

Dimensioning Fundamentals

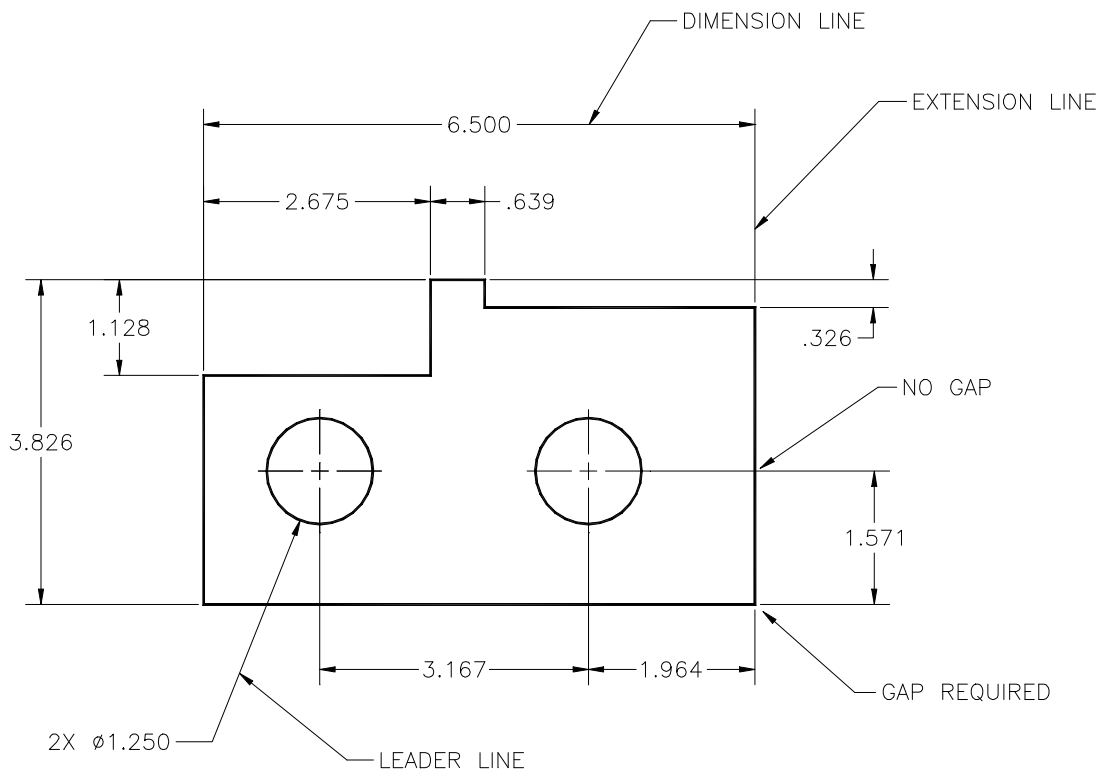
By William Bussard, March 2004

Terminology

Dimension lines: Lines located between extension lines ending with an arrow and to include a numerical value. They should be spaced uniformly approximately .375 to .500 inches apart.

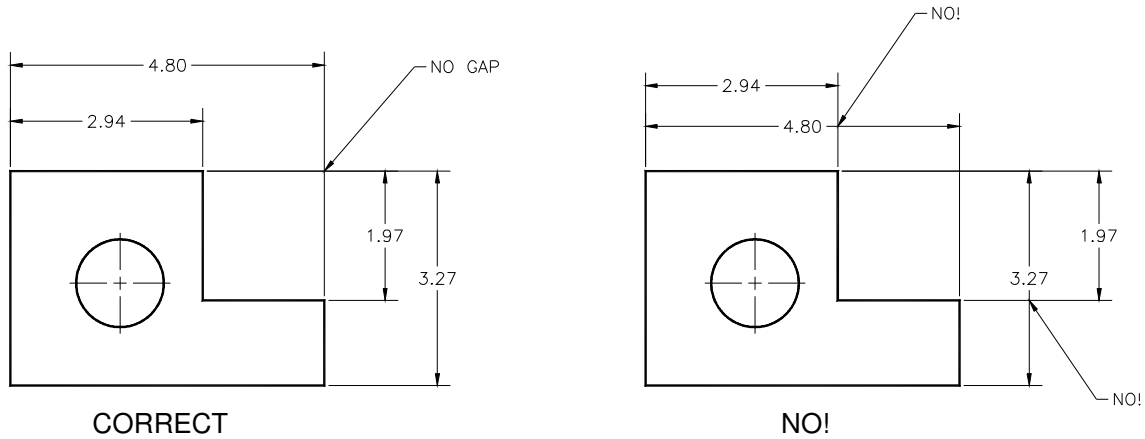
Extension lines: Extend away from a view to indicate a size or location constraint origin. There should always be a small gap (1/8") between the extension line and the feature. When extension lines cross object or extension lines, no gap in either line should be made.

Leader Lines: Lines drawn at an angle (never horizontal or vertical) extending from a note to a feature to which the note applies.

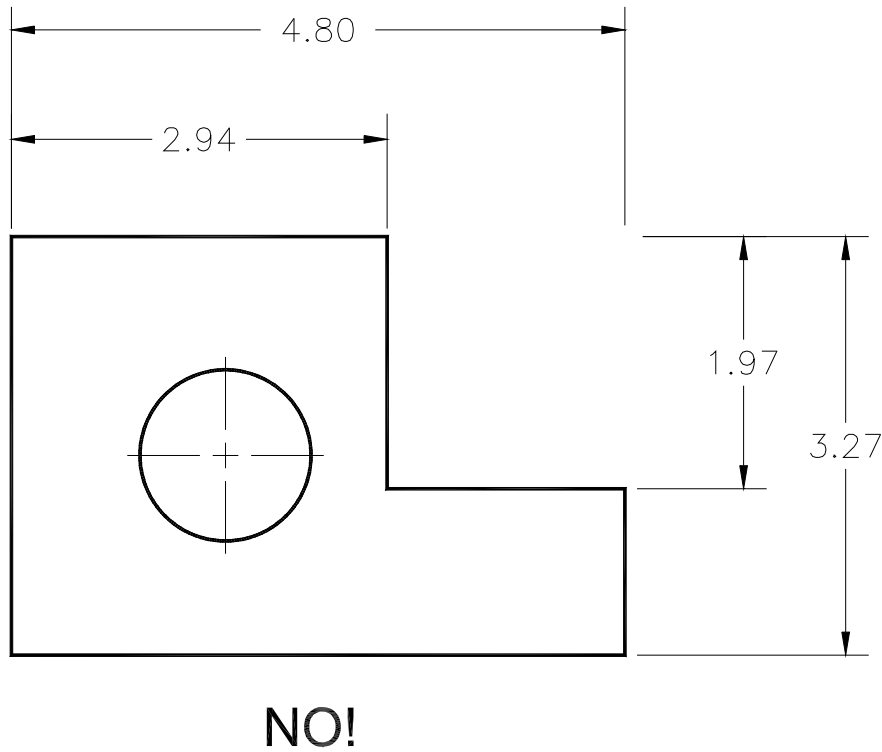


Dimension and Extension line placement

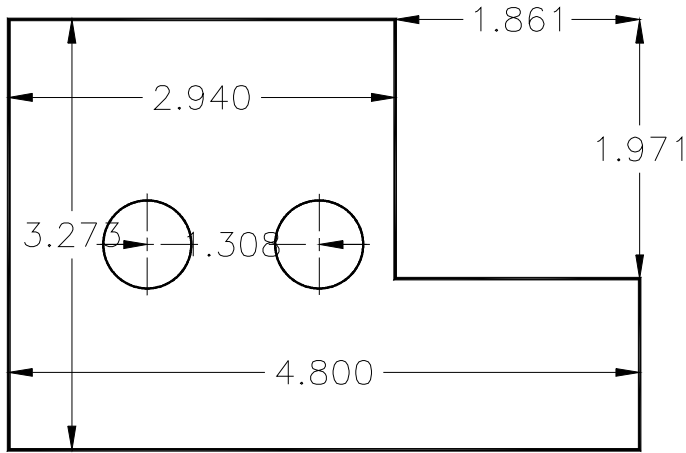
1. Always place shorter dimensions nearest to the object lines. Dimension lines should never cross. However, extension lines may cross each other.



2. Extension lines should never be shortened.

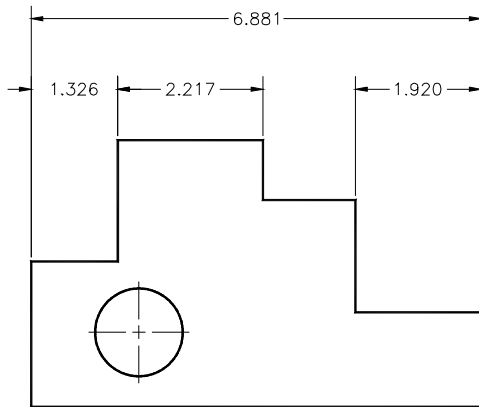


3. Dimension lines should never coincide with any object line or center line of the drawing. Therefore no line should be used as dimension line nor coincide with a dimension line.

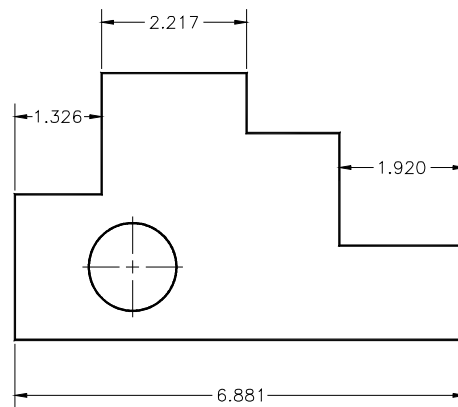


NO!

4. Dimensions should line up in chain fashion or be grouped together as much as possible.



CORRECT



NO!

5. Do not repeat a dimension. By repeating a dimension will only confuse the reader and could cause errors in the manufacturing process. In Figure 5A below, there are many cases where dimensions are duplicated. Figure 5B correctly shows only those dimensions needed to describe the part.

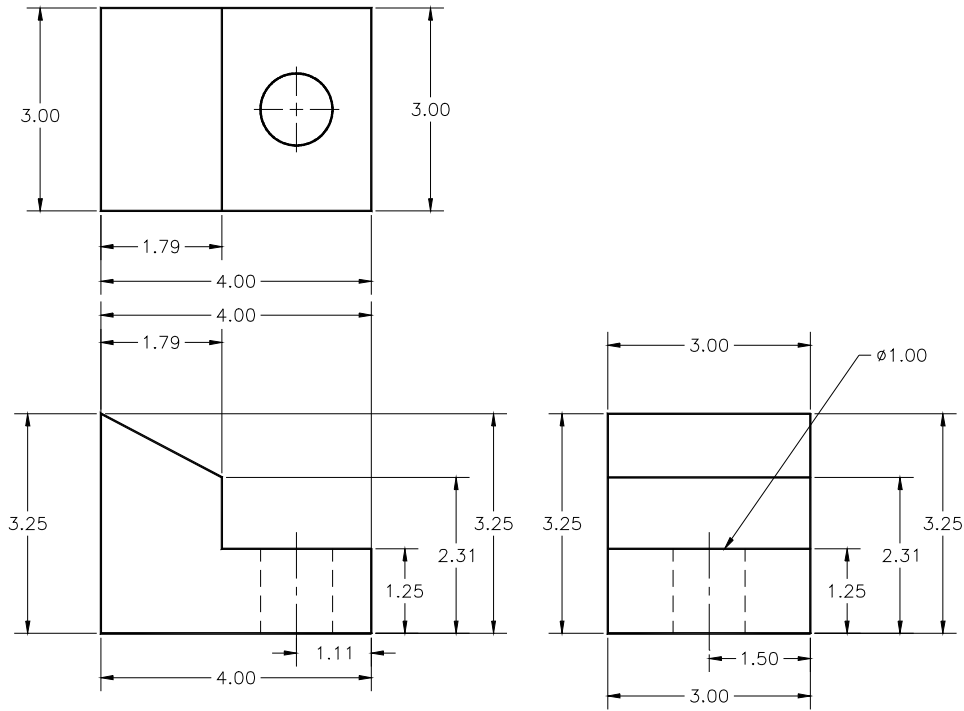


Figure 5A

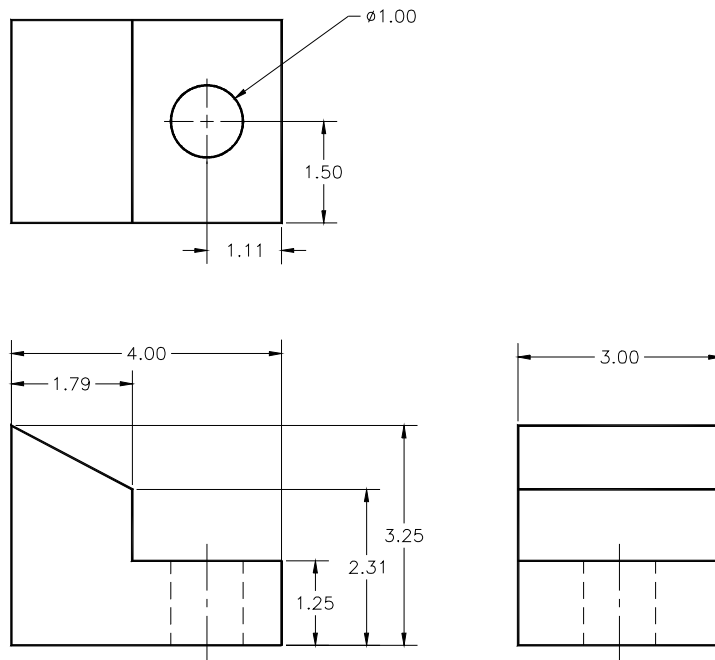
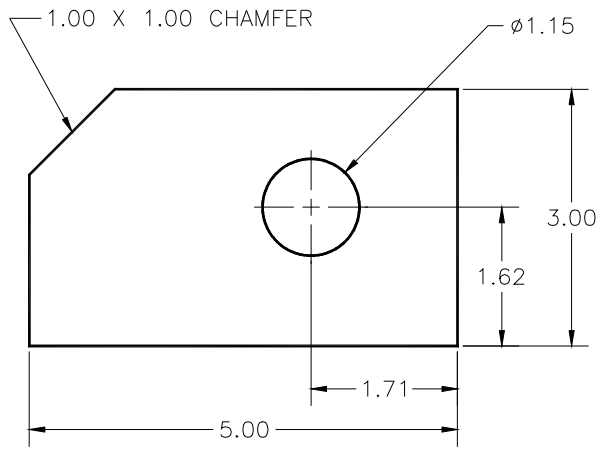
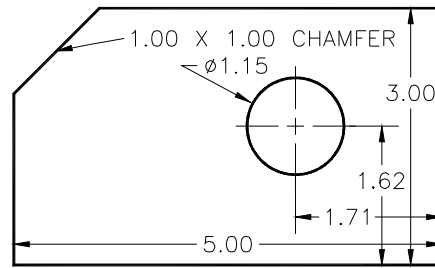


Figure 5B

7. Dimensions should always be placed off or outside of a view where possible.

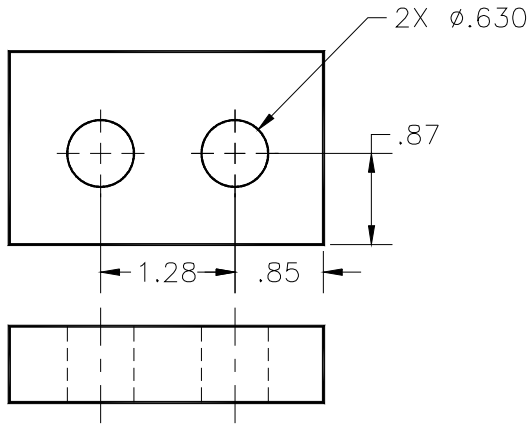


CORRECT

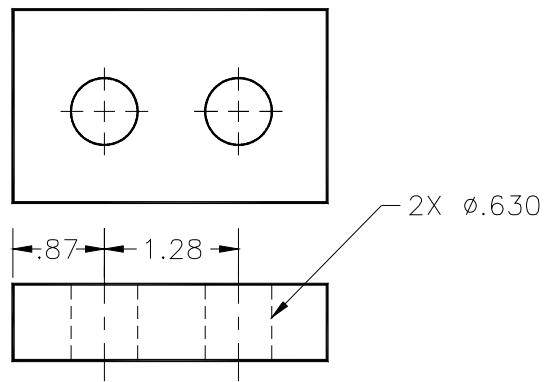


NO!

8. Hole features must be located and given size in the view where they appear as a circle not as a rectangle or hidden lines. **Never dimension to hidden lines.**

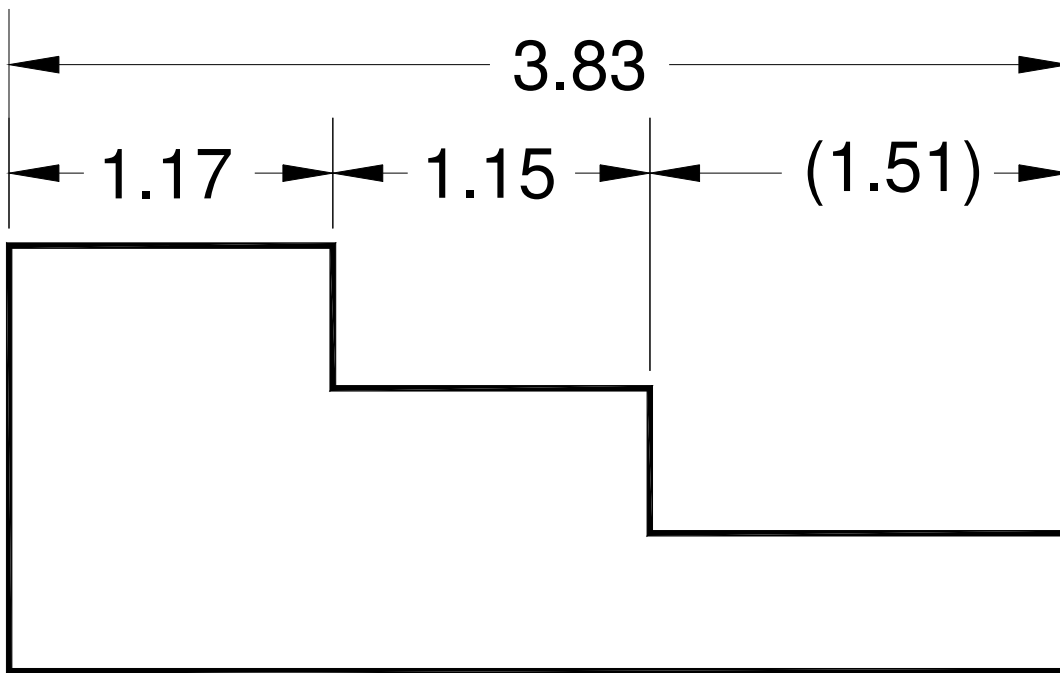


CORRECT

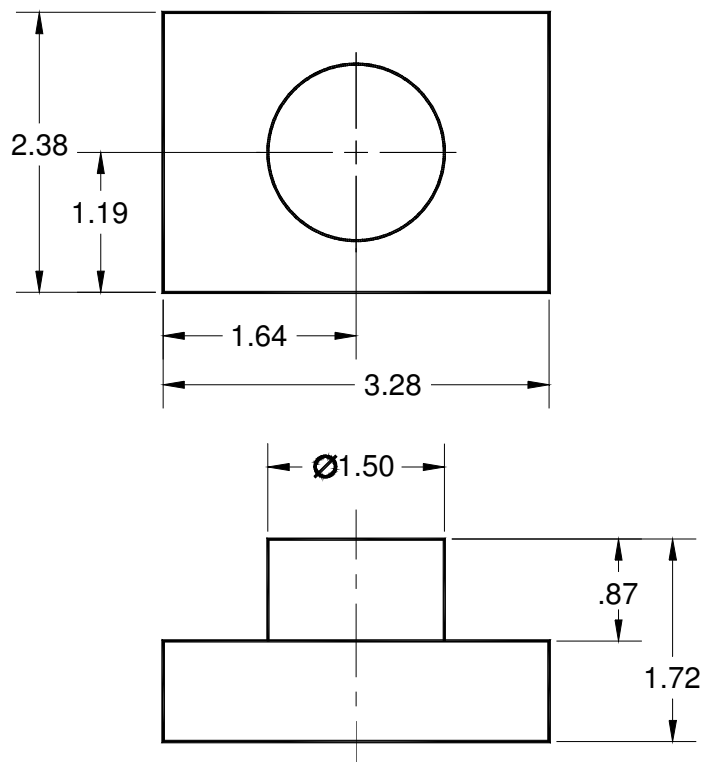


NO!

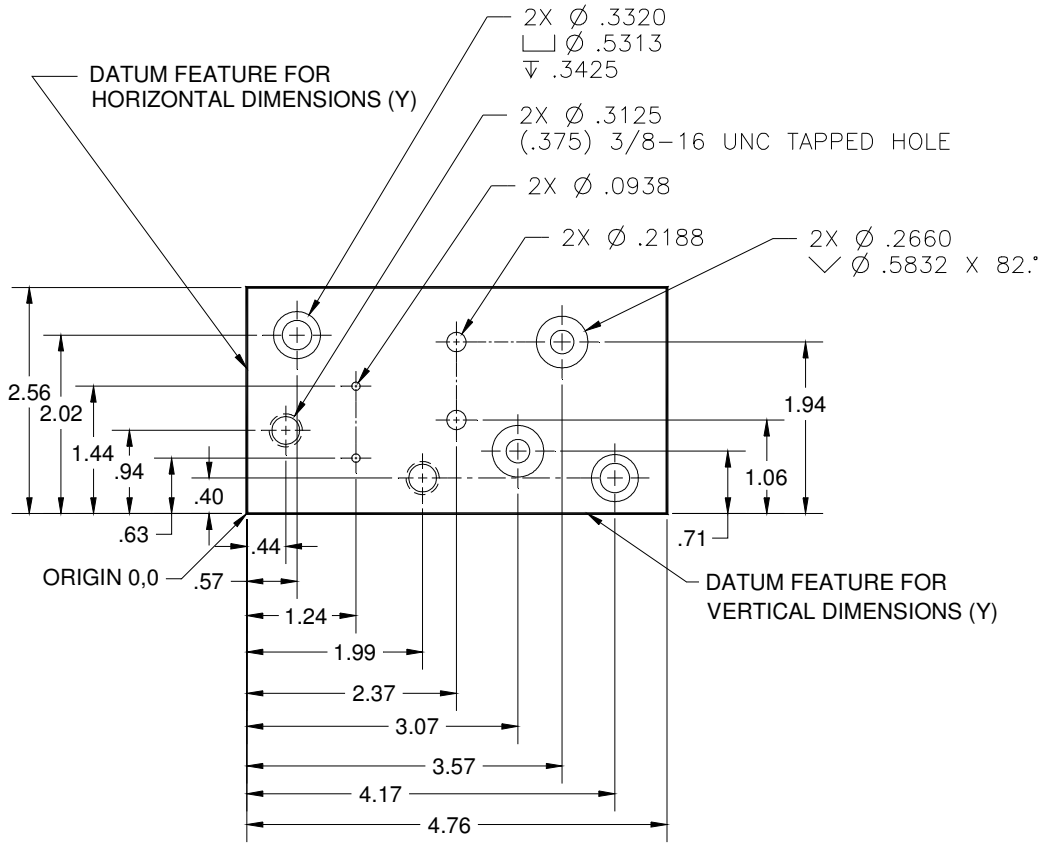
9. Avoid a complete chain of dimensions. Either omit one or use reference notation. Reference notation indicates that a dimension is used for information purposes only. Indicate a reference dimension by placing a parenthesis around the dimension. For example, (1.51) would indicate a reference dimension. See example below.



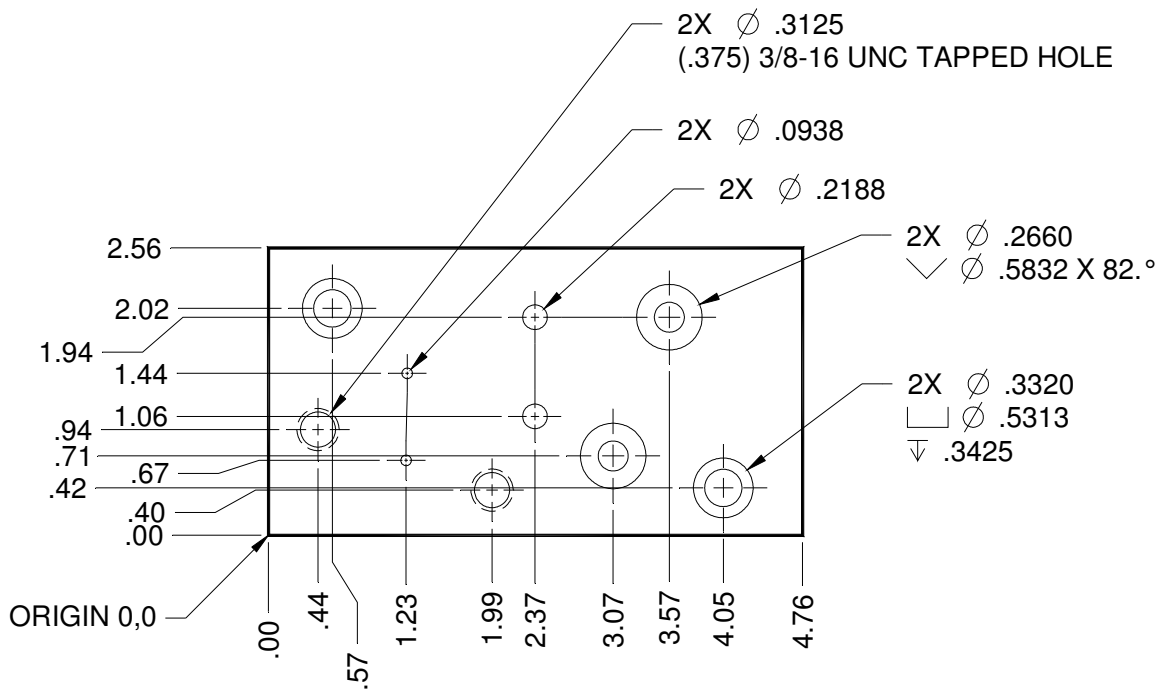
10. Locate external cylinders in the circular view but give its diameter and length in the rectangular view. See illustration below.



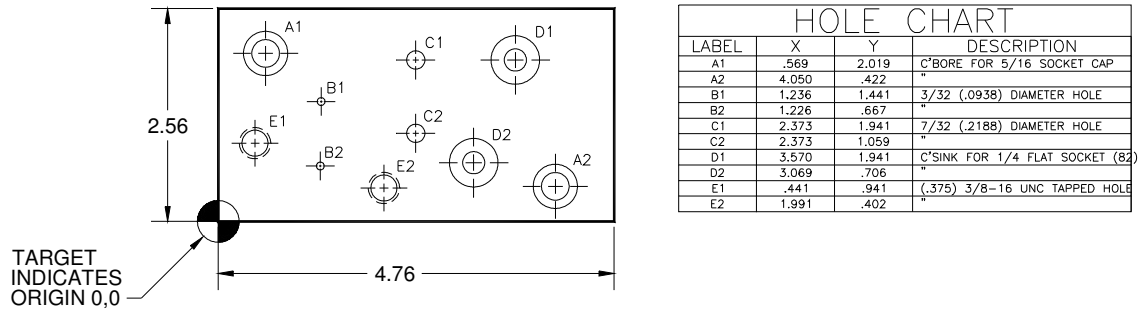
Baseline and Coordinate Dimensioning



Baseline Dimensioning
Figure 1



Ordinate Dimensioning
Figure 2



Tabular Ordinate Dimensioning
Figure 3

Dimensioning Symbols and Hole Callouts

1. Symbols represent specific information which could be difficult to duplicate in note form. They aid in clarity, ease of CAD drawing presentation, and above all, save time. Seven such symbols are show below.



COUNTERBORE
OR SPOTFACE



COUNTERSINK



DEPTH
(OR DEEP)



DIAMETER

R

RADIUS

X

PLACES
OR BY

()

REFERENCE

2. Local Notes: Local notes apply to specific features only and are connected to a feature by a leader. Notes should always be lettered horizontally. Leader arrows for notes should always point toward the circular view of the hole feature and if extended, would pass through the center. Local notes showing hole features, using the above symbols, are presented below reflecting Current and Previous ANSI practices.

