Dimensioning Standards

Dimensioning Standards

- In order for the drawings to be dimensioned so that all people can understand them, we need to follow standards that every company in the world must follow. Standards are created by these organizations:

—ANSI
—ISO
—MIL
—DOD
—DIN
—JIS
—CEN

Standards Institutions

- ANSI - American National Standards Institute. This institute creates the engineering standards for North America.
- ISO - International Organization for Standardization. This is a worldwide organization that creates engineering standards with approximately 100 participating countries.

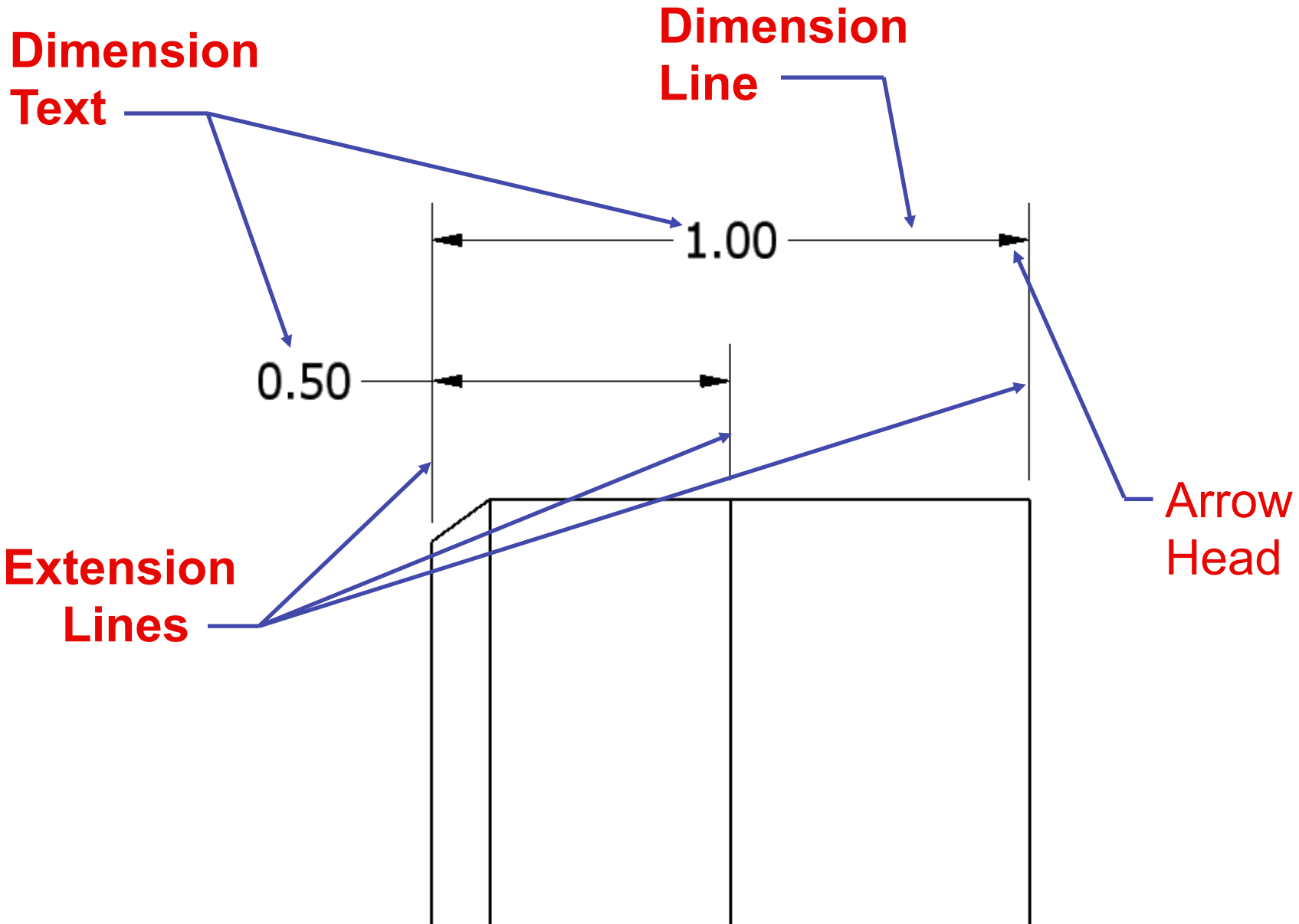
Standards Institutions

- The United States military has two organizations that develop standards.
  - DOD - Department Of Defense
  - MIL - Military Standard

Standards Institutions

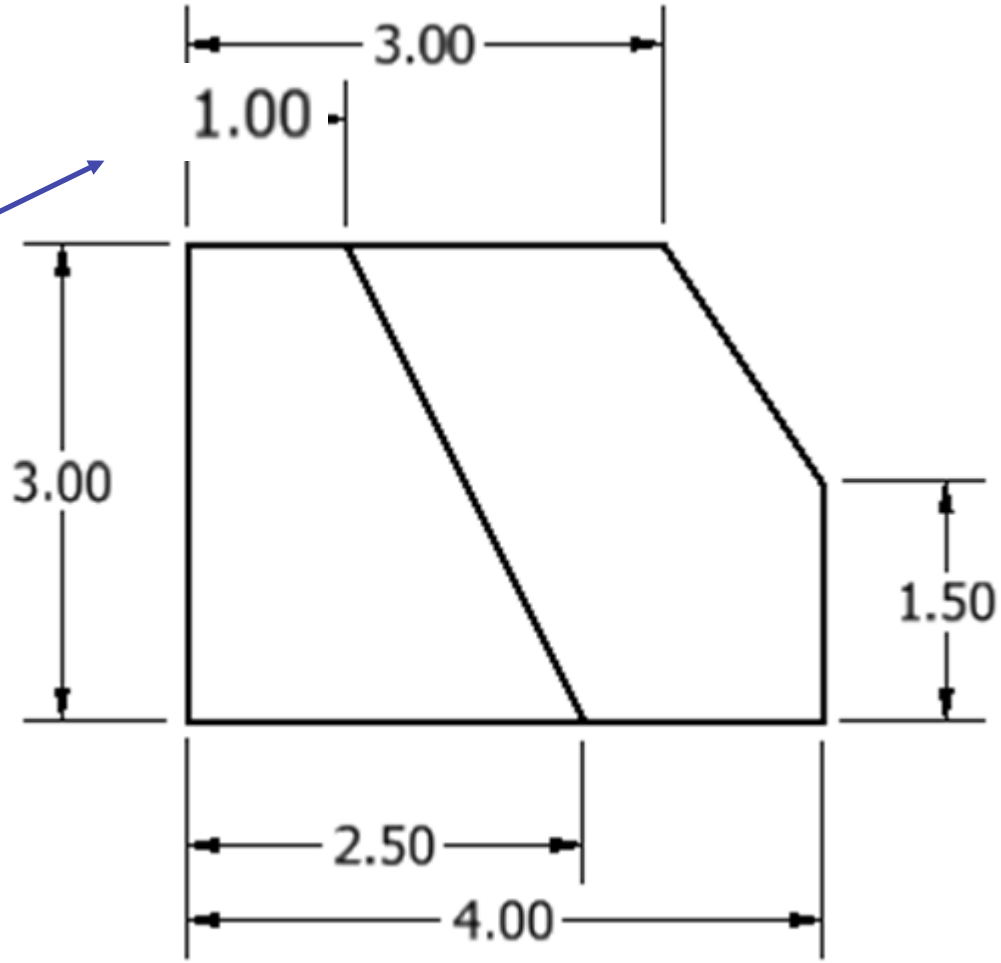
- DIN - Deutsches Institut für Normung. The German Standards Institute created many standards used worldwide, including the standards for camera film.
- JIS - Japanese Industrial Standard. Created after WWII for Japanese standards.
- CEN - European Standards Organization.

Dimension Components

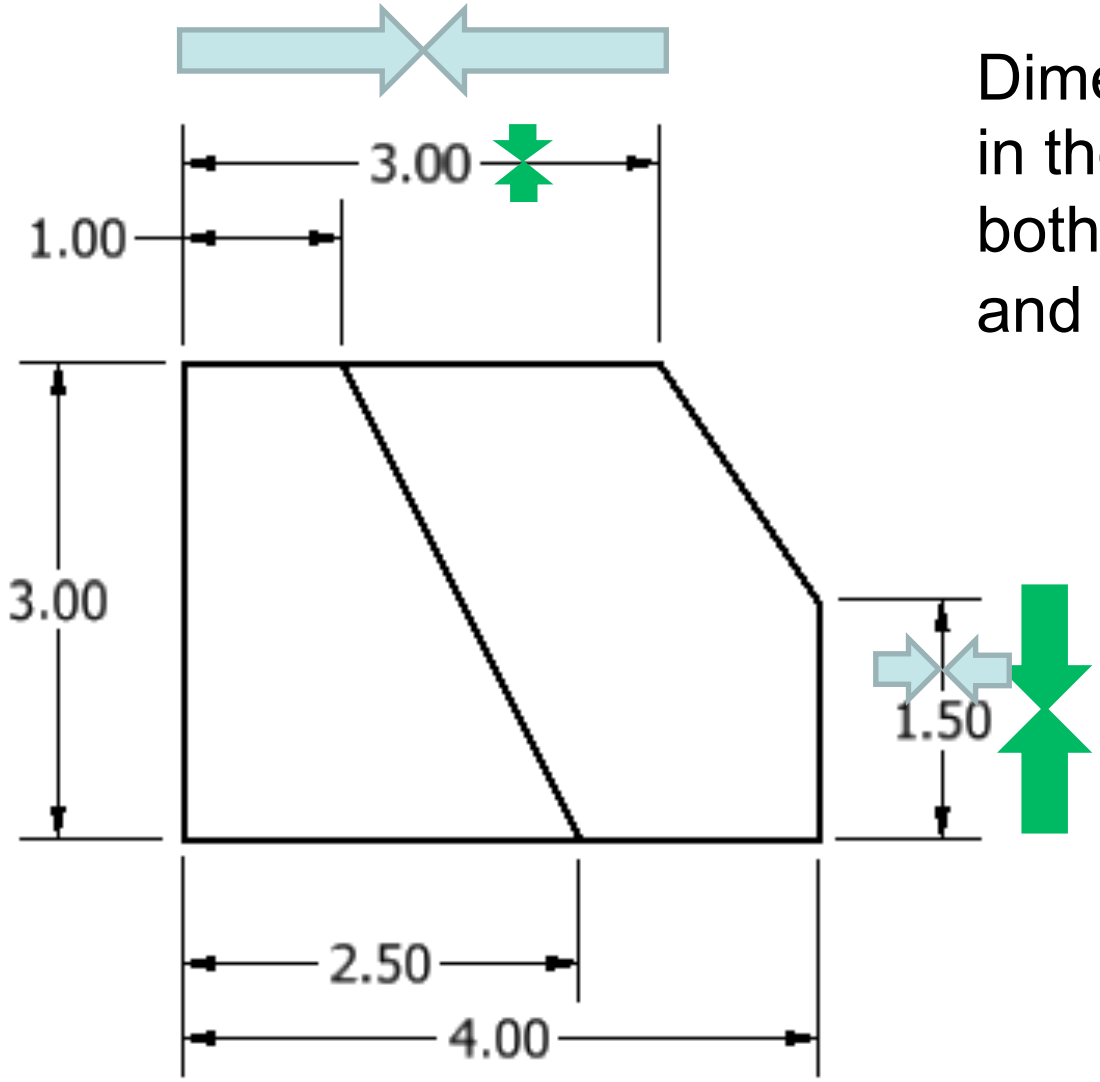


Dimension Text Guidelines

If the dimension text will not fit between the extension lines, it may be placed outside them



Dimension Text Guidelines

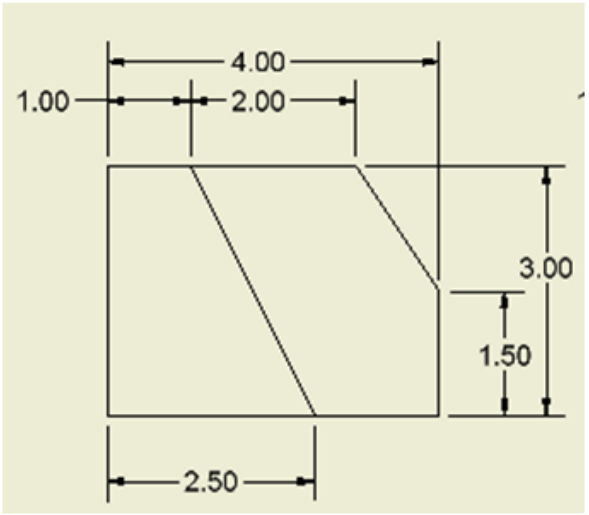


Dimension text is placed in the middle of the line both horizontally and vertically

Dimensioning Methods

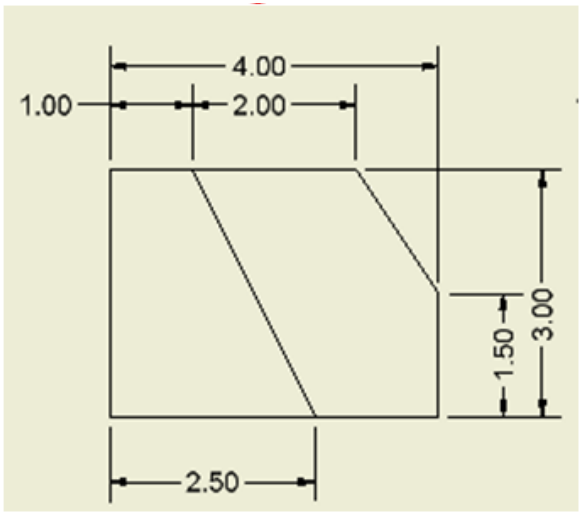
- Dimensions are represented on a drawing using one of two systems, unidirectional or aligned.
- The *unidirectional* method means all dimensions are read in the same direction.
- The *aligned* method means the dimensions are read in alignment with the dimension lines or side of the part, some read horizontally and others read vertically.

Dimensioning Methods



Unidirectional

Dimensions are placed so that they can be read from the bottom of the drawing sheet. This method is commonly used in mechanical drafting.

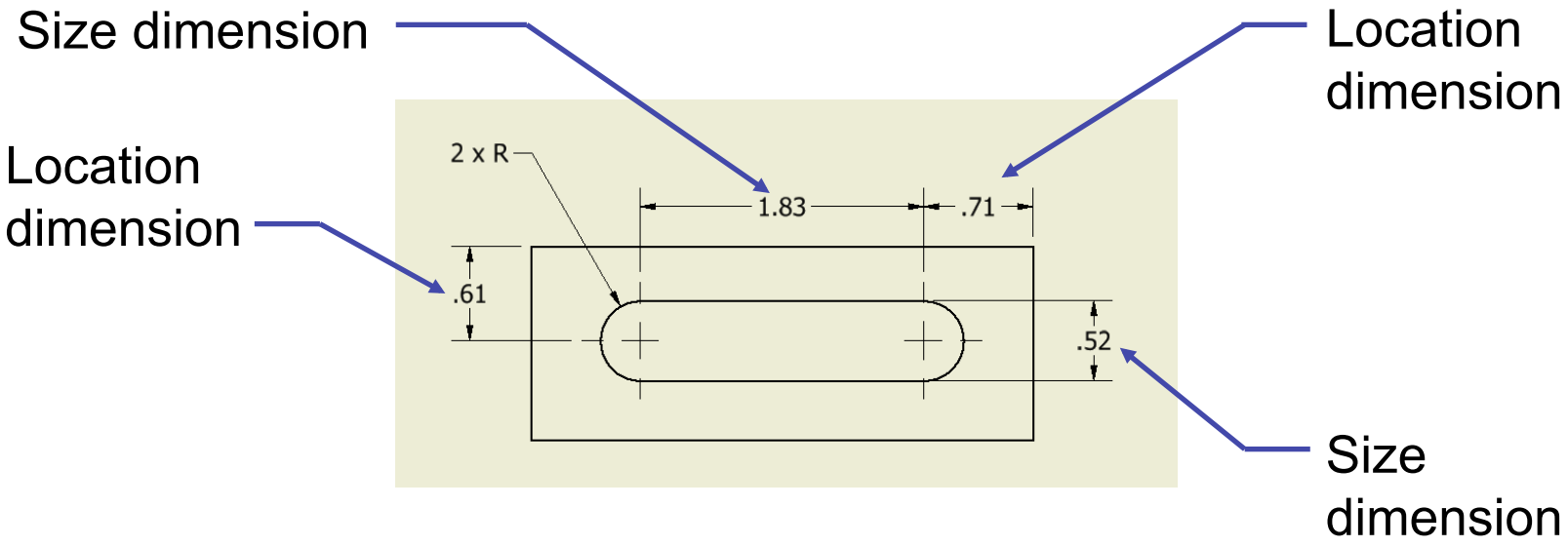


Aligned

Dimensions are placed so the horizontal dimensions can be read from the bottom of the drawing sheet and the vertical dimensions can be read from the right side of the drawing sheet. This method is commonly used in architectural and structural drafting.

Classification of Dimensions

- *Size.* Dimensions are used to identify the specific size of a feature on an object.
- *Location.* Dimensions are used to identify the physical proximity of a feature to another feature within an object.

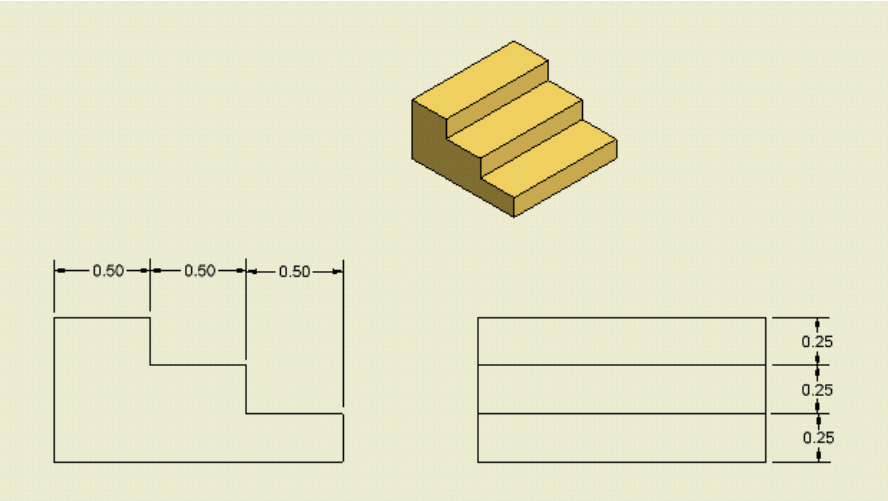


Linear Dimensioning

- Chain Dimensioning
  - Dimensioning from feature to feature
  - Common dimensioning technique

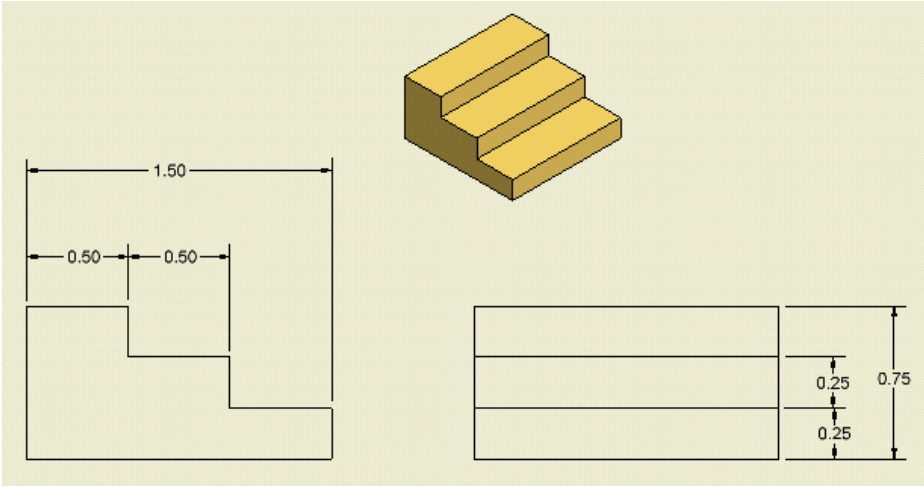
Chain Dimensioning Examples

METHOD 1



- Dimension from feature to feature across entire part
- Manufacturing inaccuracies can accumulate

METHOD 2

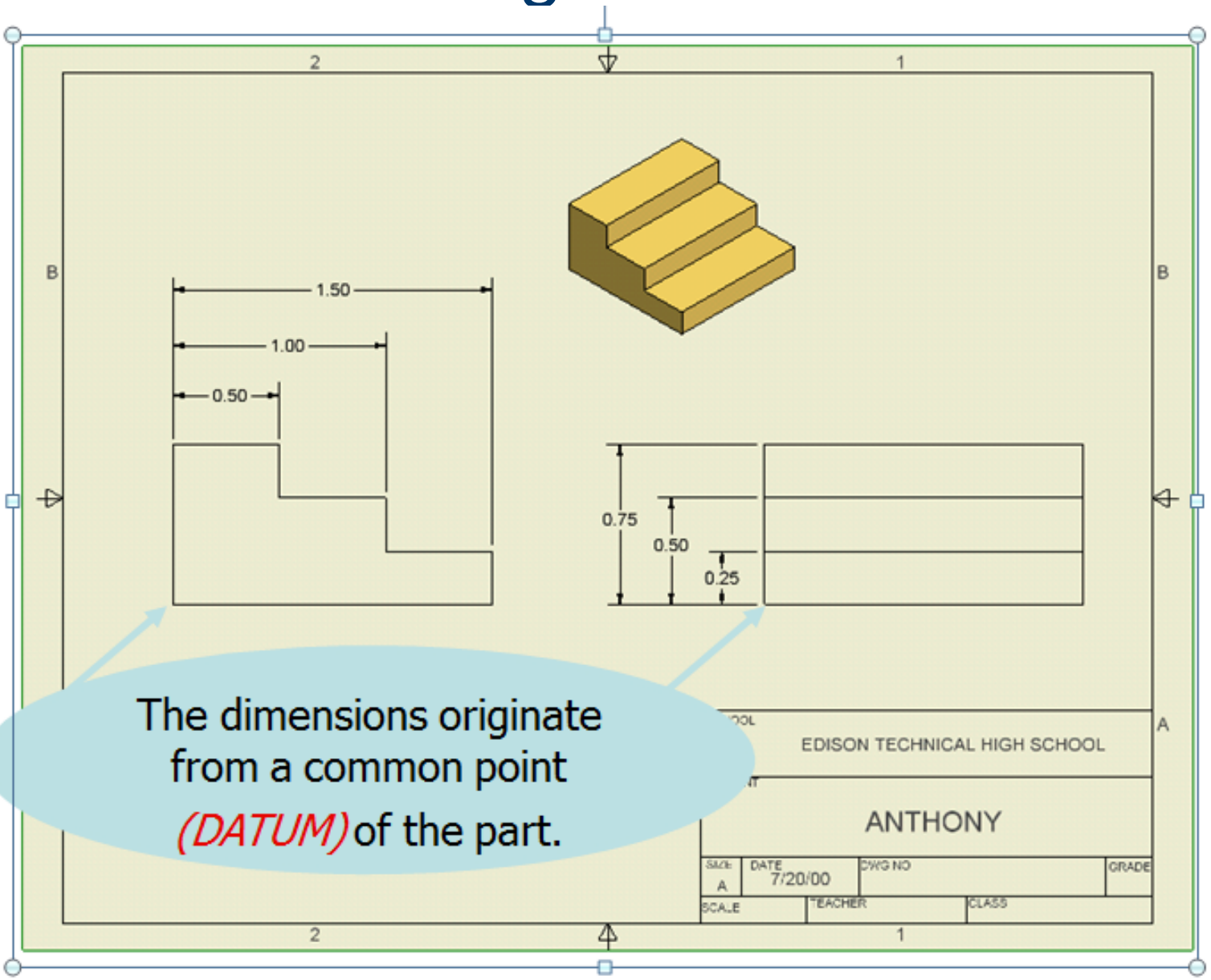


- Dimension from feature to feature *except* omit one partial dimension in the chain
- Dimension overall length/width/ height to limit manufacturing inaccuracies
- Preferable chain dimensioning method

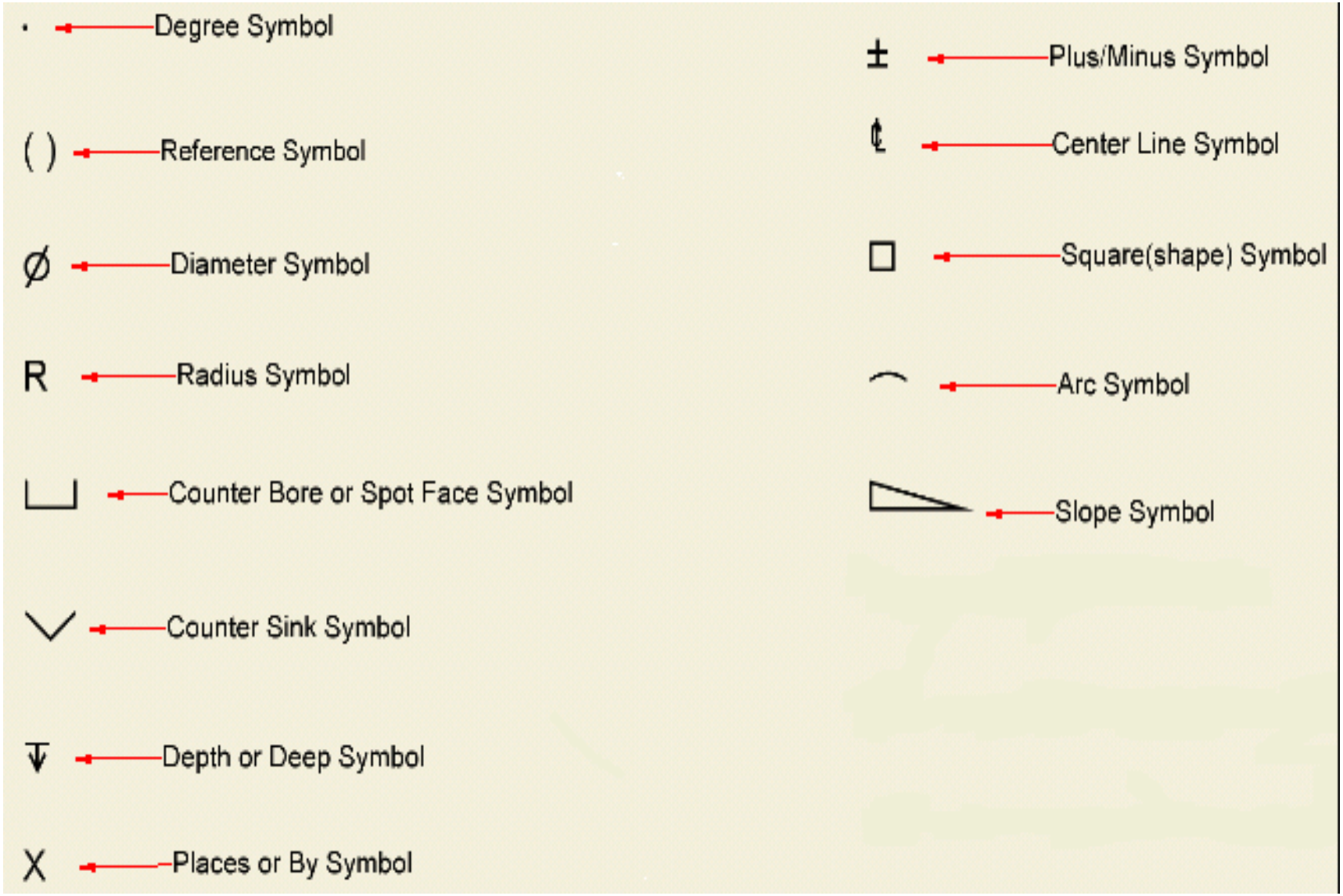
Datum Dimensioning

- Datum Dimensioning
  - Dimensioning from a single point of origin called a DATUM
  - Reduces dimensional deviations in manufactured parts because each size/ location dimension is referenced to a single point

Datum Dimensioning

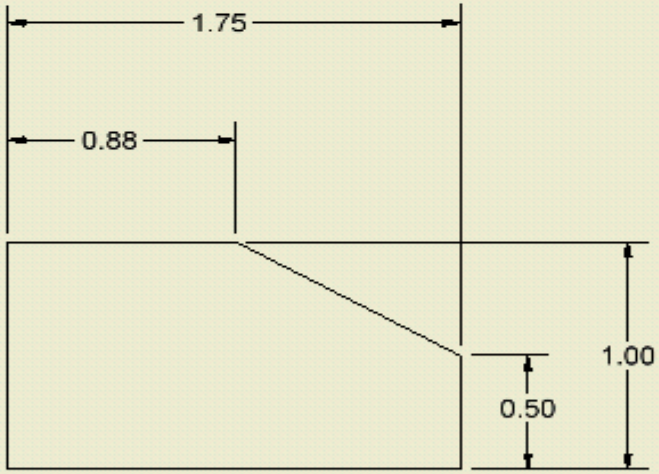


Dimensioning Symbols

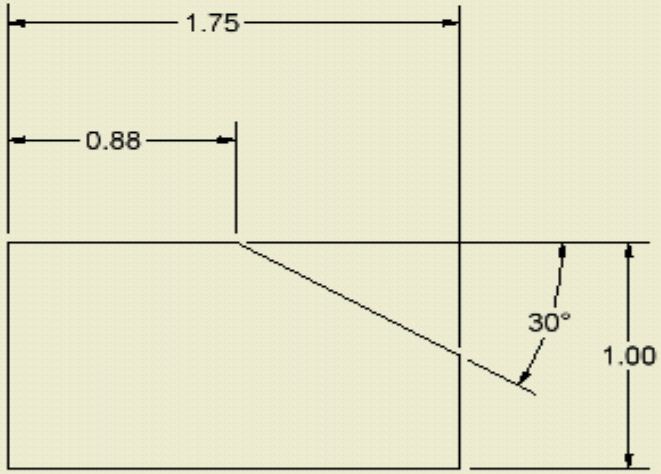


Dimensioning Angles

- Angled surface may be dimensioned using *coordinate method* to specify the two location distances of the angle.
- Angled surfaces may also be dimensioned using the *angular method* by specifying one location for distance and the angle.



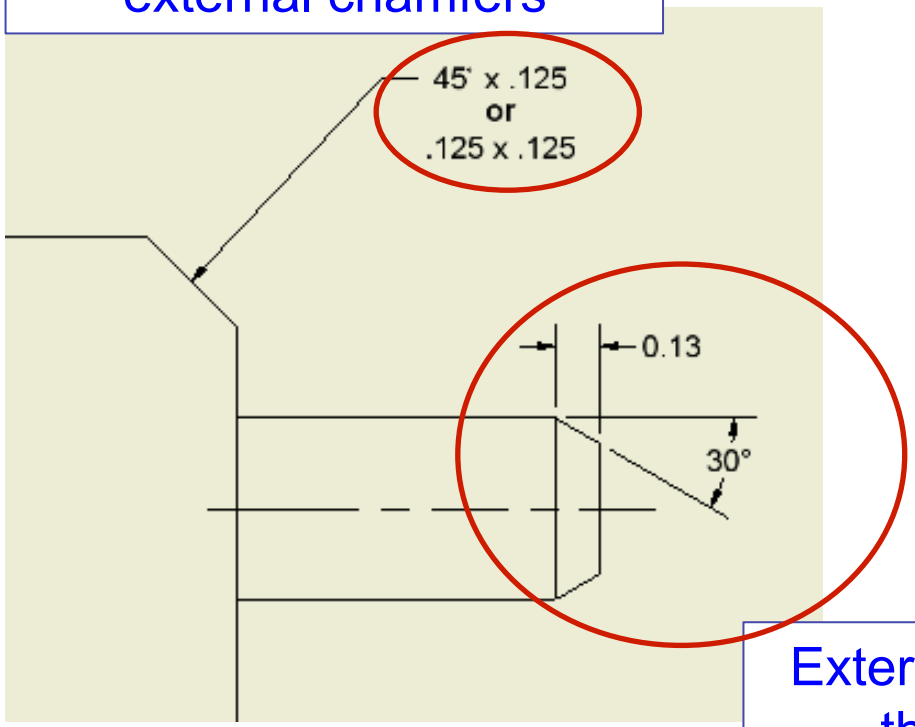
Coordinate Method



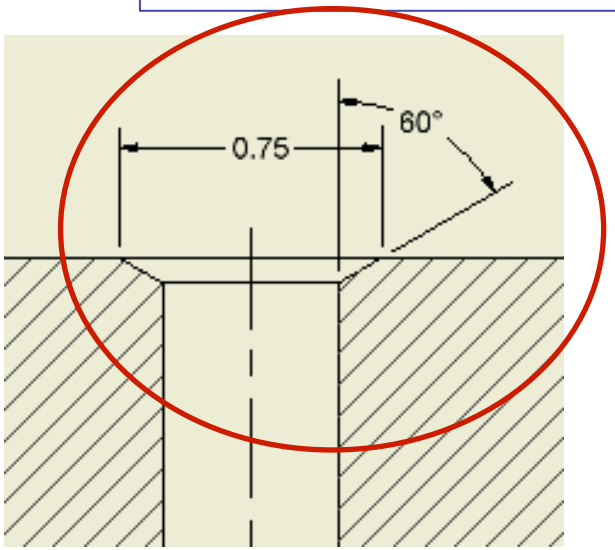
Angular Method

Dimensioning Chamfers

Two options for 45 degree external chamfers



Internal Chamfers

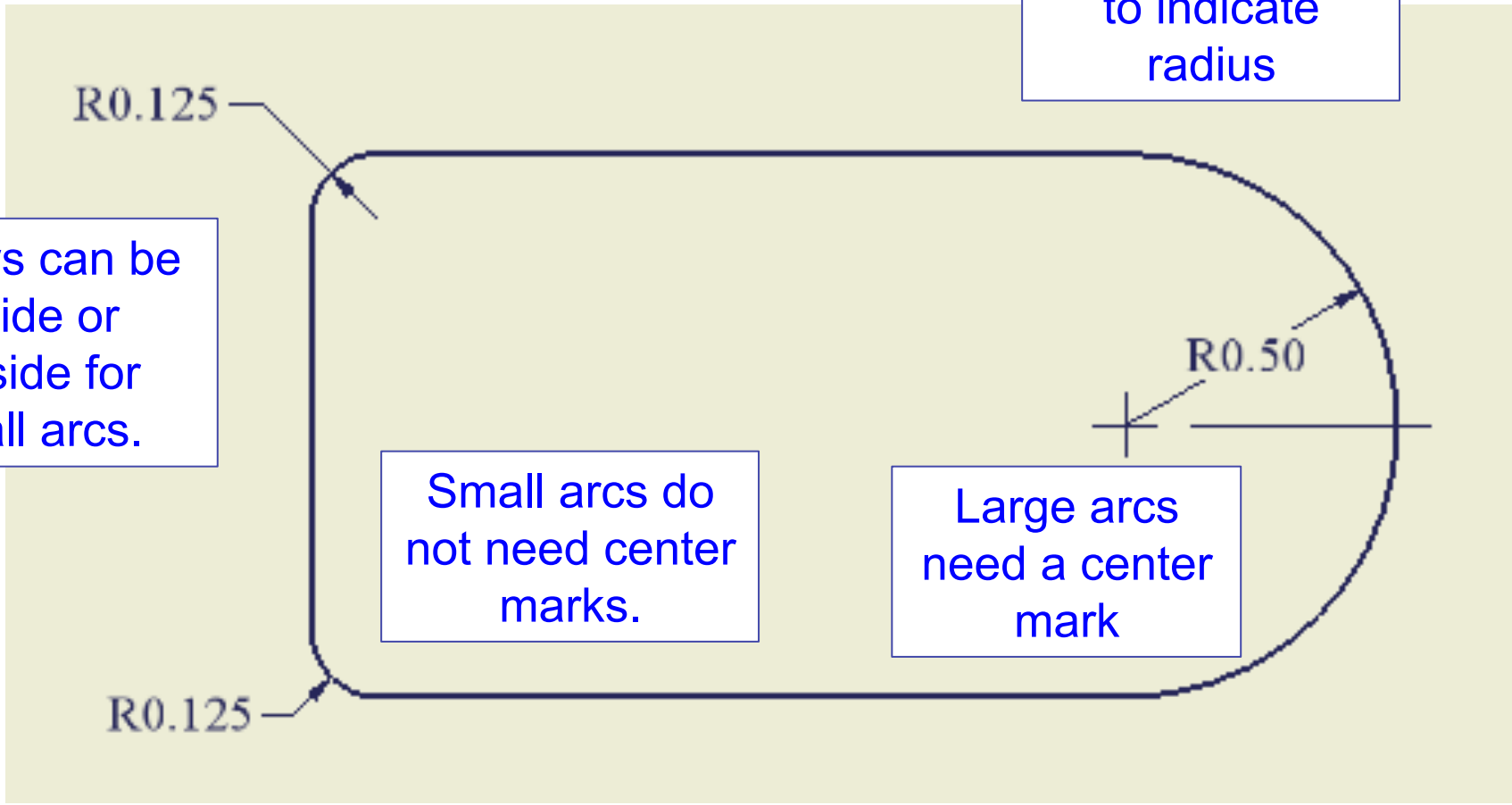


External chamfers other than 45 degrees

Dimensioning Arcs and Circles

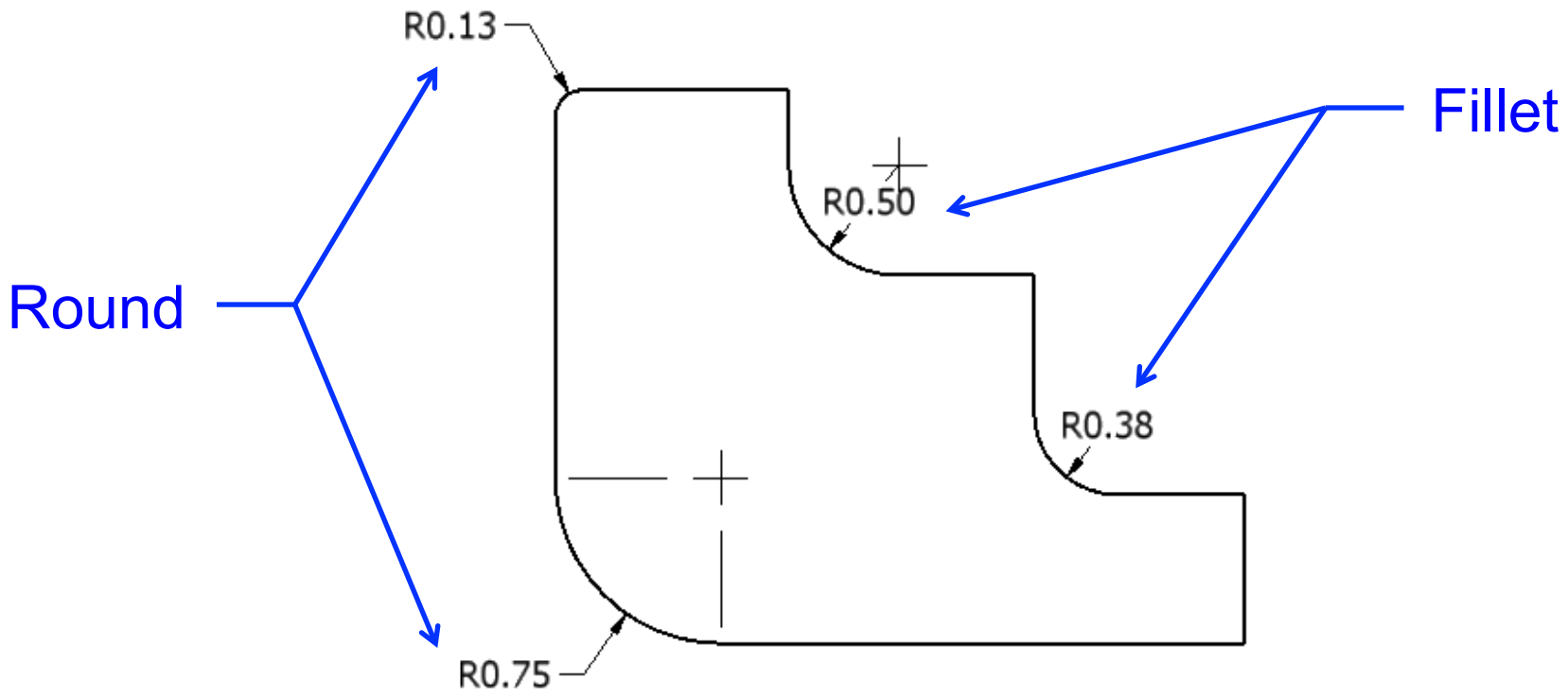
- Arcs and circles are dimensioned in views that show the arc or circle.
- Arcs are dimensioned with a leader to identify the radius; in some cases, a center mark is included.
- Circles should have a center mark and are dimensioned with a leader to identify the diameter.

Dimensioning Arcs



Fillets and Rounds

- **Fillet.** An inside radius between two intersecting planes
- **Round.** An outside radius applied to corners

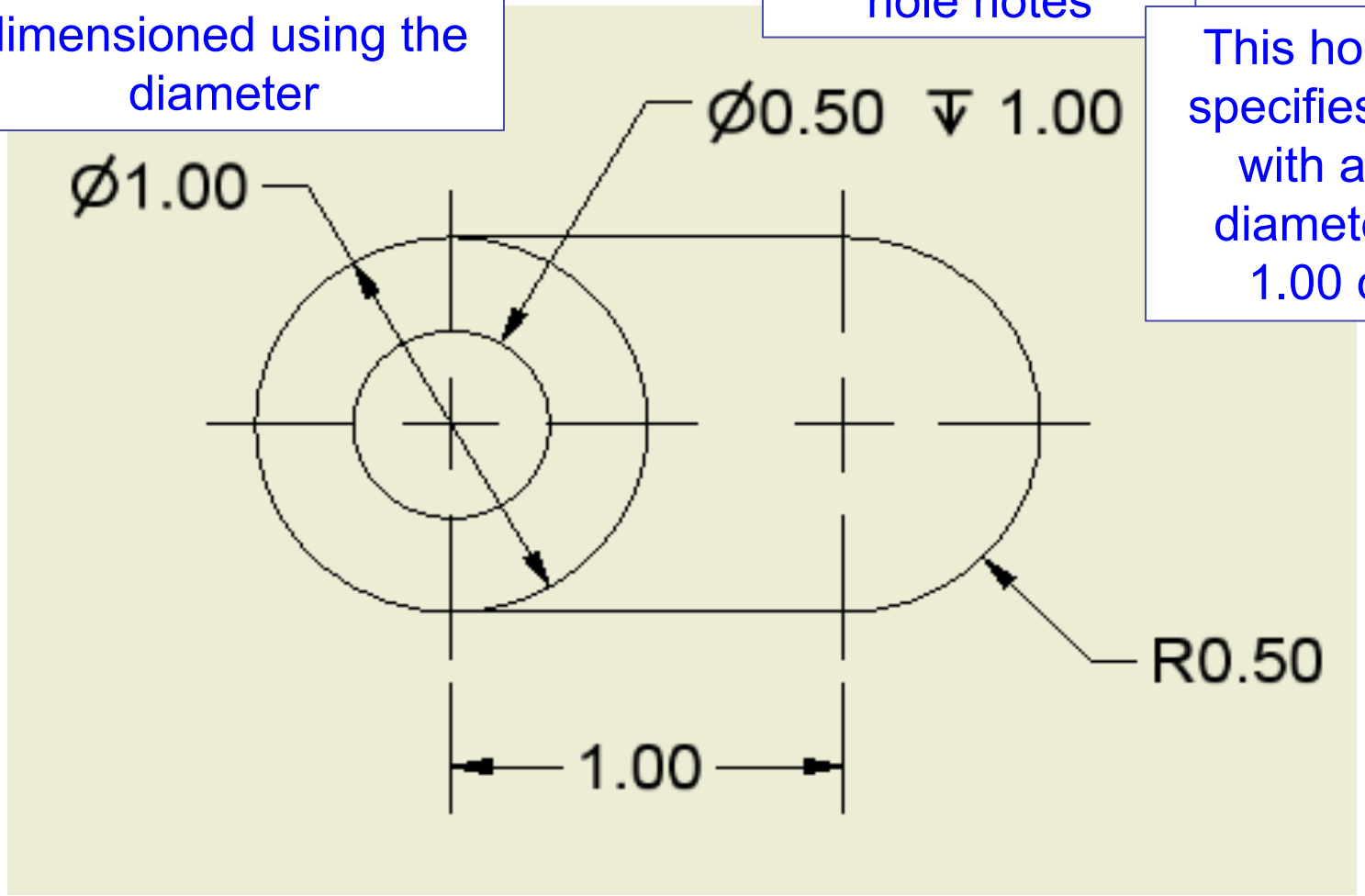


Dimensioning Circles

Full circles should be dimensioned using the diameter

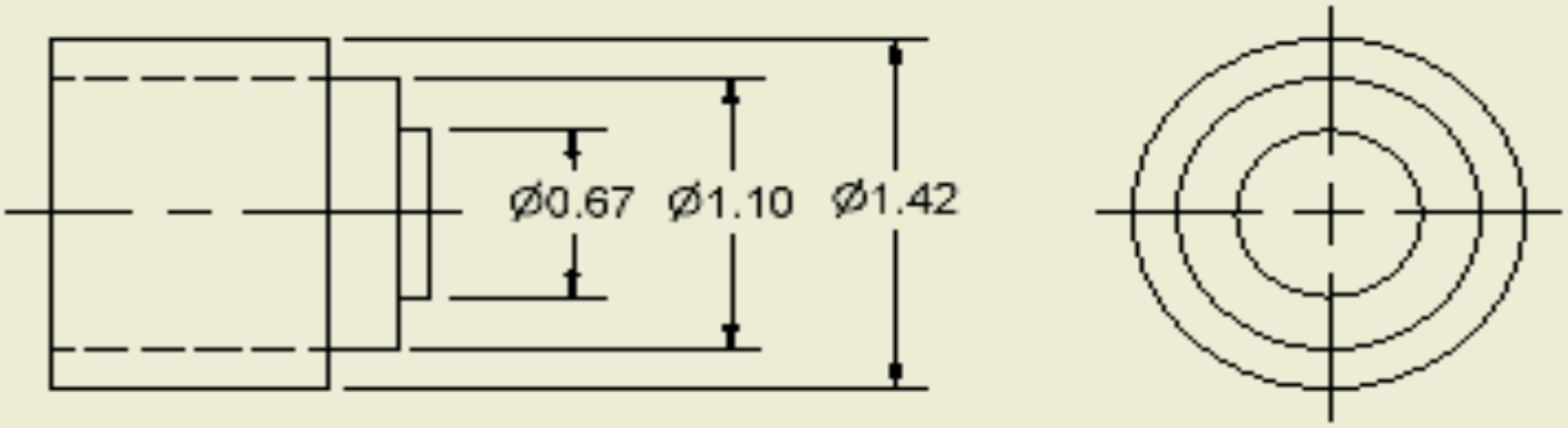
Holes should use hole notes

This hole note specifies a hole with a 0.50 diameter and 1.00 deep



Dimensioning Circles

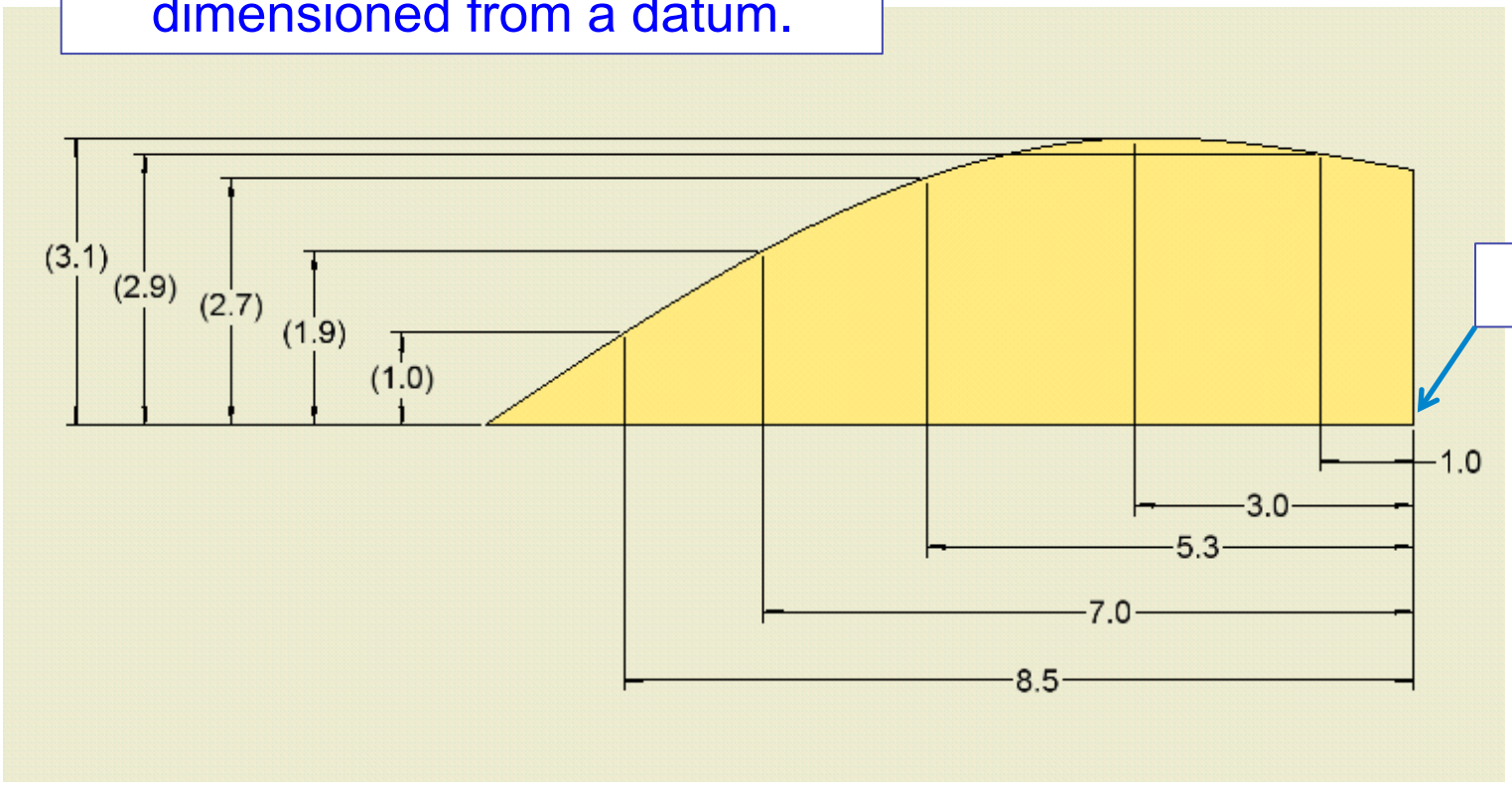
Cylindrical parts may be dimensioned in this manner



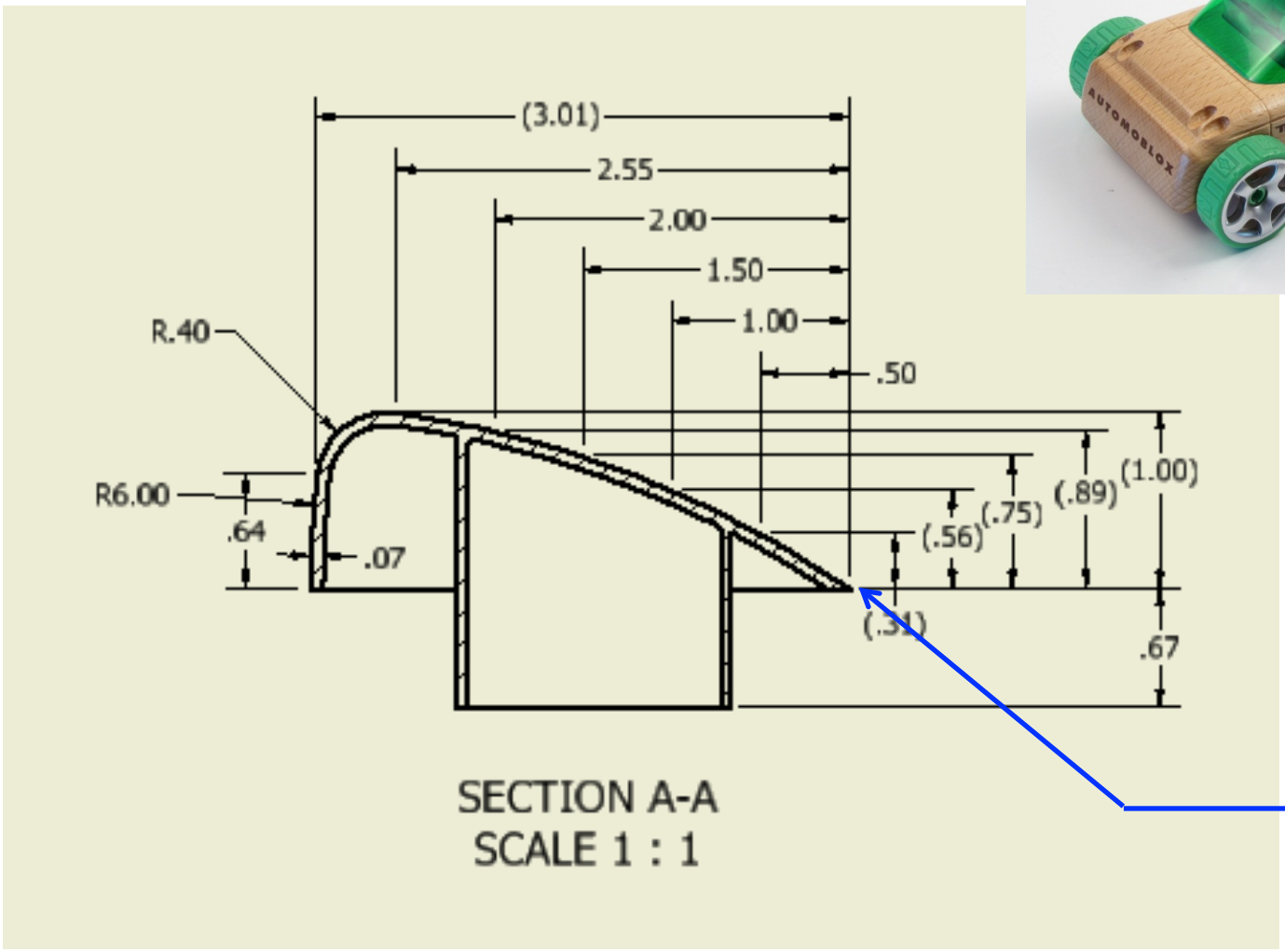
Note that the diameter symbol is used so that the dimension is not assumed to be linear

Dimensioning Splines and Curves

Points are placed along the contour of splines and dimensioned from a datum.



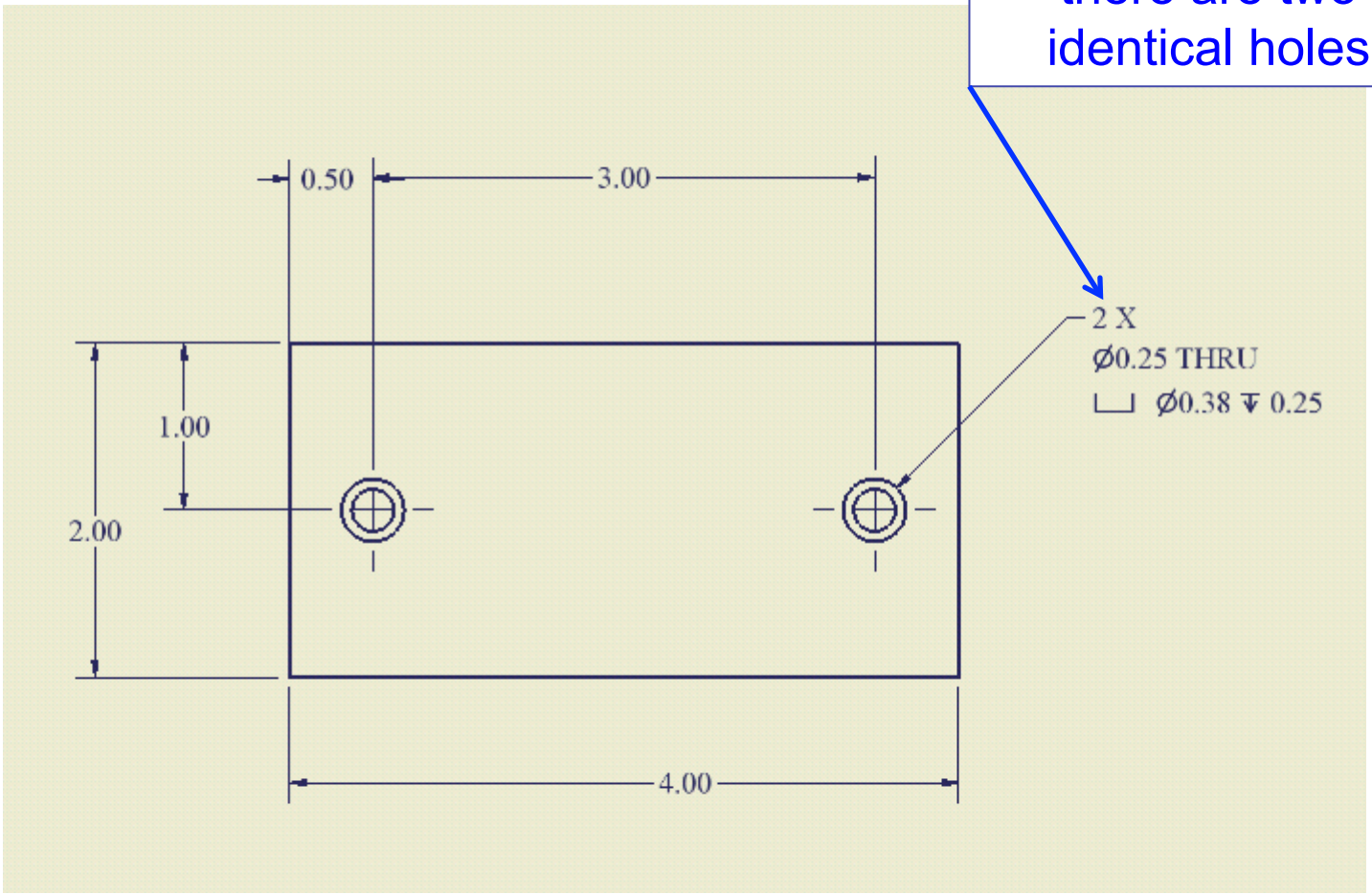
Dimensioning Splines and Curves



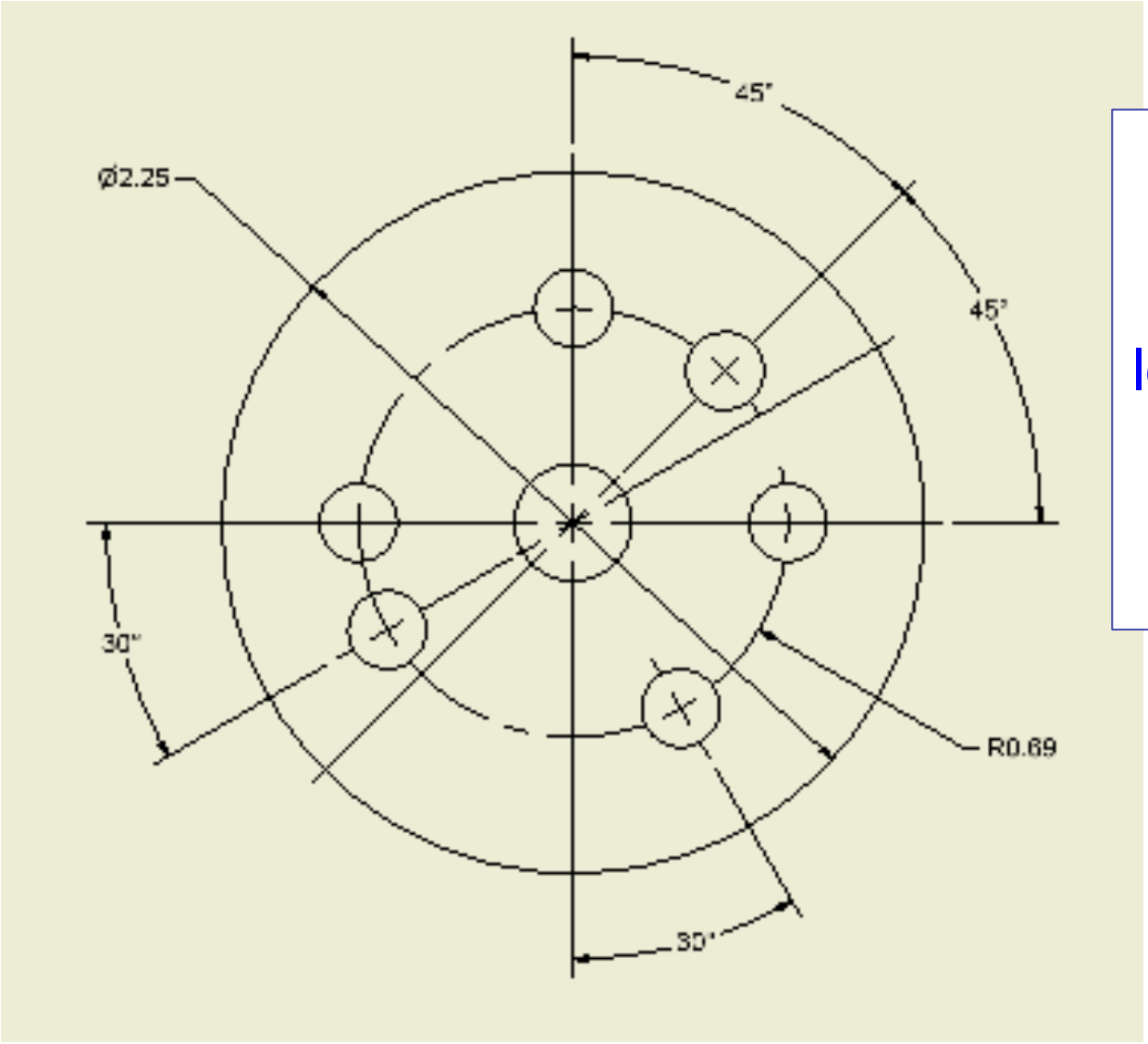
Reference Dimensions

"X" indicates the number of places (or occurrences)

2 X indicates that there are two identical holes



Dimensioning Radial Patterns



Angles and radius values are used to locate the center of radially patterned features