Assignment 1.2: Additional Drawing help for students:

i.e., Step by step instructions for drawing the part:

This assignment can be difficult for some students… follow these steps for an easier route to completion:

Tools of the Trade: Items and Instruments for this assignment…

- Several sheets of paper, including graph paper with ¼ inch squares
- A bit of tape to hold down your drawing
- Your new F pencil
- Ruler
- Compass
- Eraser
- Paper towel (for cleaning instruments and wiping away eraser remains)
- Hole Template (optional) – it might be handy for the smaller holes.

First Step: **Setting up your paper**

- It is recommended to have 2 or more sheets of paper stacked on top of each other before drawing. This creates a softer feel for better control, a softer drawing surface and a thicker base for your compass point when drawing circles.

- Tape down each corner of the paper to prevent sliding.

Step Two: The Initial Layout

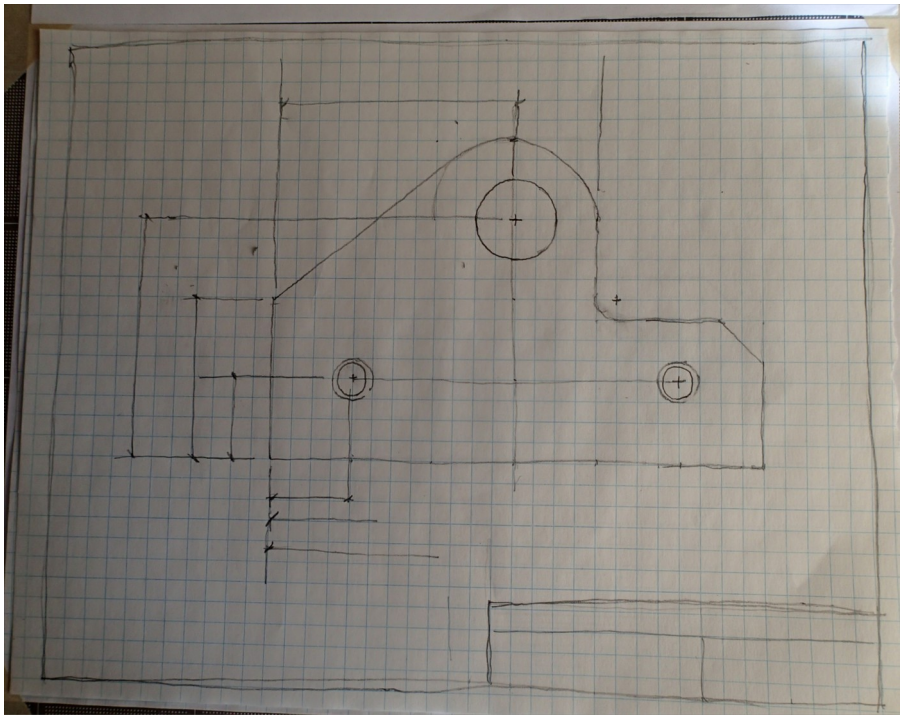
2.1 Start by drawing a light border around the paper, approximately ¼" from the edges. (Darken afterwards, at the end of the drafting process.)

2.2 Draw the outline of the title block. Refer to the example on pg 1-33. The exact dimensions for a title block can vary - this example uses 4-1/2" x 1-1/16".

2.3 Visualize (or make a draft) to pre-determine how the components of the drawing will be arranged to fit on the sheet.

-Take this into account:

- Clearing the title block border.
- More space is required when using baseline dimensioning.
- Note: *sides with more dimensional detail will require more space*.
- A quick freehand pre-work sketch on another piece of paper will reduce the number of mistakes, saving time.

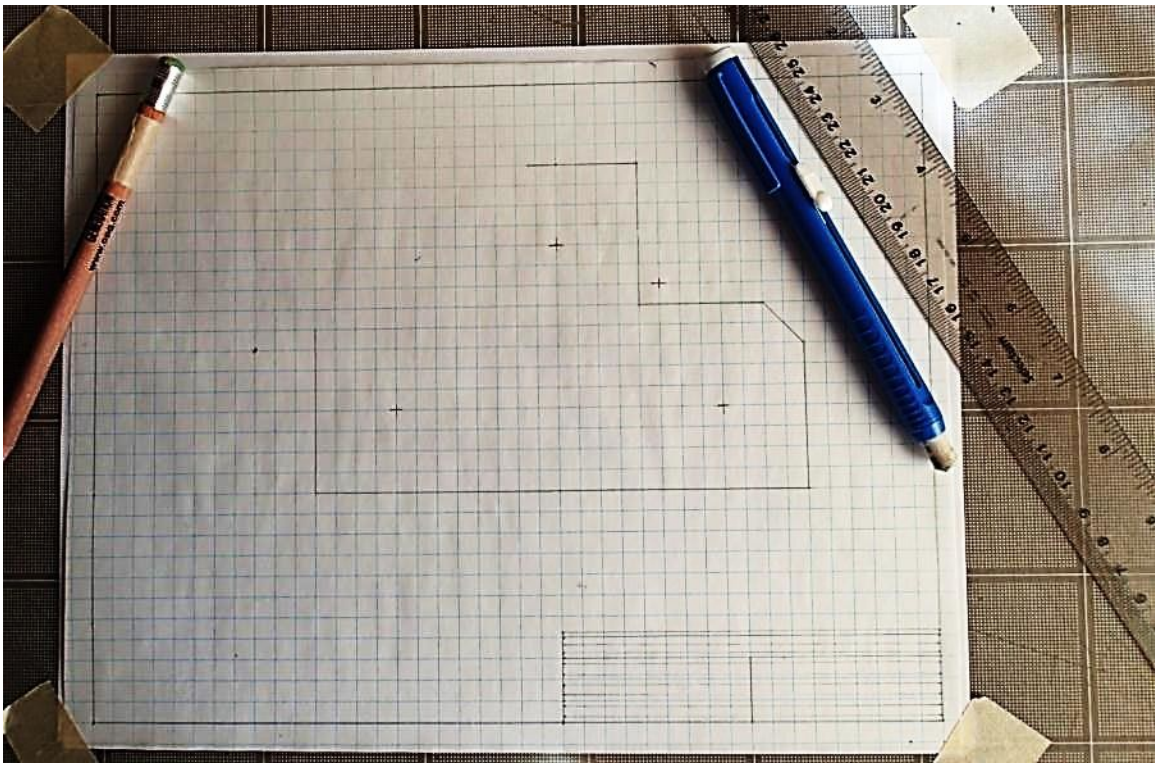


2.4 Start drafting the outline of the object, beginning at the **datum** (i.e., the lower left corner).

- You can use a ruler
- The scale is 1:2
- Start with light lines
- There is enough information on the dimensioned sketch to create this drawing

Continue drafting the object shape outline, using your ruler. *(Note: The eraser is also a tool; you may find yourself using it a lot.)*

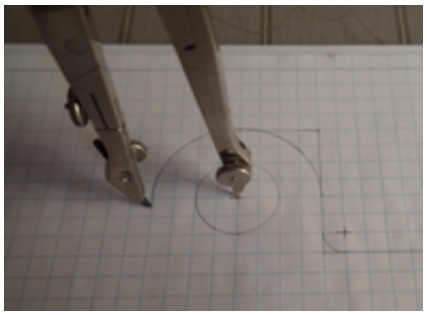
To draft the arcs and circles: Carefully find the location of the hole centres and mark them with a small “+” on the drawing. Refer to the following figure:



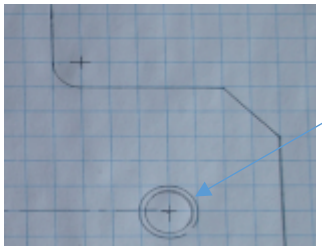
<u>Step Three:</u> Continuing with the Geometry

3.1 Use a compass to draw the arcs and holes on the part. Holes are centred on the centre marks that you drafted earlier.

Note that the 2” arc will be tangent to the sloping line on the left side of the component. This means that the arc must be drawn longer to start. Once this line is drawn, careful erasing will follow.



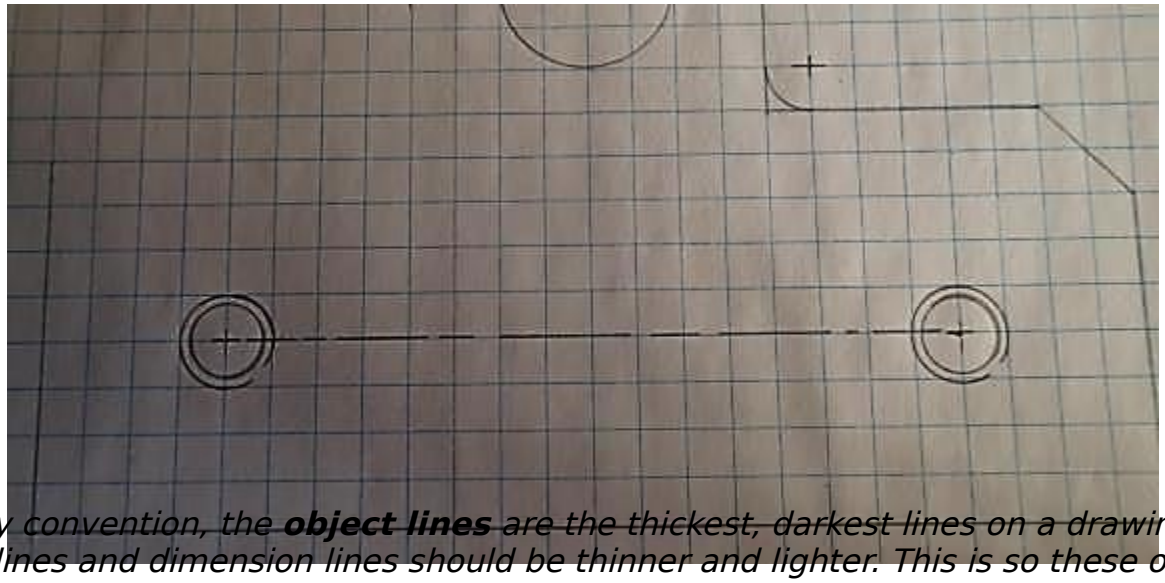
3.2 Draw a chamfer. A chamfer is a corner that is cut. In this case, the chamfer is a cut at 45 degrees and extends 1” in <u>both</u> the <u>x and y</u> directions, thus it is 1.41” long (don’t forget the scale). See the small figure below:



Note the drawing convention for threaded holes.

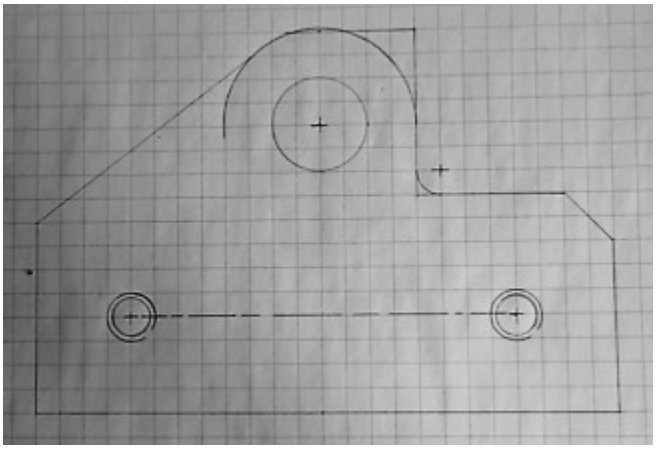
3.3 The bottom two holes are drawn with 2 concentric circles. The outer circle on each has a small gap; this indicates that these holes are threaded. Again, don’t forget the 1:2 scale. The diameter of the outer circle is drawn to scale but the inner circle diameter is only approximate.

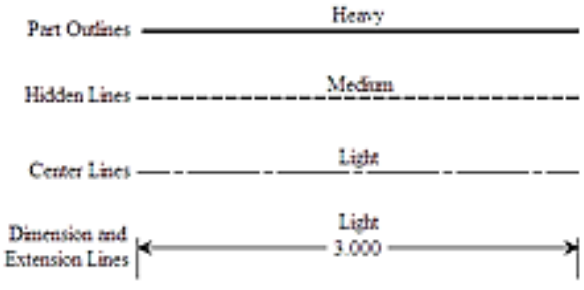
- 1-12 UNF means that this hole is 1" in diameter and there are 12 threads per inch deep.
- Use the centre line convention (a series of long and short dashes) to show that the two holes are aligned horizontally on the drawing.



*Note: by convention, the **object lines** are the thickest, darkest lines on a drawing. Centre lines and dimension lines should be thinner and lighter. This is so these other lines do not obscure the object.*

With the addition of the angled tangential line on the left you should now have the geometry completed – lightly, to be darkened later.





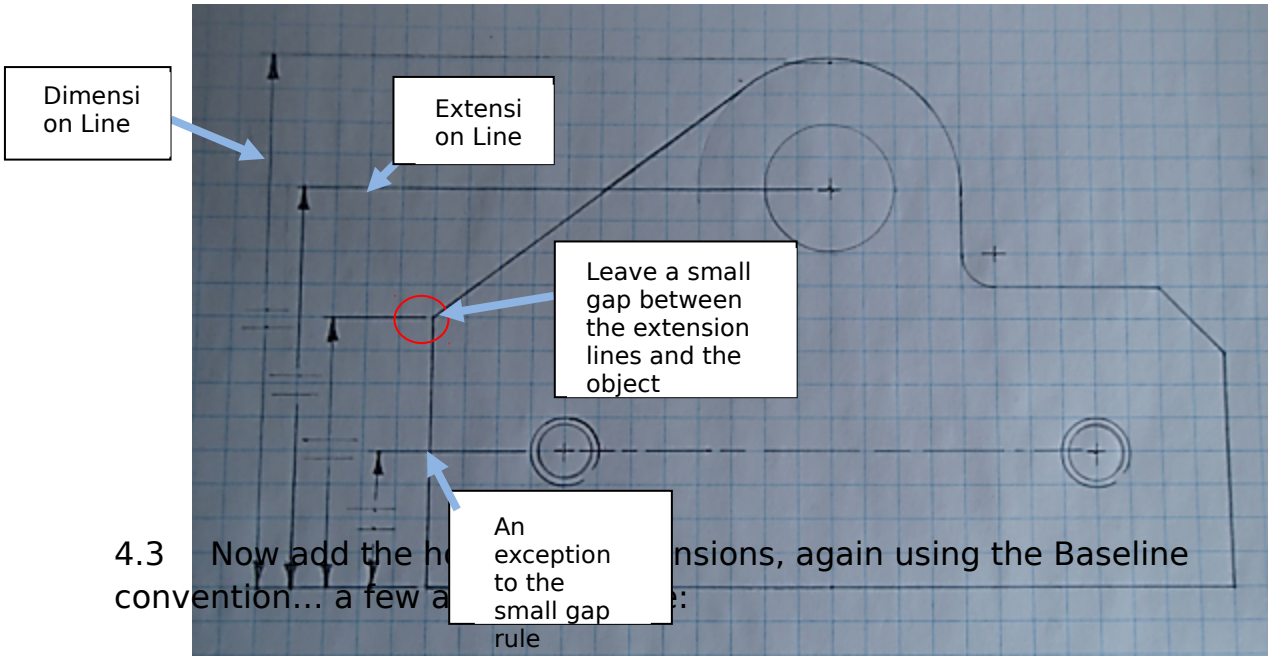
<u>Step Four:</u> Drawing in the Dimension Lines

4.1 Use **<u>baseline dimensioning</u>**. Start by considering the vertical dimensions.

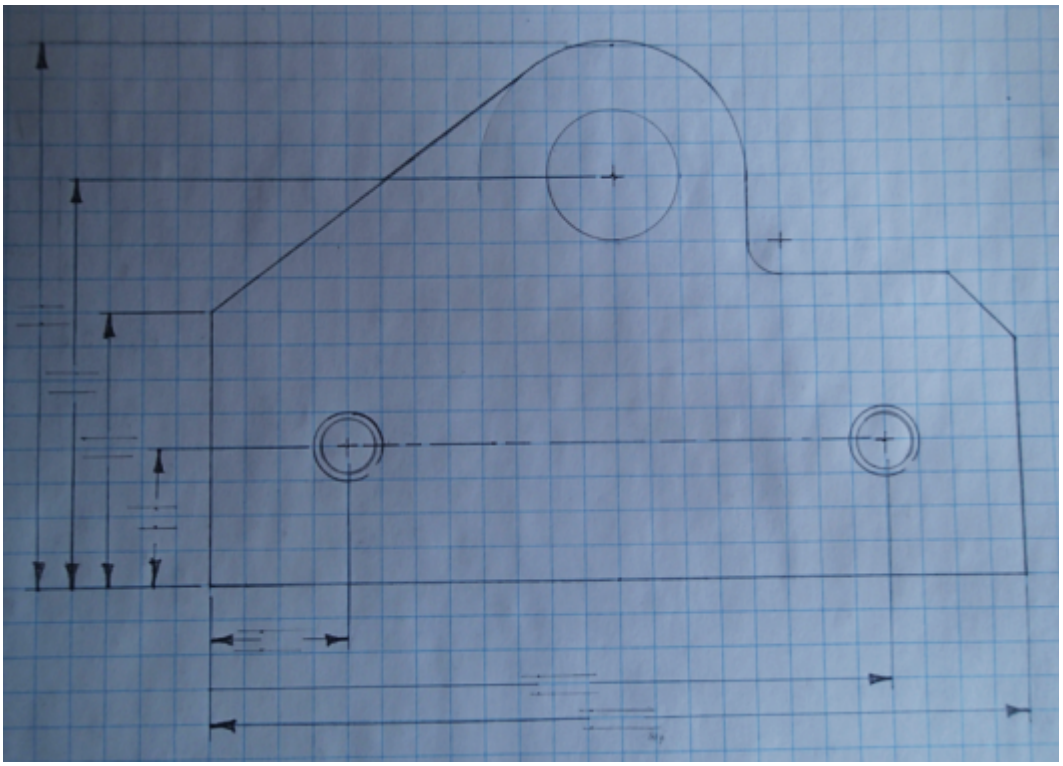
<u>Note - it is imperative</u> that you provide a sufficient number of dimensions so that a machinist can properly fabricate the part, without ambiguity or guesswork.*

4.2 The following photo shows appropriate dimensioning and conventions for the left side.

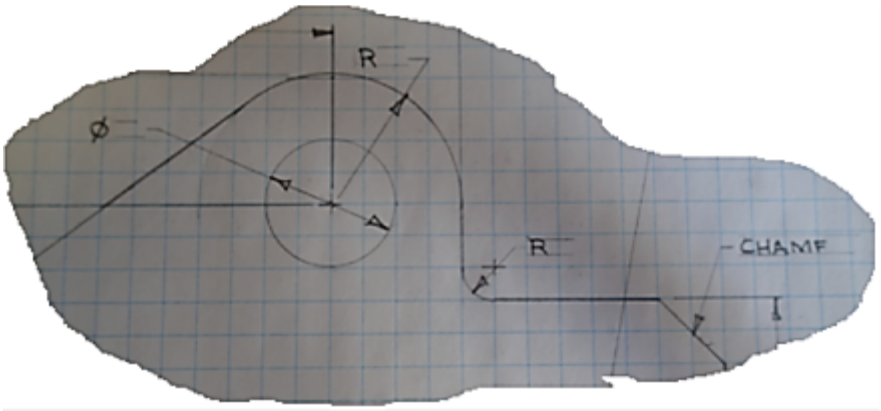
Be sure to use **<u>guidelines</u>** for the lettering!



4.3 Now add the h nsions, again using the Baseline convention… a few a :



4.4 Add the radii, diameter and chamfer dimensions. Note the conventions used.



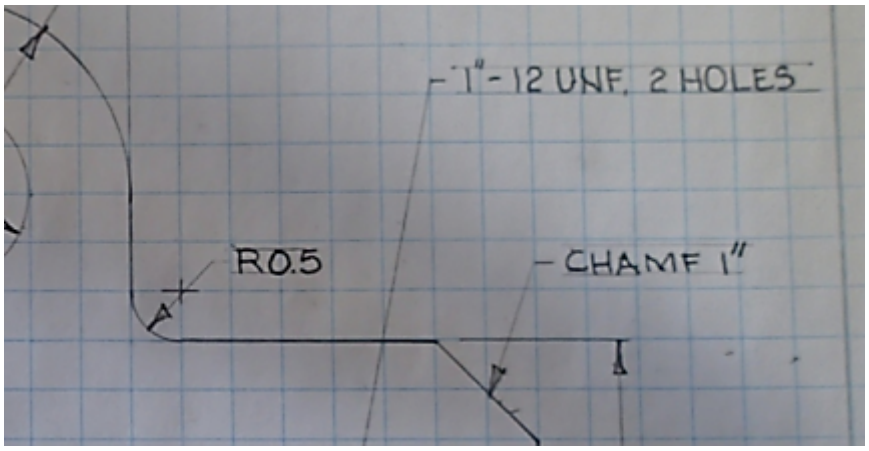
Step Five:

Darkening Lines and Adding Text.

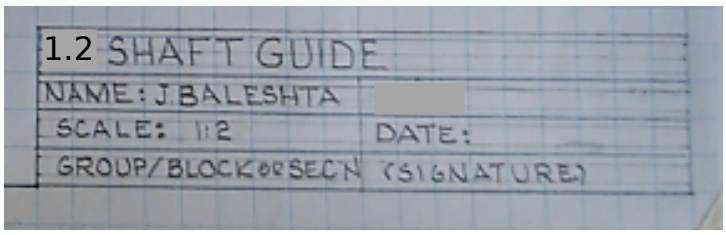
5.1: Darken the object lines. This should be a quick operation but do it carefully.

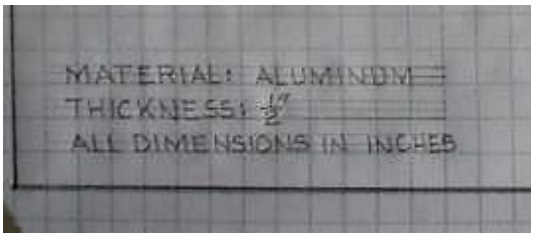
5.2 Add text (for dimensions etc.). A paper sheet can be used to protect the drawing from smudges.

- Make certain that you use Engineering Technical Lettering and the stroke sequences from the charts on pg. 1-35 of the course notes. The text height is 1/8”.
- Note that the drawing convention for arcs is to use an R (for radius) e.g. R0.5, and the convention for circles is to use a diameter symbol e.g. Ø2.0



5.3 Add text for the material type, material thickness, and units used. Finally include the Title Block Information (ref pg 1- 33).





Note that not all the dimension lines etc., have been shown in these guidelines. To encourage you to think independently – ***the missing dimensional information is up to you to complete on your drawing****.*