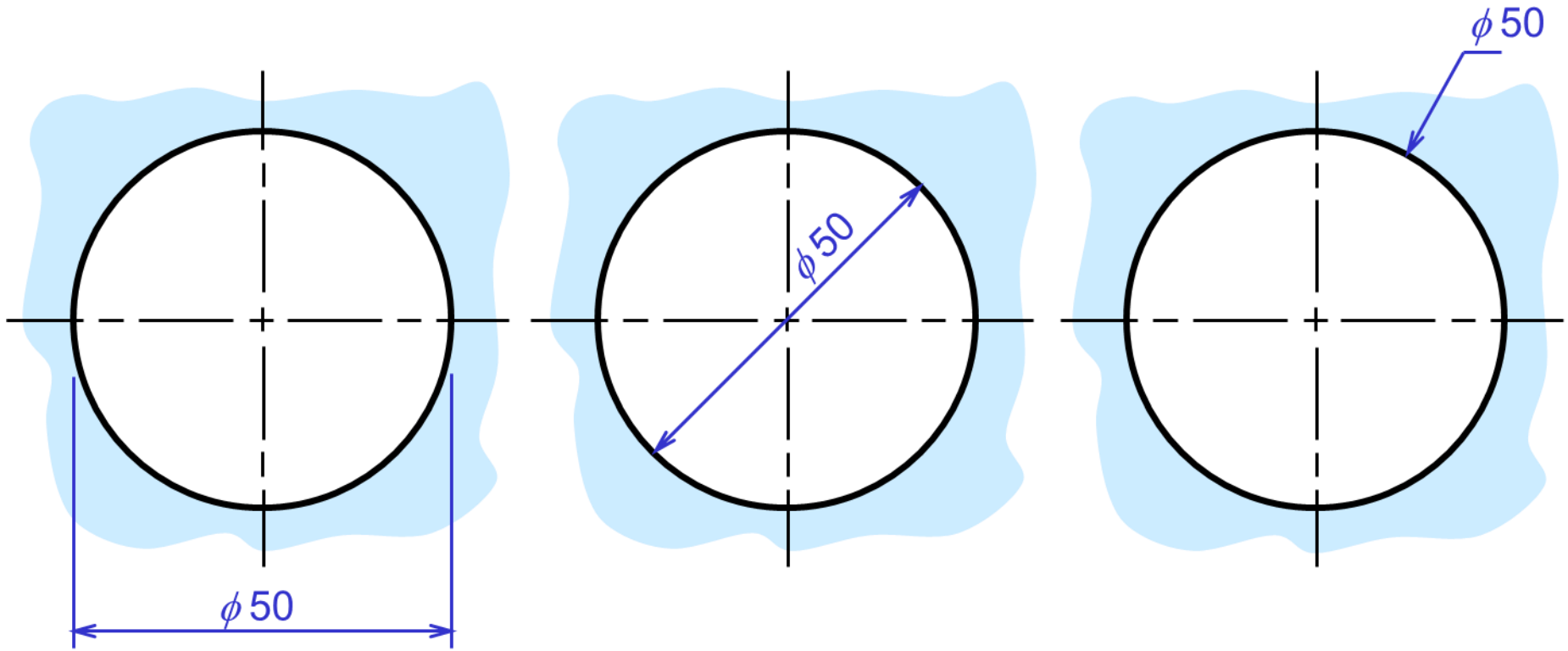
Large hole

- Three possible methods are:-

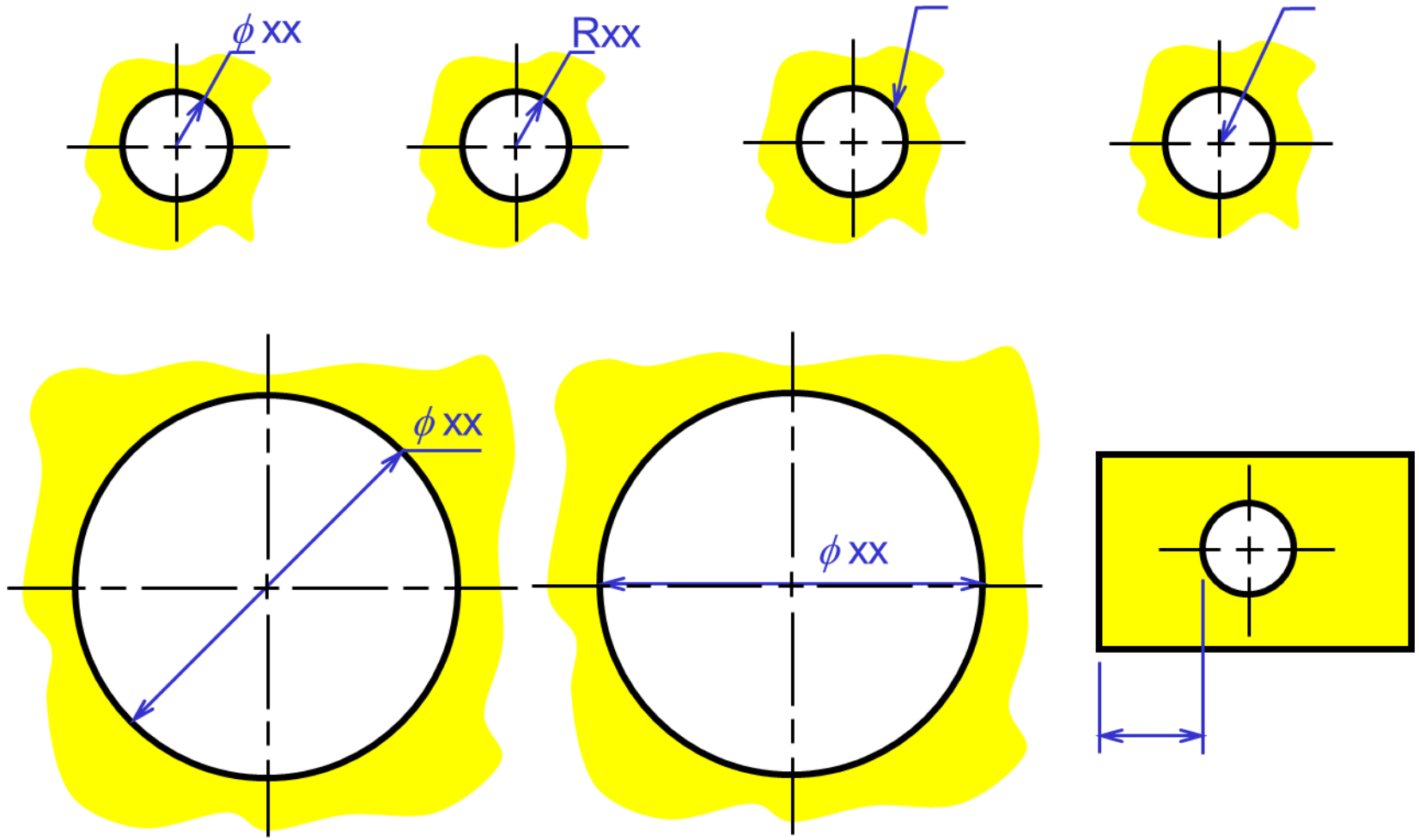
Use extension and dimension lines

Use diametral dimension line

Use leader line and note



Hole : Common mistakes

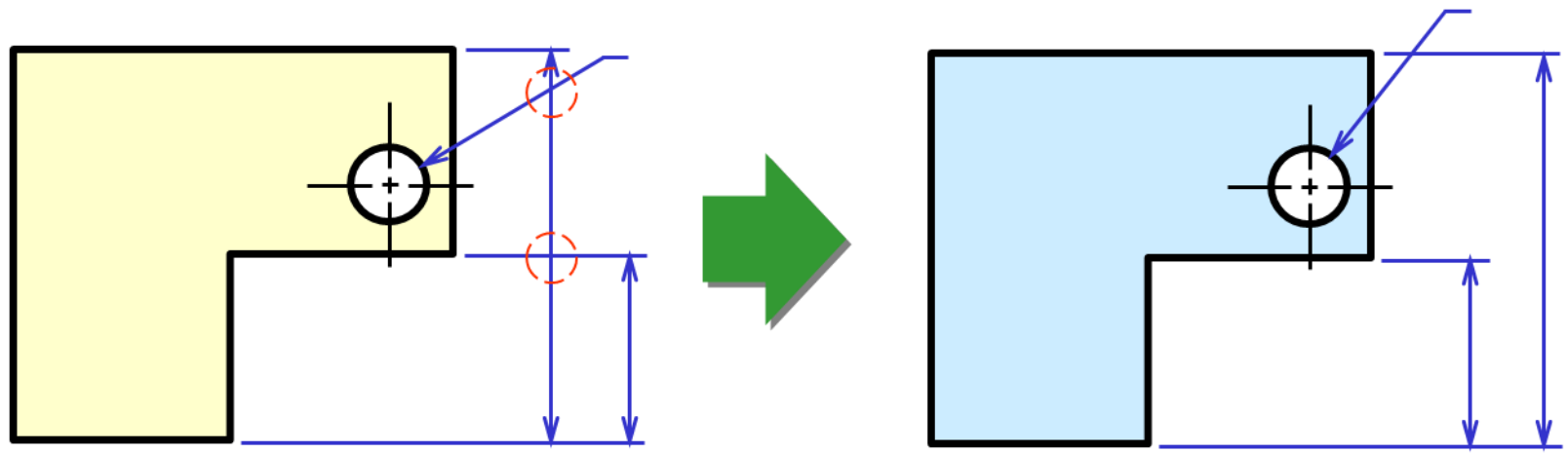


Placement of dimensions

Recommended practice 1

- Extension lines, leader lines **should not** cross dimension lines.

Example



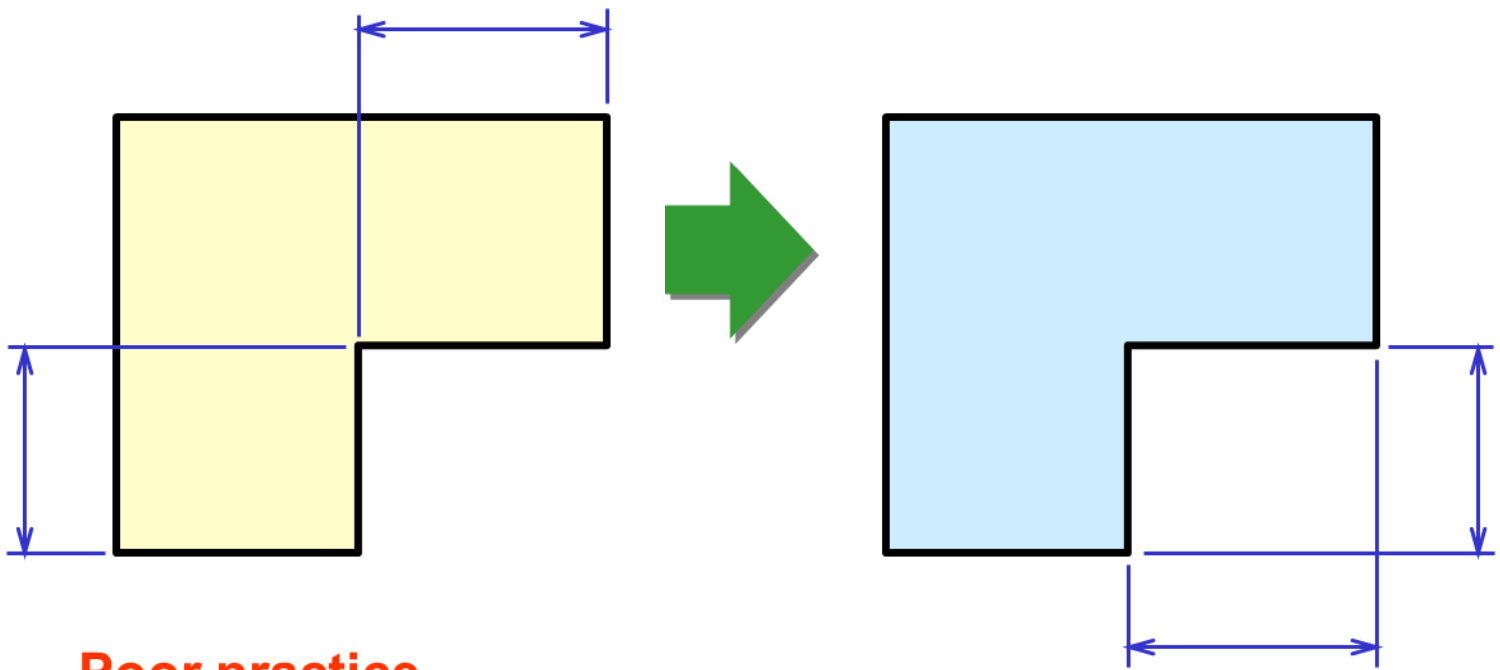
Poor practice

- Place longer dimensions outside shorter ones.

Recommended practice 2

- Extension lines **should be** drawn from the nearest points to be dimensioned.

Example

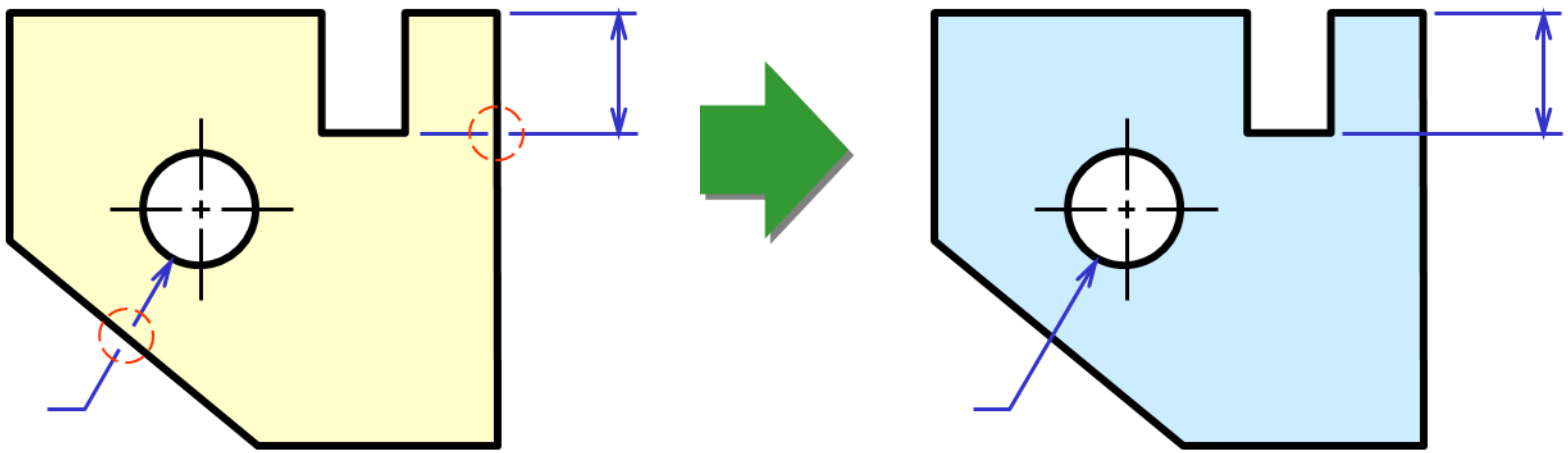


Poor practice

Recommended practice 3

- Extension lines of an internal feature **can** cross a visible line **without** leaving a gap at the intersection point.

Example

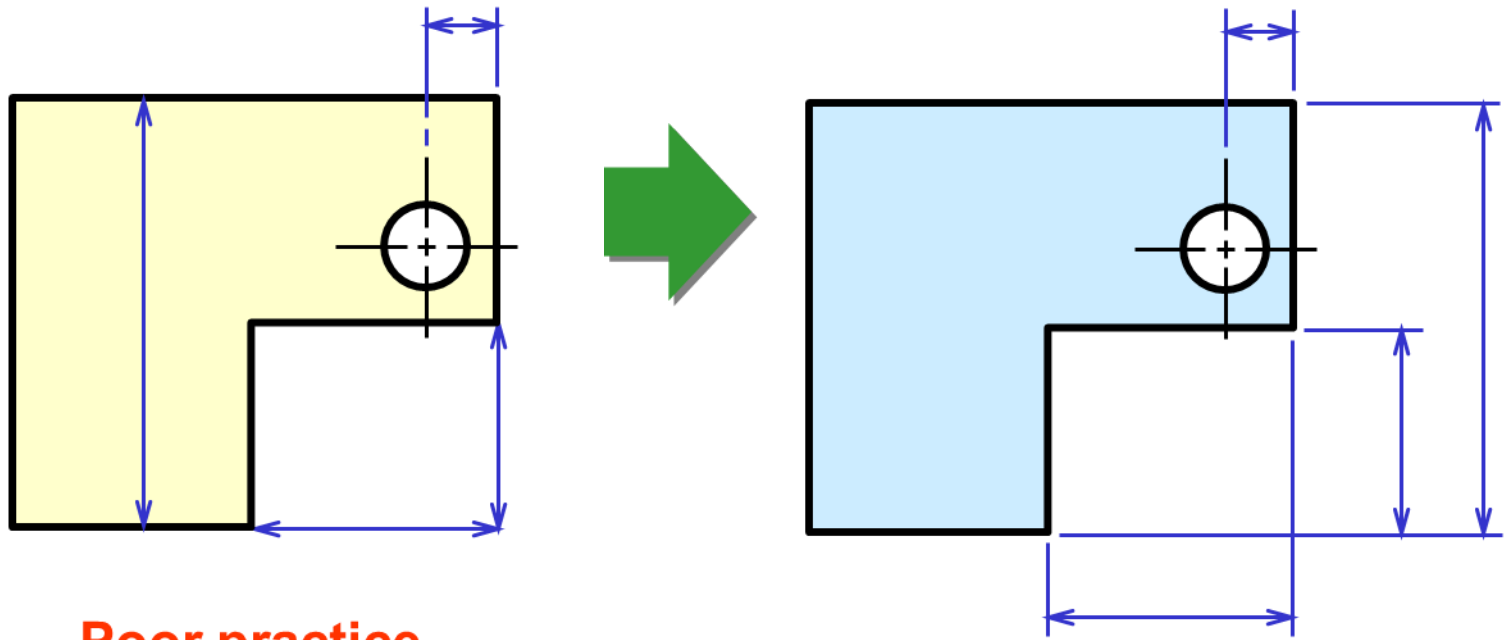


Wrong

Recommended practice 4

- **Do not** use visible, center, and dimension lines as an extension lines.

Example

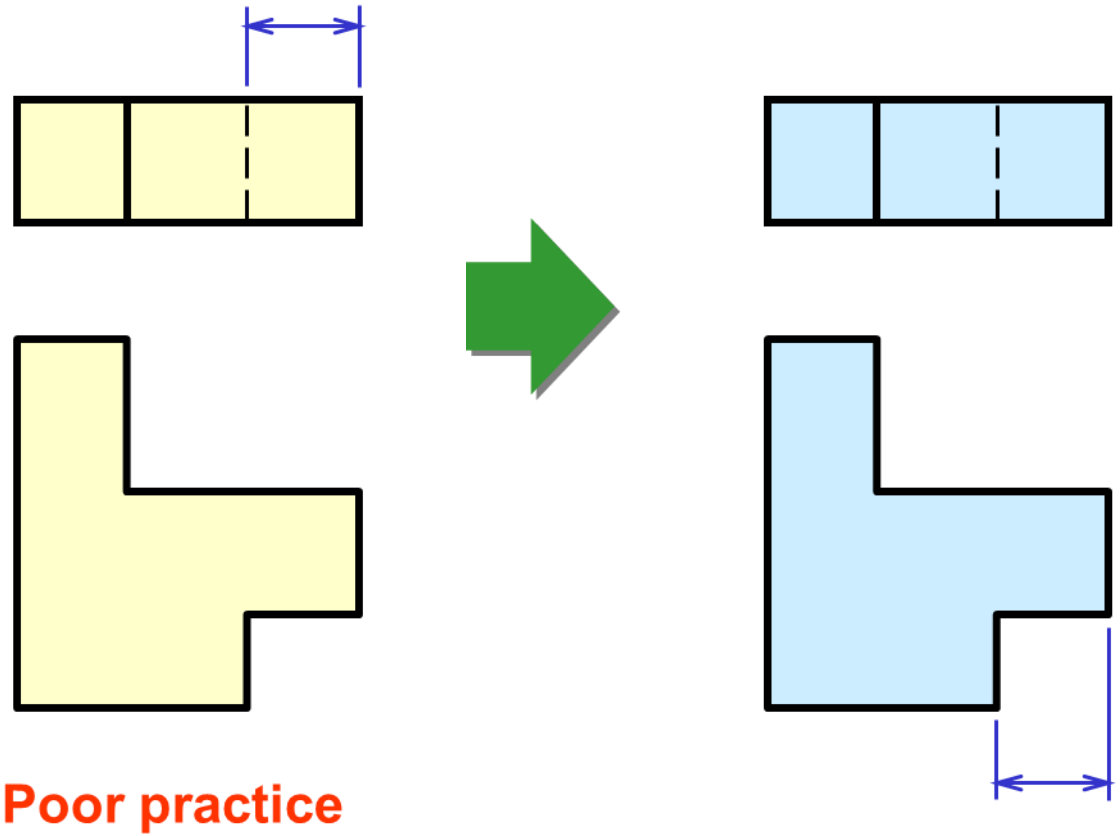


Poor practice

Recommended practice 5

- ***Avoid*** *dimensioning hidden lines.*

Example

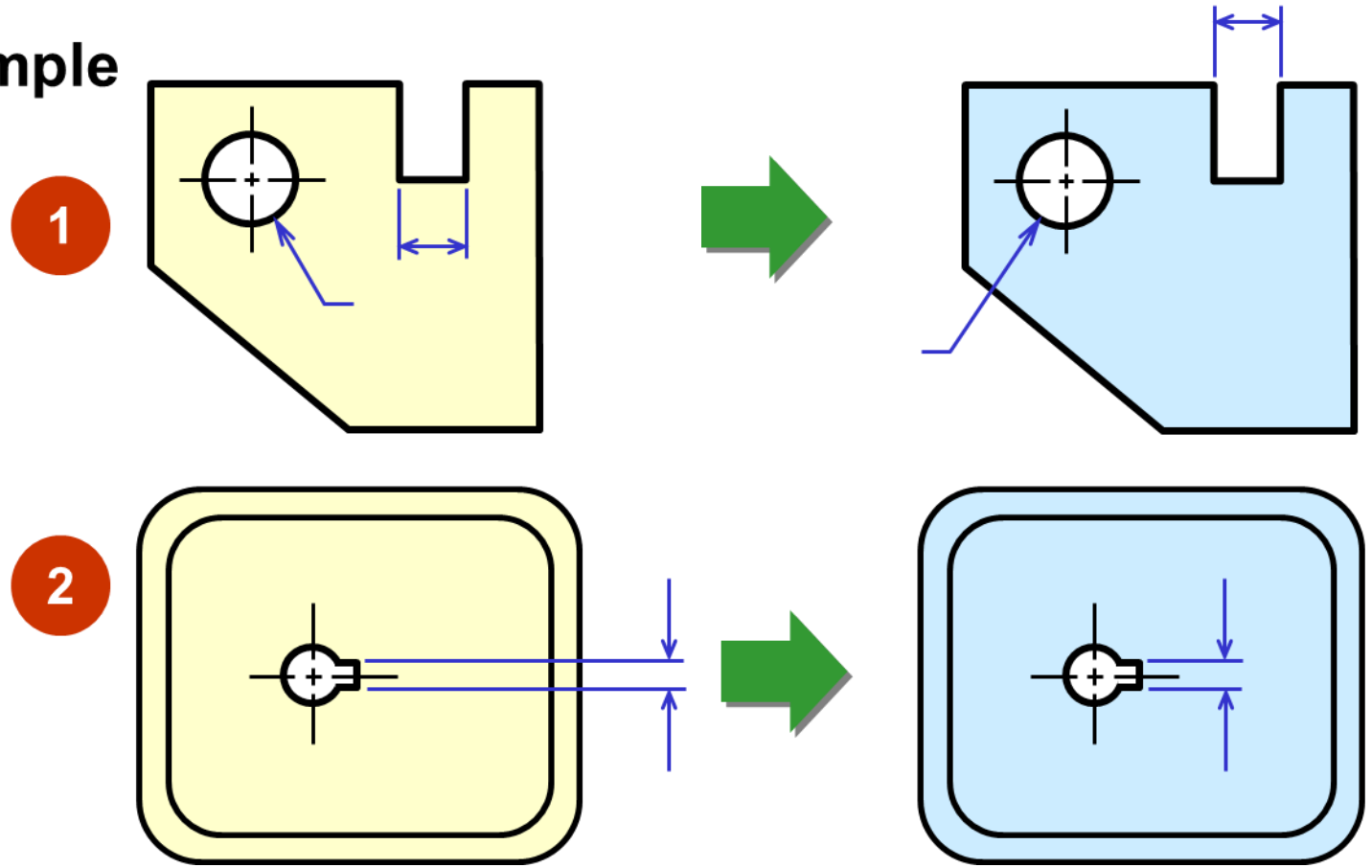


Poor practice

Recommended practice 6

- Place dimensions **outside** the view, unless placing them inside improve the clarity.

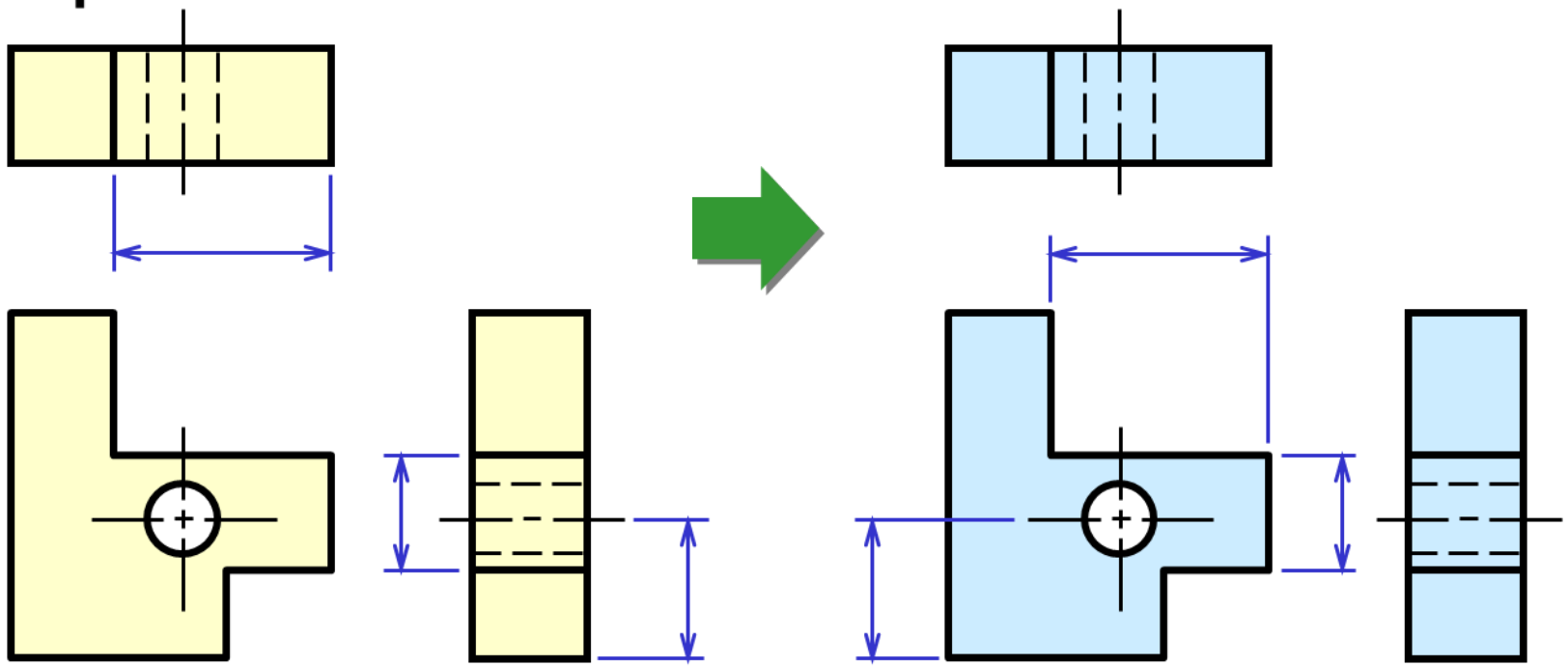
Example



Recommended practice 7

- Apply the dimension to the view that clearly represents the contour or shape of a feature.

Example

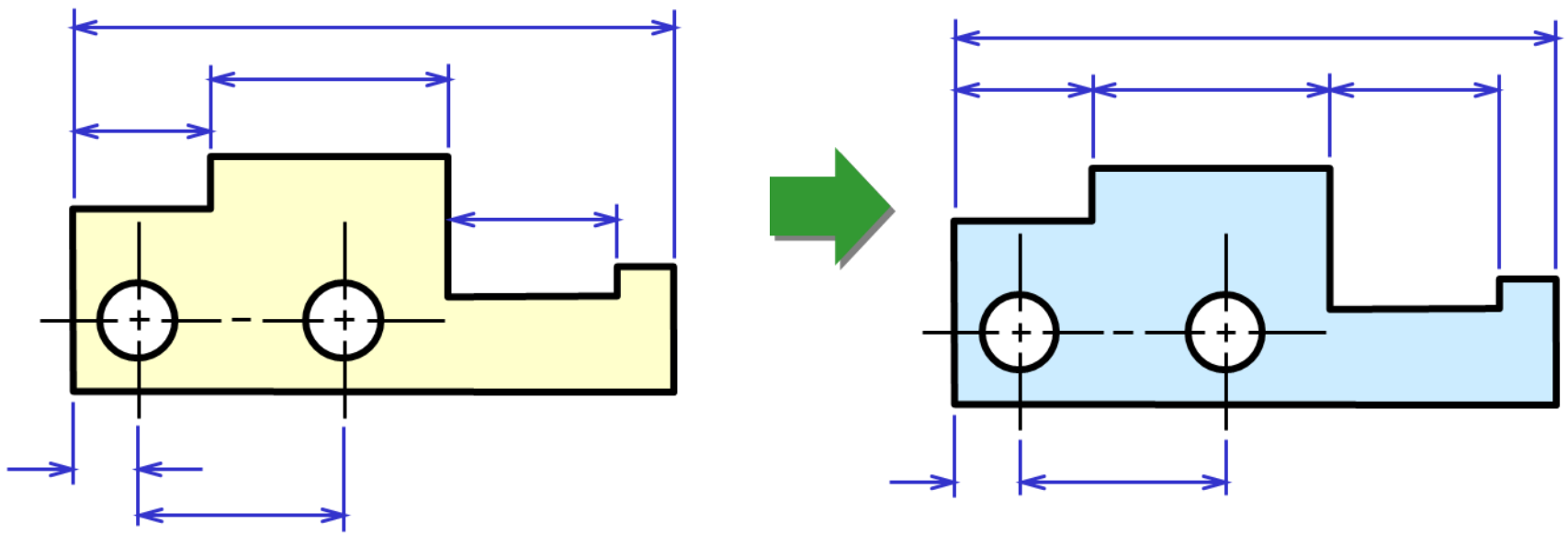


Poor practice

Recommended practice 8

- Dimension lines should be lined up and grouped together as much as possible.

Example

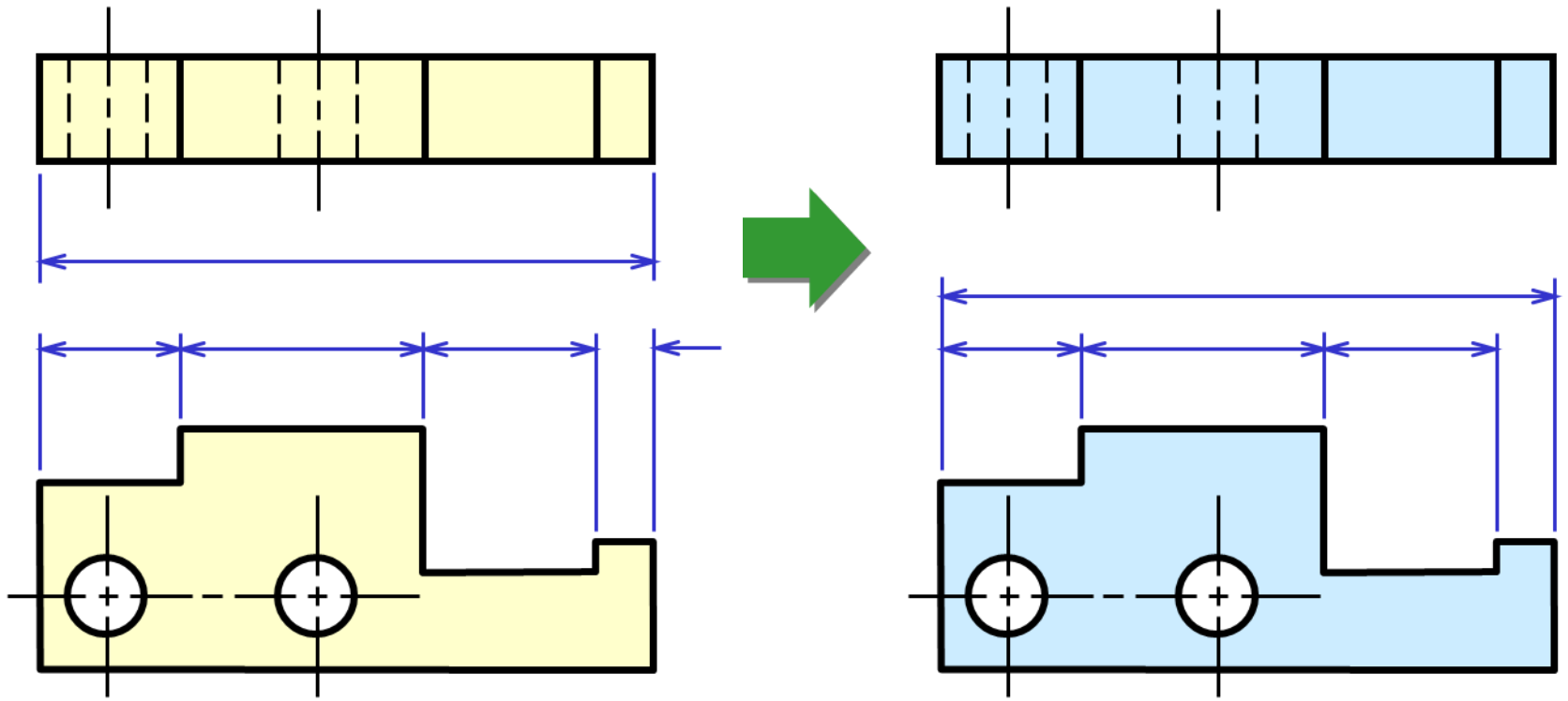


Poor practice

Recommended practice 9

- **Avoid** repeat a dimension (superfluous dimensions).

Example



Poor practice