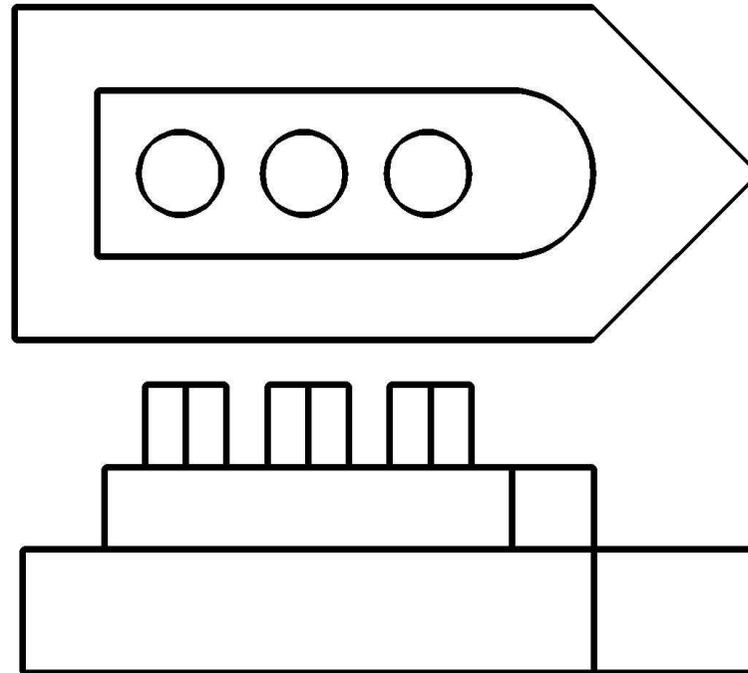


The Language of Drawing

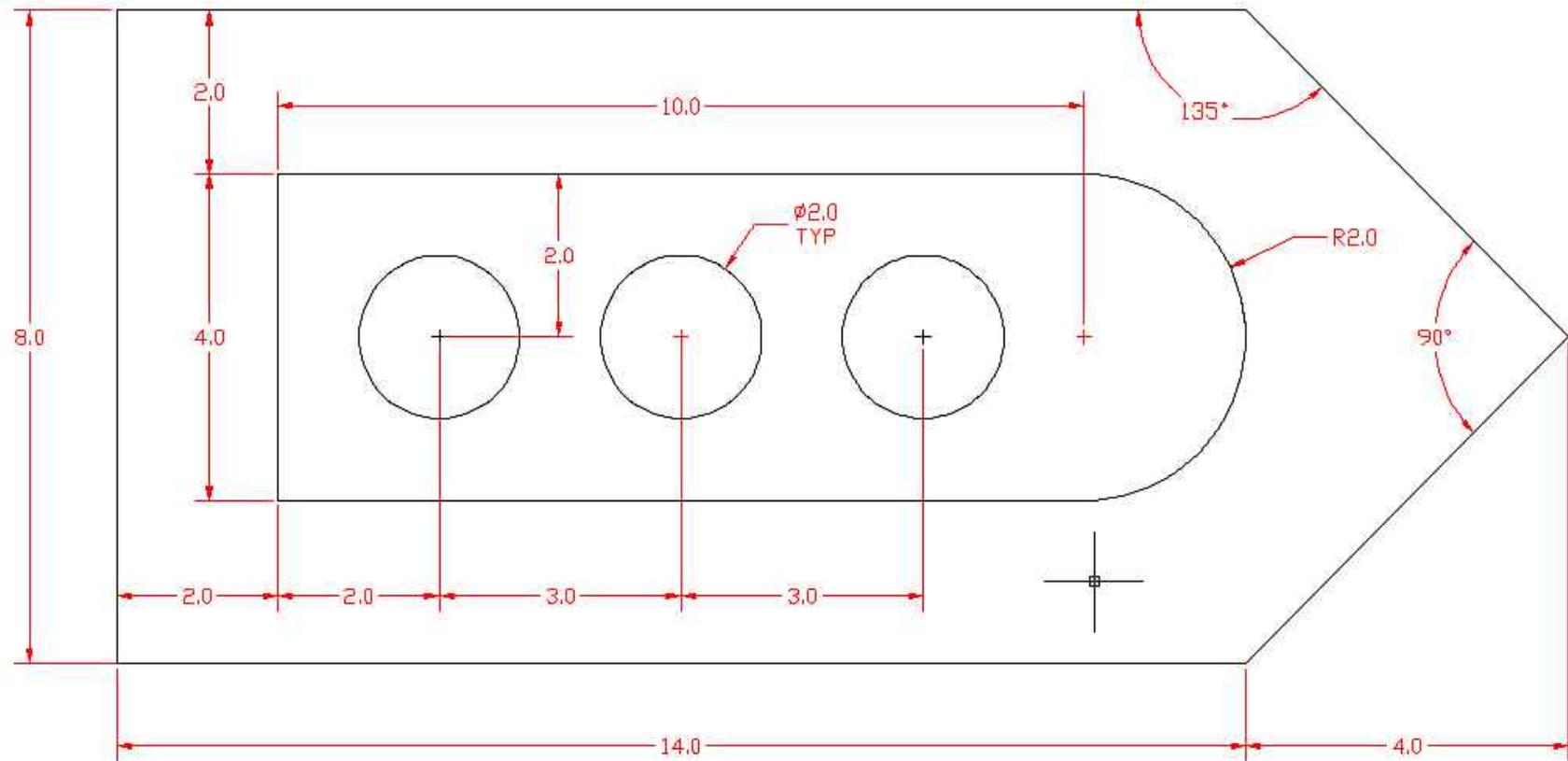
Chapter 3: Dimensioning

Here is a very basic drawing of a toy boat with two views: top and front. The drawing clearly shows the details, but it does not show the exact measurements of the boat.



For all we know, the boat could be an inch to 10 feet long. To show the exact measurements, you will need to add dimensions to the drawing.

Every detail on the boat needs to be dimensioned, but dimensions placed on one view should not be replaced on another. Here is the top view of the boat with its necessary dimensions.

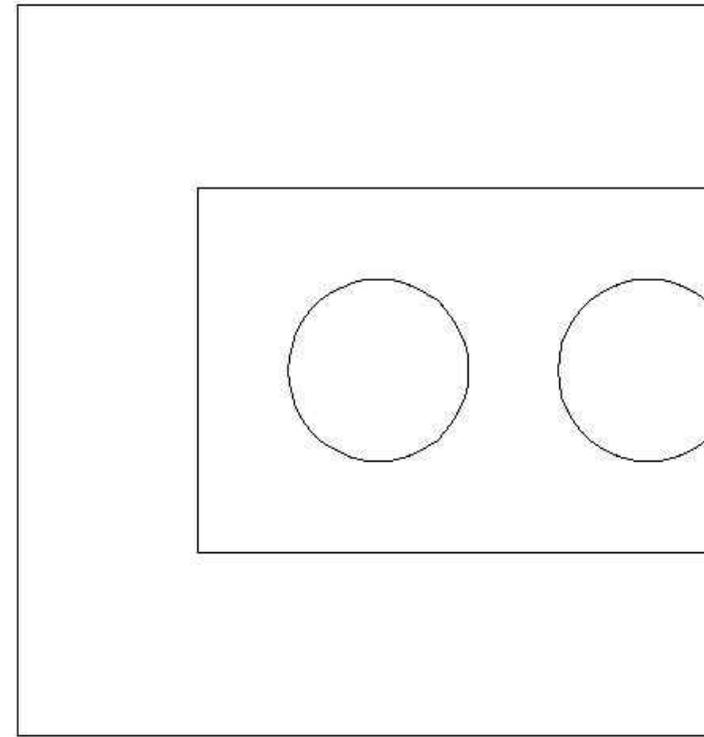
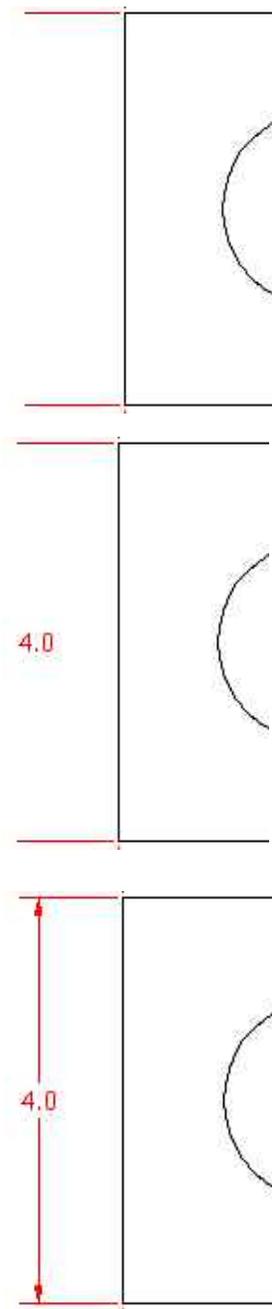


There are three types of dimensions shown above: linear, radial, and angular. Linear dimensions show length, like the 14.0 unit measurement along the bottom of the drawing. Radial dimensions show the size of circular elements measured from or across the center point, like the 2 unit diameter smokestack. Angular dimensions show angles between lines, like the 90° point on the front of the boat. All these types of dimensions are drawn with a different format.

To draw linear dimensions, draw two lines extending from the points you wish to dimension. NOTE: The extension lines cannot touch the object lines from which they are extending. They can overlap other lines, but not the lines being dimensioned.

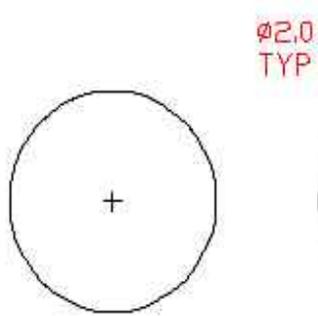
Next, in the center of the two extension lines, write the dimension.

Finally, draw a line from each side of the dimension to the extension line, with a small arrow at the end.

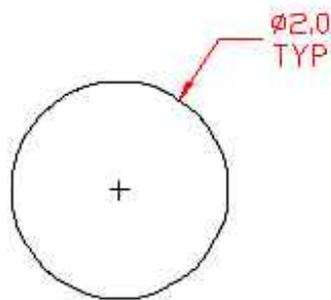


Above is a portion of the top view of the boat. Place the 8.0 and 4.0 linear dimensions as they appear on the master top view on the last page.

Whenever possible, dimensions should be aligned with each other for easier reading. Remember, the goal of dimensioning is to make it as easy as possible to interpret the drawing's measurements.



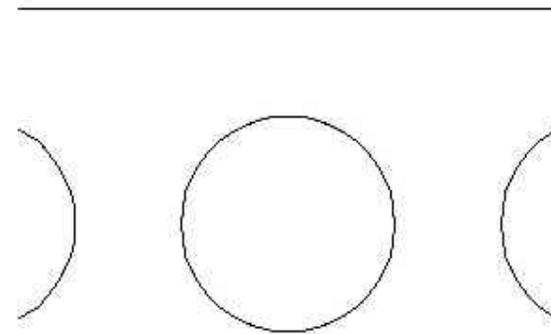
When placing radial dimensions on the sketch, first write the measurement relatively close to the object. For diameters, use a "Ø" sign in front of the dimension. For a radius measurement, use an "R".



Next, draw a line to the object and place an arrow at the end. The arrow should be pointing at the center of the circle or arc. In this instance, the line is bent to face the center.

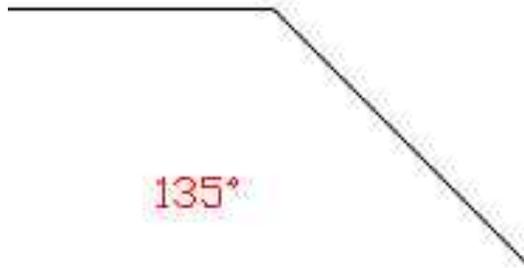
Make sure that the dimension and line do not obstruct other objects or dimensions.

Sometimes diameter dimensions can be placed inside of a circular object. In this case, treat the dimension as a linear dimension, with two opposite sides of the circle acting as extension lines. Place the dimension in line, but not on top of, the center, and draw two lines from each side of the dimension to the circle, creating a diameter. Place arrows at the ends of the lines.

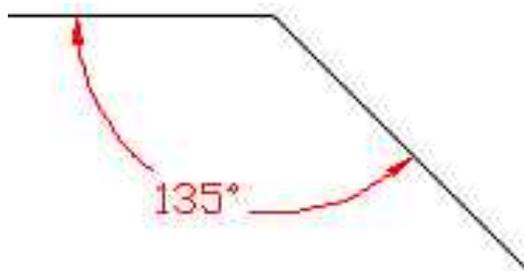


Above is a portion of the top view. Place the 2.0 diameter dimension as shown in the master top view.

The "TYP" placed below the 2.0 dimension is an abbreviation for "Typical". This means that the other two circular objects are also 2.0 in diameter, and we do not need to dimension them.

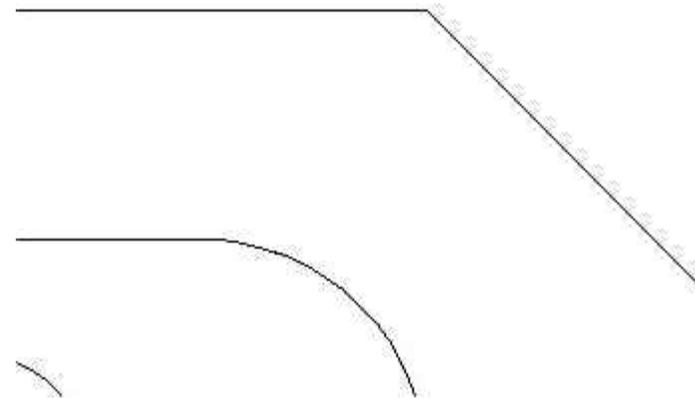


To place an angular dimension, first write the angle measurement in the center of the angle as shown.



Next, draw two lines from either side of the angle measure, creating an arc. Place an arrow at the end of each line. The arrows should be perpendicular to the edge to which they are pointing.

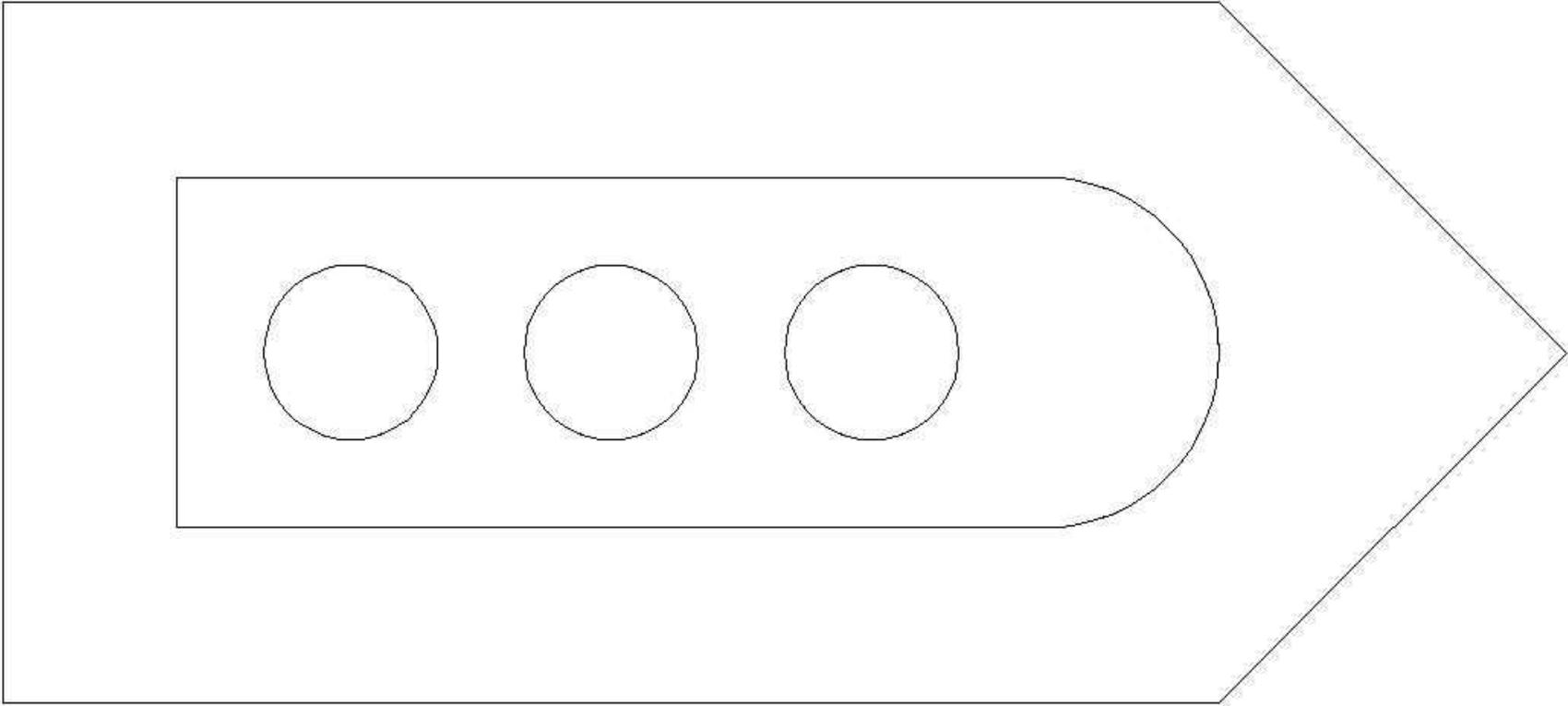
Hand-drawing a good circle takes practice. One way to make drawing arcs and circles easier is to make dots outlining the path of the curve, and then tracing over the dots. It is easier and cleaner to erase a misplaced dot than a whole arc.



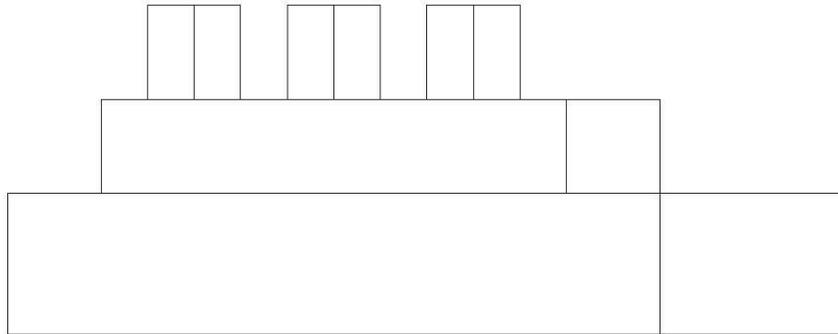
Above is a portion of the top view. Place the 135° dimension as it is shown in the master top view.

As you have probably noticed, none of the drawings so far have been specifically labeled with metric or standard dimensions. Although this is an important subject in dimensioning, it is not crucial to learning how to place dimensions. Metric and standard dimensions both have the same formatting. If you wish to label these dimensions one way or the other, feel free.

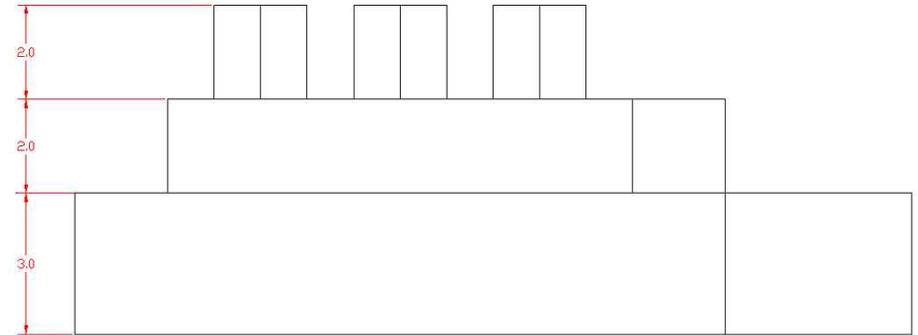
Now that you know how to place the three main types of dimensions, dimension the entire top view of the boat. The exact placement of the dimensions is up to you; however, you must include all the measurements included in the master top view. Refer back to the master top view if you have trouble.



Here is the front view of the boat. As you can see, it has no angular or radial dimensions, but it does need some linear dimensions to define the height and length of the boat.



Surprisingly, only three dimensions need to be placed on the front view. All the other details have been defined on the top view.



Here is the front side view of the boat. Place the three dimensions for this view as shown in the graphic above.

