Learning Objectives

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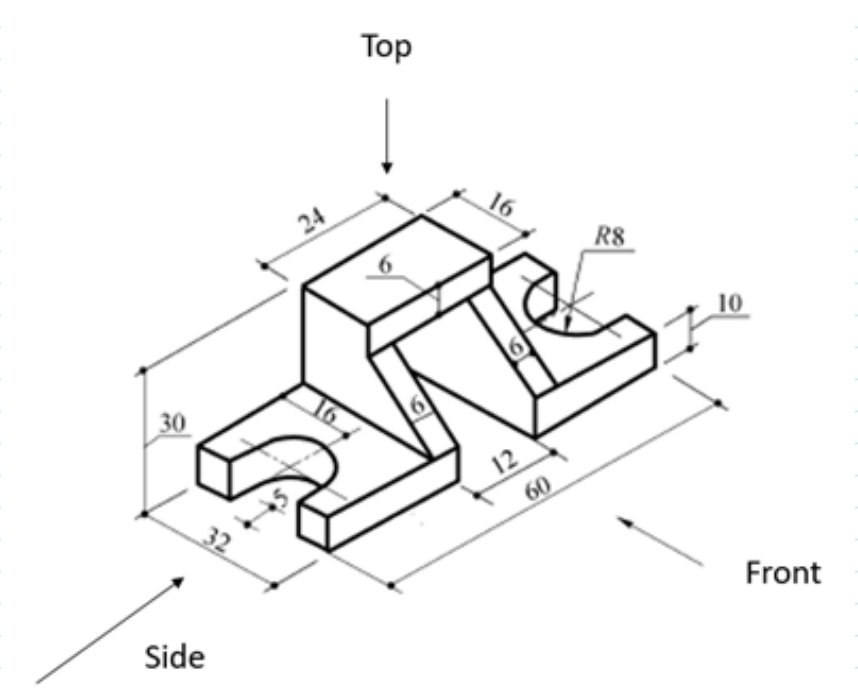
Learning Objectives

1. Use AutoCad to prepare orthographic views of a 3D object
2. Learn how to develop a top, front and side view orthographic projections
3. Learn the tips for developing orthographic projections
4. Learn how to layout the projection on the AutoCad Drawing Space
5. Learn how to dimension the projection drawing.

Homework Assignment 4

1. Draw three orthographic views (top, side and front) of the 3D object shown below. Include the dimensions on the drawing in a different layer using a red font. Make sure that the drawing is neatly arranged in the drawing space as seen in Example 3 and that the drawing is dimensioned as seen in Example 1 (100 points).



Drawing units below are in cm.

AutoCAD Helps

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Resources from AutoDesk

https://help.autodesk.com/view/ACD/2022/ENU/

https://knowledge.autodesk.com/support/autocad/learn?sort=score

Workbooks
https://my.civil.utah.edu/~bartlett/CVEEN%201400/workbooks/Work%20Book%201%20-%20Basics%20of%20Autocad%20(1).pdf

https://my.civil.utah.edu/~bartlett/CVEEN%201400/workbooks/Work%20Book%202%20-%20Basics%20of%20Autocad%20(2).pdf

Video

https://knowledge.autodesk.com/support/autocad/learn-explore/caas/video/youtube/watch-v-TBeDavql0lk.html

(50 minutes long)

Opening Standard Drawing Sizes

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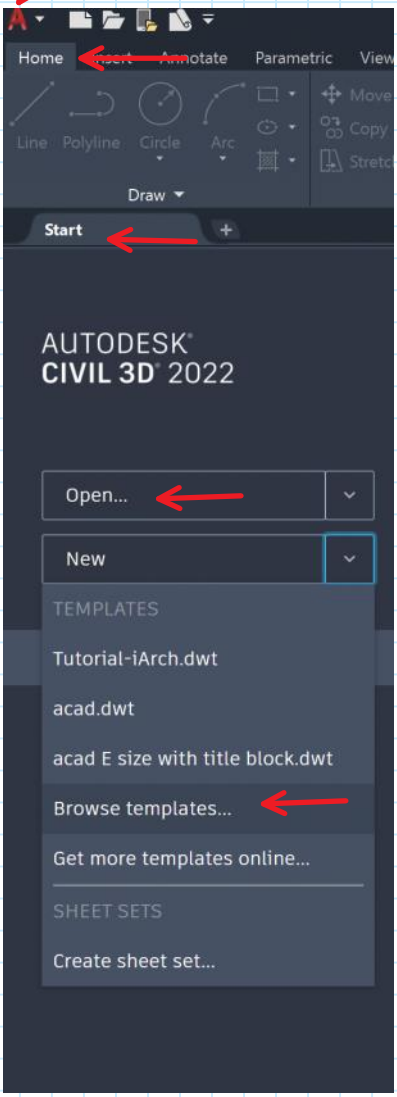
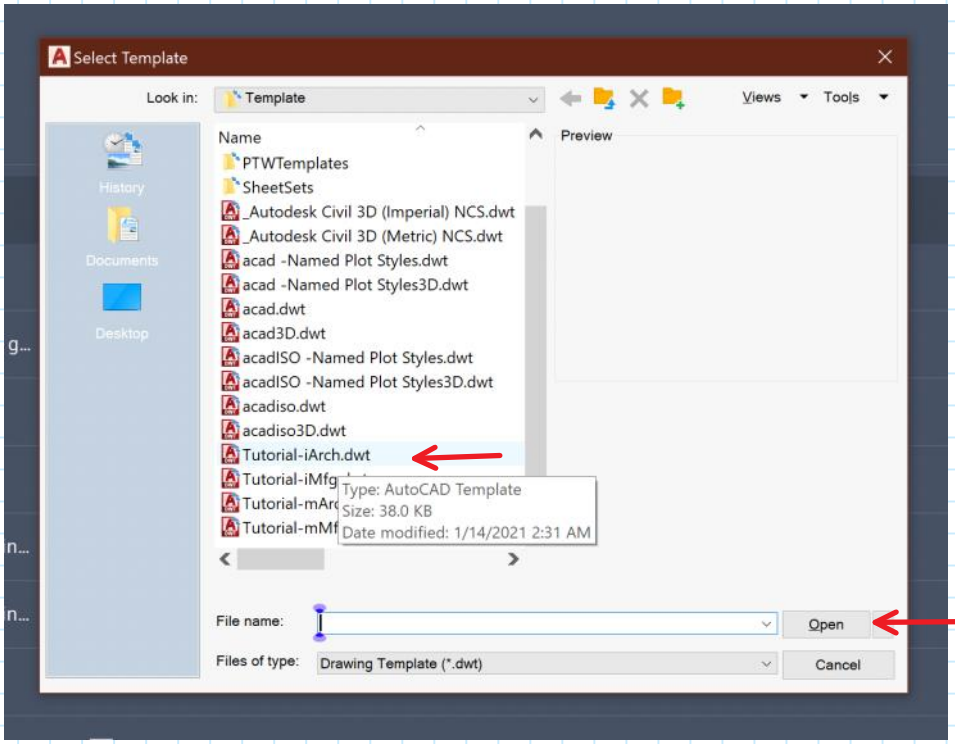
Standard US engineering drawing sizes according ANSI/ASME Y14.1 "Decimal inch drawing sheet size and formats" below:

ANSI	Size	
	(mm)	*(inches)*
ANSI A	215.9 x 279.4	8.5 x 11
ANSI B	279.4 x 431.8	11 x 17
ANSI C	431.8 x 558.8	17 x 22
ANSI D	558.8 x 863.6	22 x 34
ANSI E	863.6 x 1117.6	34 x 44

Opening a standard drawing template





Saving Files

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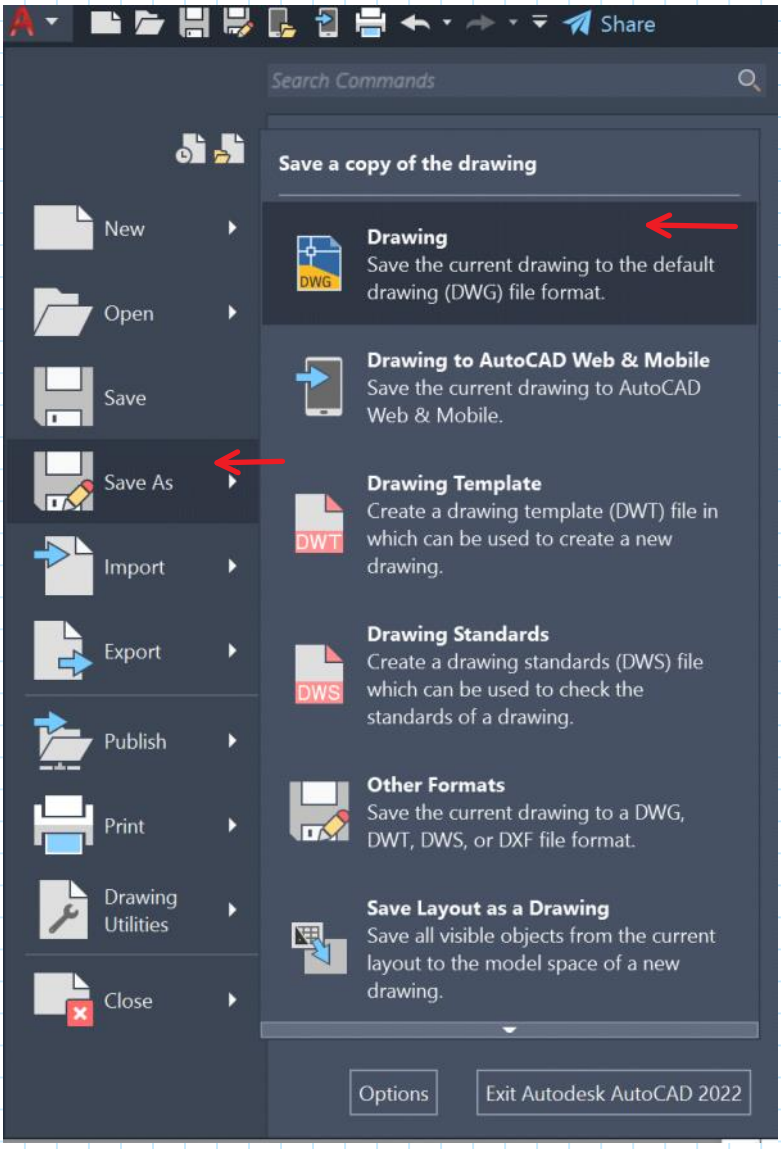
Saving Files



HW4_Lastname_Firstname.dwg

HW4_Bartlett_Steven.dwg

DO THIS FOR THE REMAINDER OF THE SEMESTER FOR ALL SUBMITTED FILES. HOWEVER, CANVAS CANNOT READ DWG FILES, SO SUBMIT THEM AS PD FILES. THIS PROCESS IS EXPLAINED IN THE NEXT FEW PAGES.

Printing Files to pdf format

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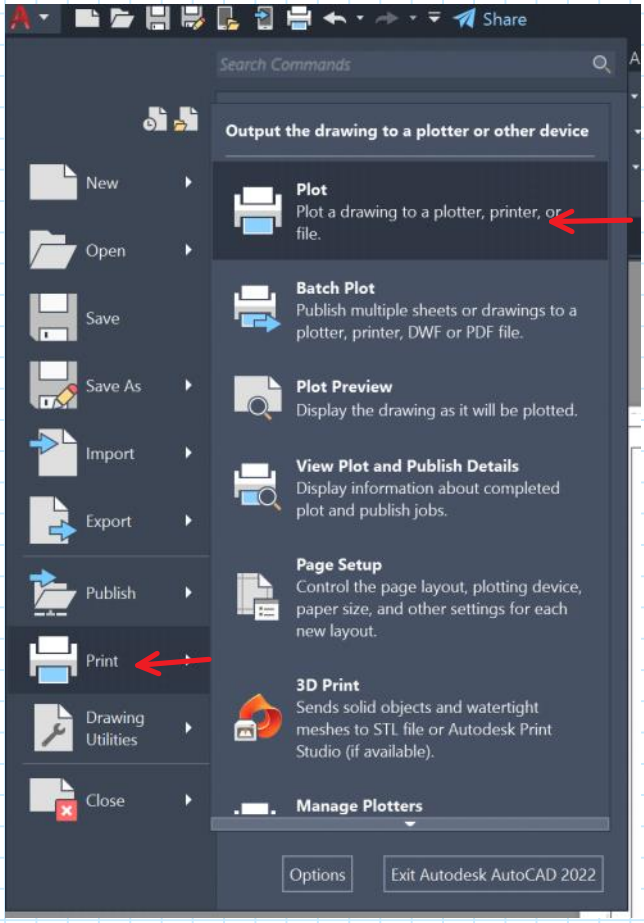

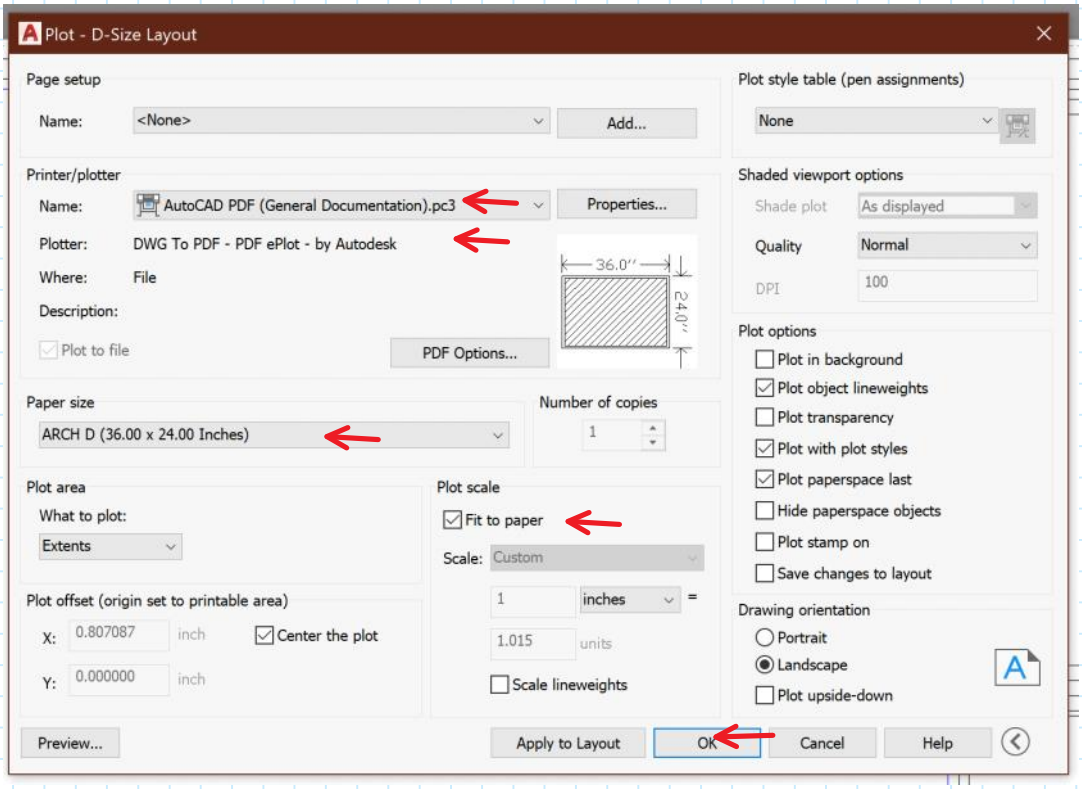

Printing Files (cont.)

Wednesday, February 1, 2023 1:48 PM

Introduction to User Interface

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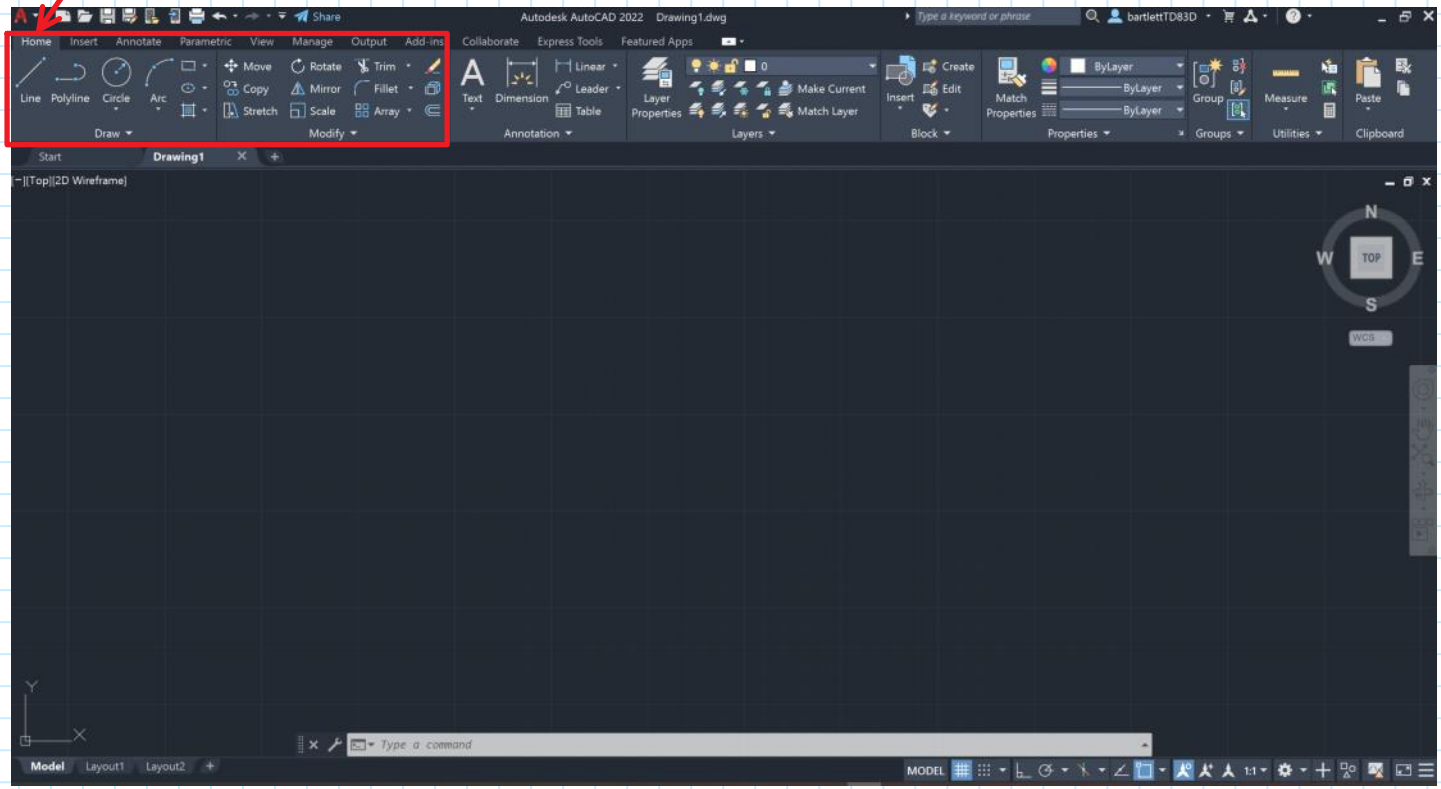
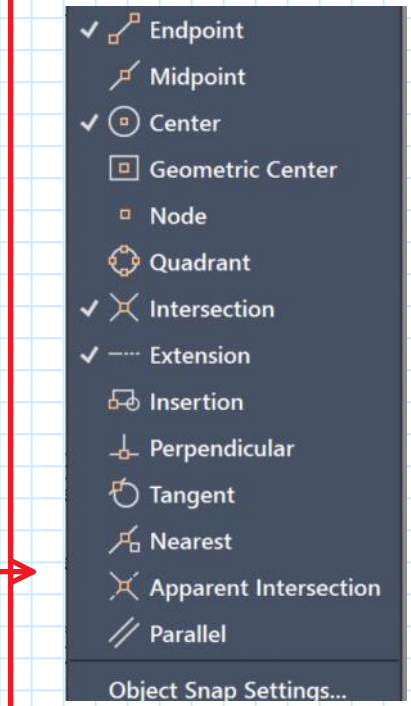


- Lines, Polylines, Circle, Arcs
  - Dynamic mode <on> for angle and length
    - 

  - Object Snap <Osnap>
    - 



Drawing Lines - Setting up the dynamic input

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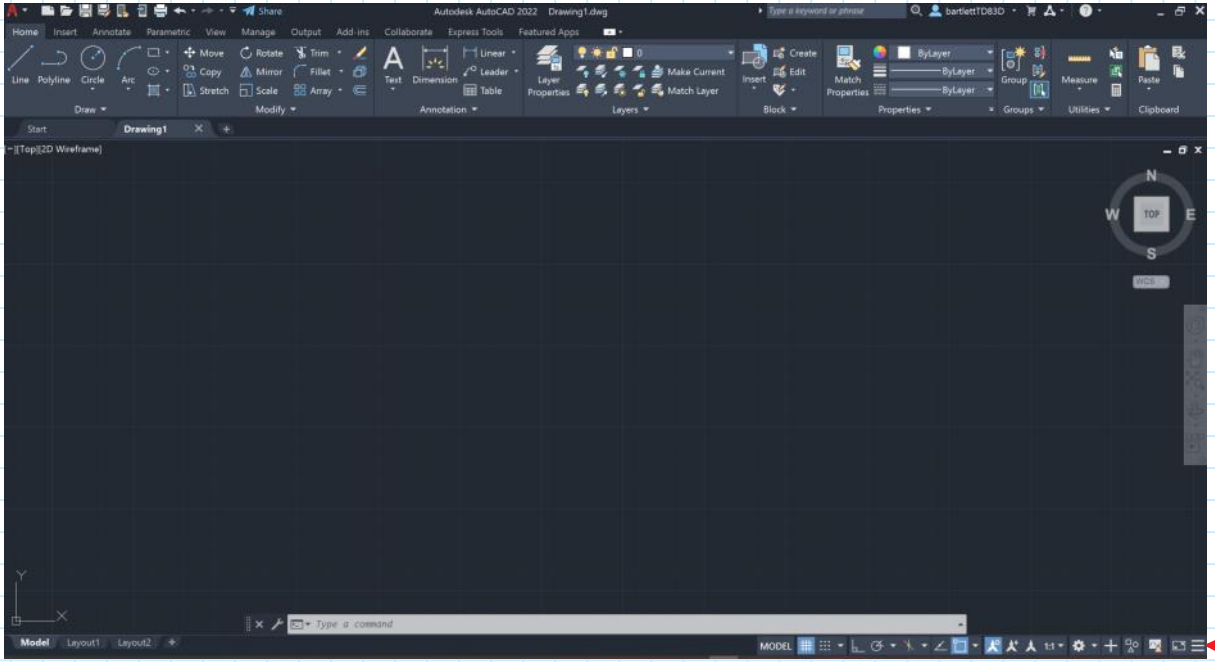

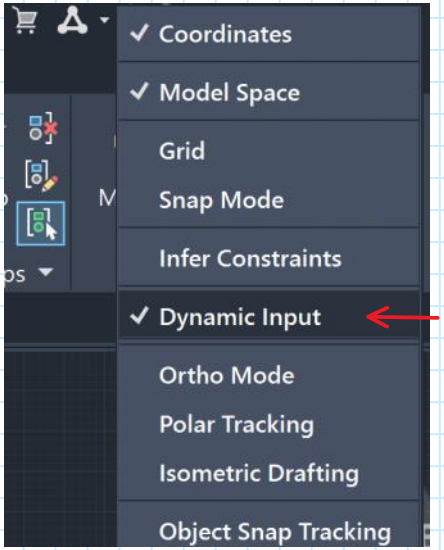

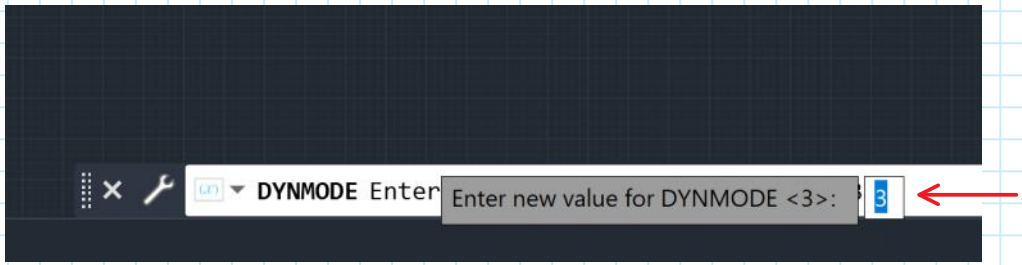

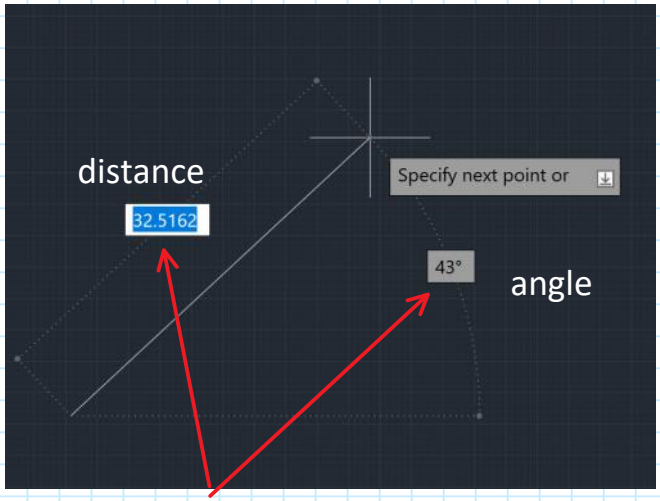

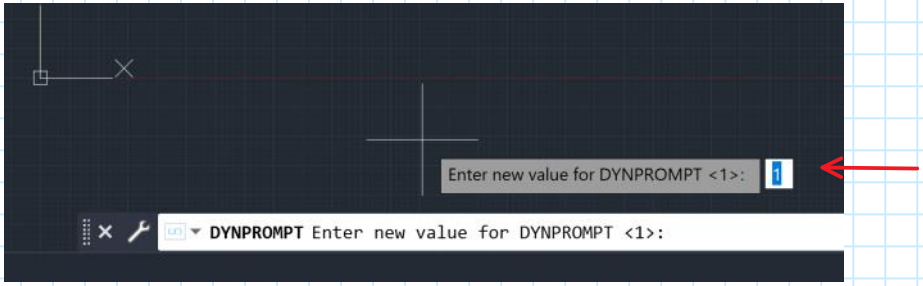

Use the tab key to toogle between these input boxes. Hit enter key when done

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Drawing Lines - Trimming (cont.)

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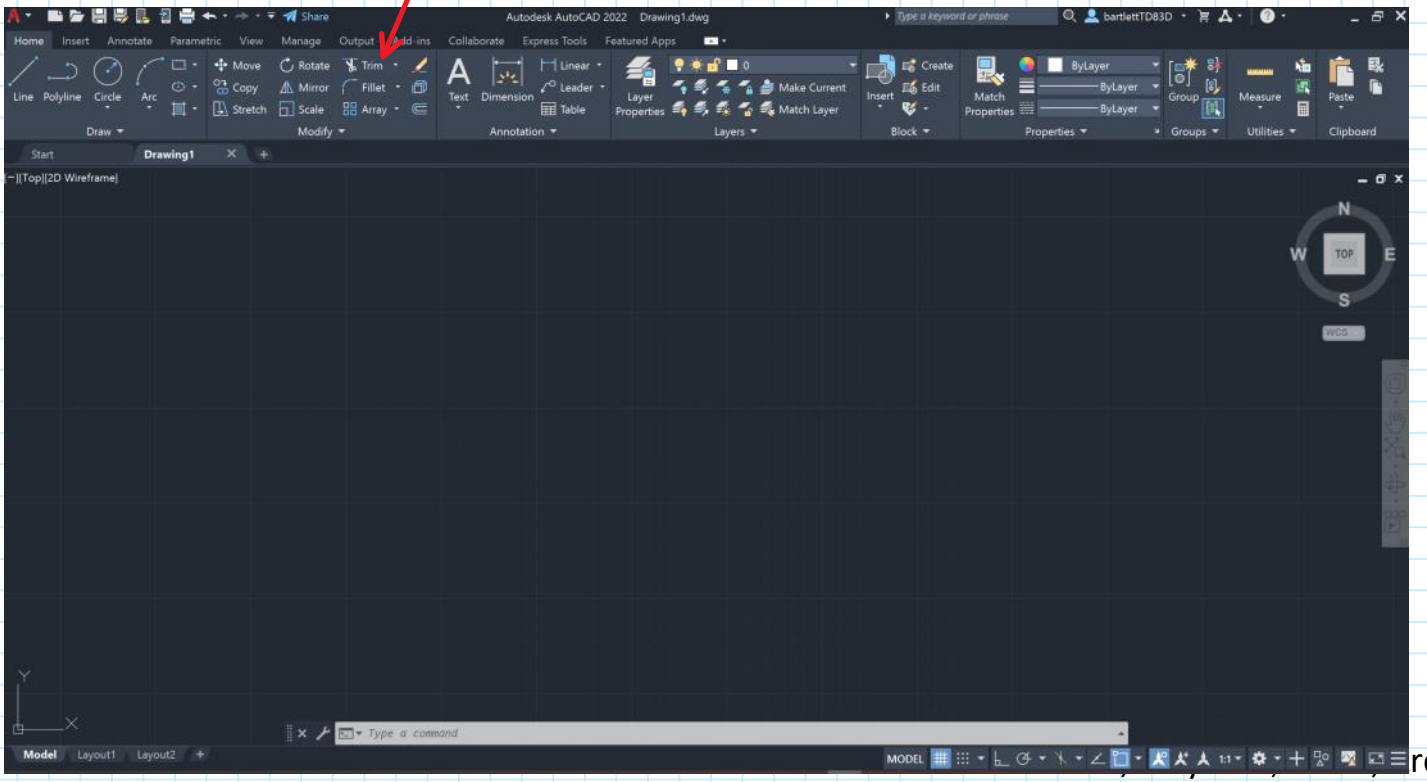
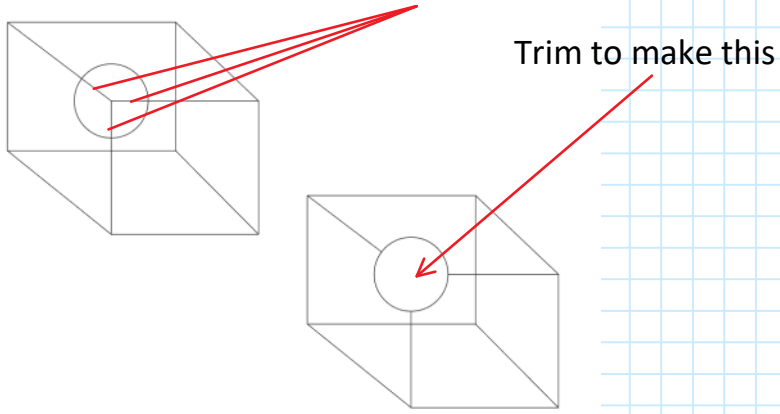


rcs (cont.)

TRY THIS IN CLASS USING THE TRIM COMMAND. REMOVE THE CORNER OF THE BOX AS SHOWN IN THE BOTTOM RIGHT DRAWING.



UNITS for drawing space

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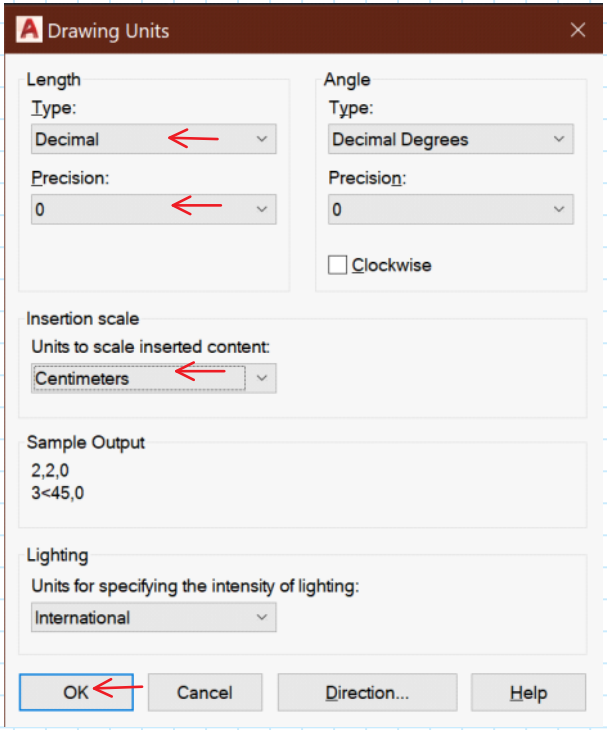
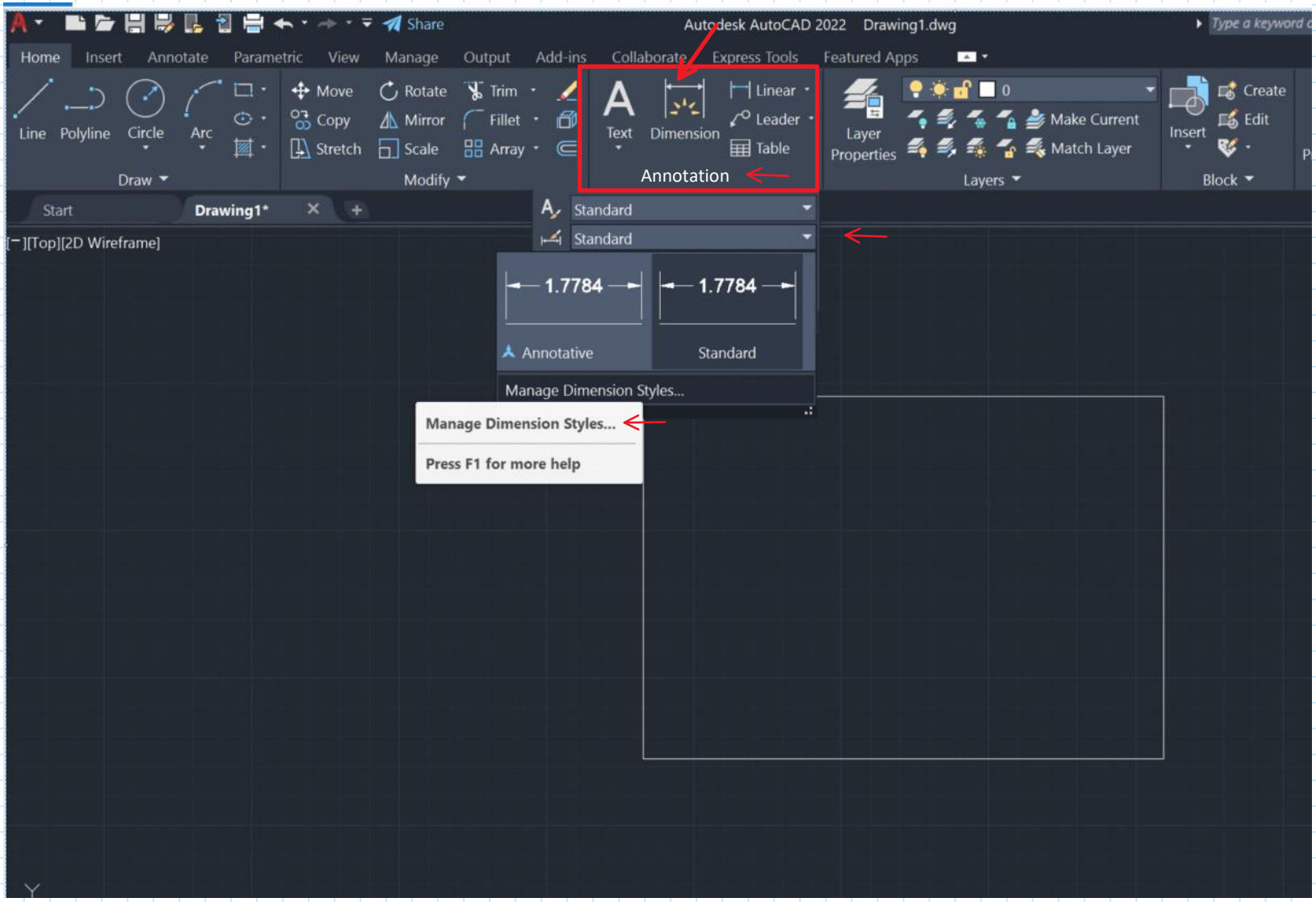
In the command line, type units and the below screen will appear.

Change the Type to Decimal and Precision to 0 and the Insertion Scale to Unitless.



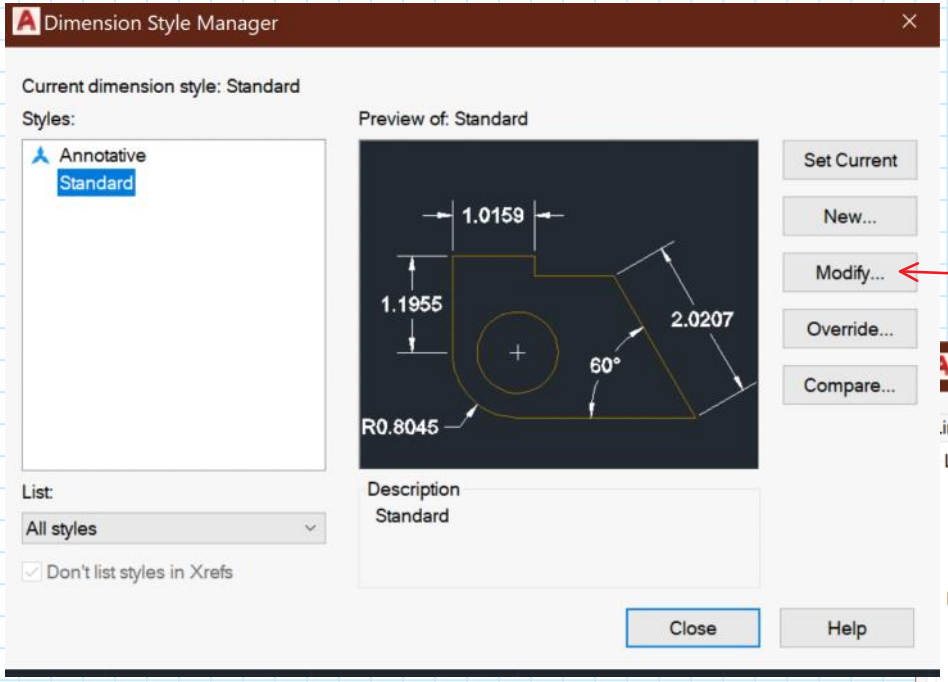
UNITS for dimensioning

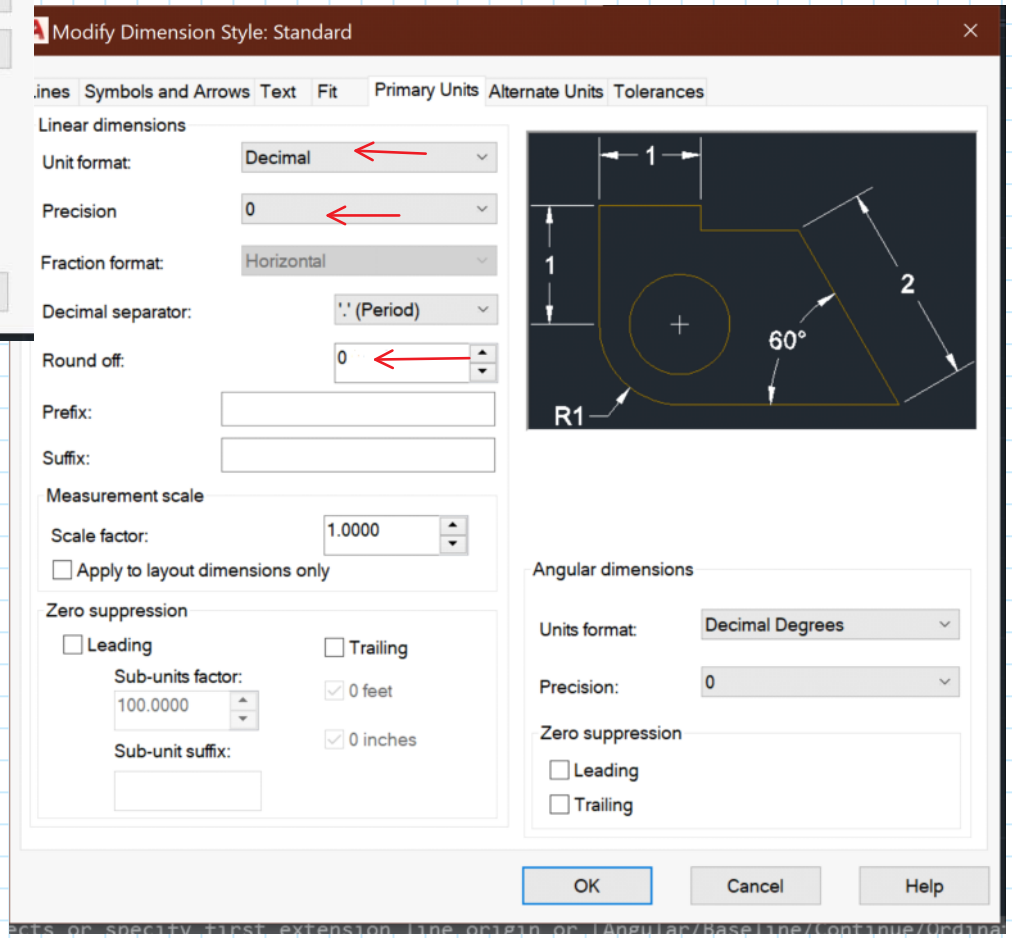
Wednesday, February 1, 2023 1:48 PM



UNITS for dimensioning (cont.)

Wednesday, February 1, 2023 1:48 PM





Dimensions - Font Size

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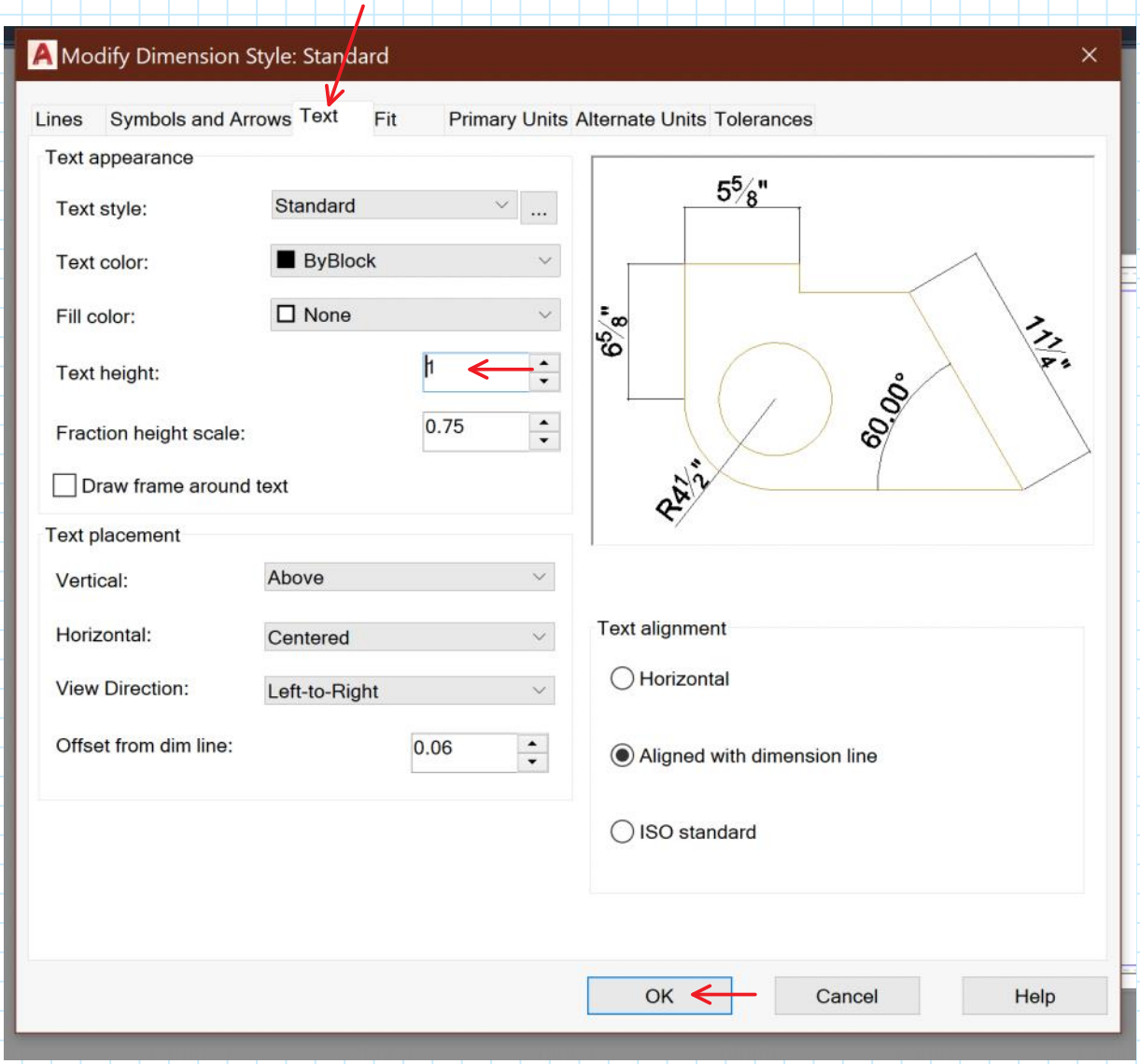

This font size can be changed for the dimension lines to make them visible on the drawing.

CLOSE ←

Dimensioning

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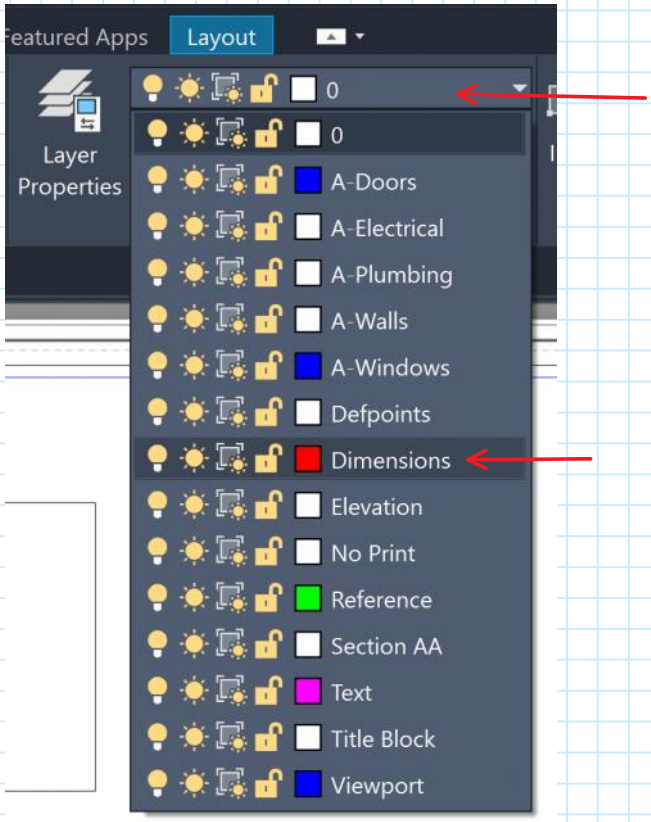
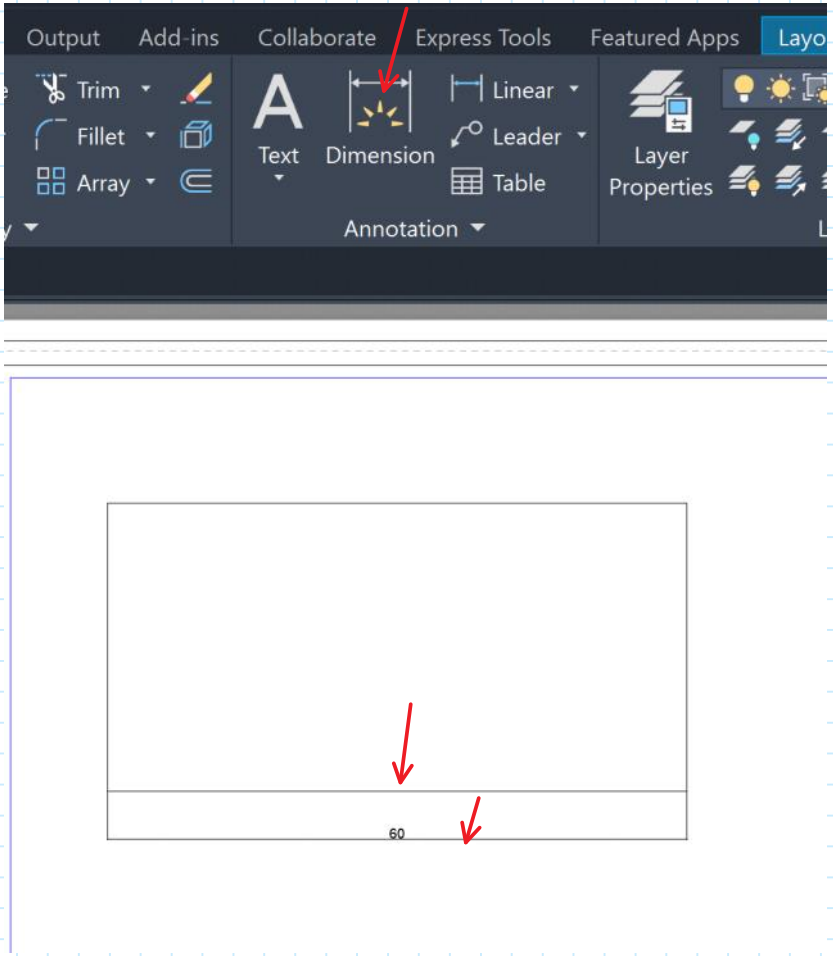


1. From the home menu tab, select the layer box.
2. Change the active layer from layer 0 to layer Dimensions. Note that the default color for this layer is red. This is the color we want for our drawing.



1. From the home menu tab, select Dimension
2. Select Object for Dimensioning in the drawing space. The dimension line will be created.
3. Pull away (downward) to set the distance for dimension away from the object line

Preparing Drawing Space for Printing

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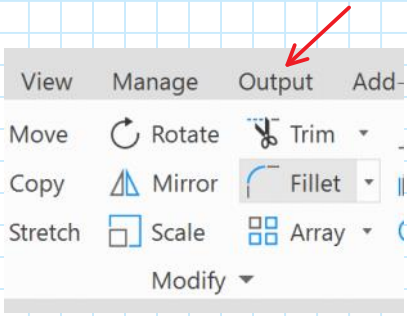

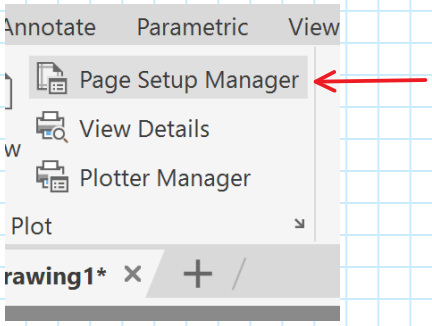

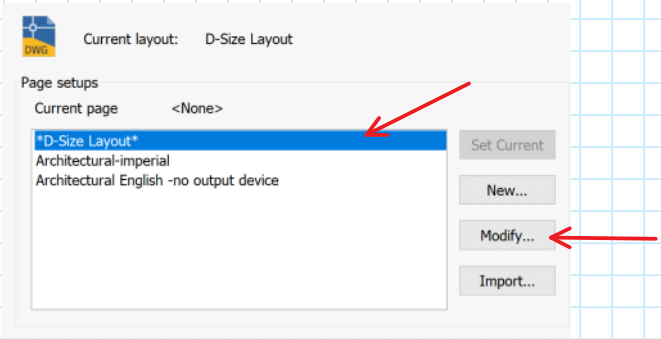

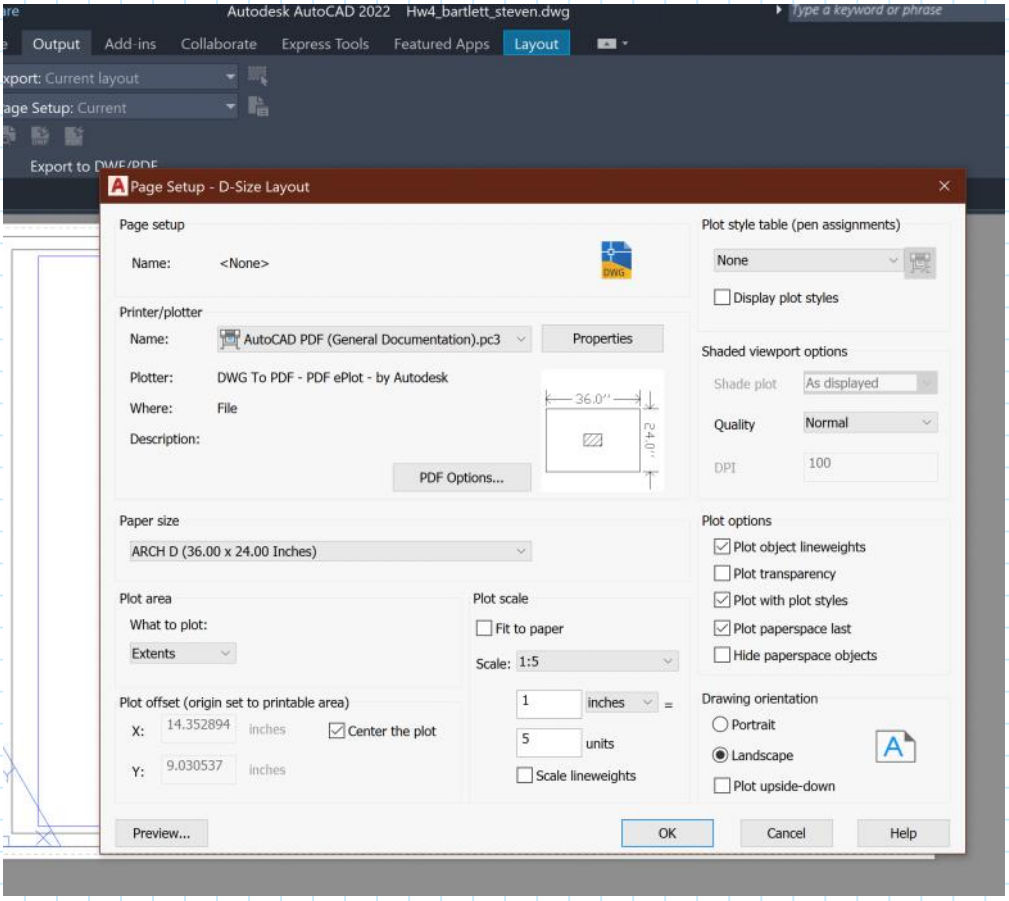

Preparing Drawing Space for Coordinates (cont.)

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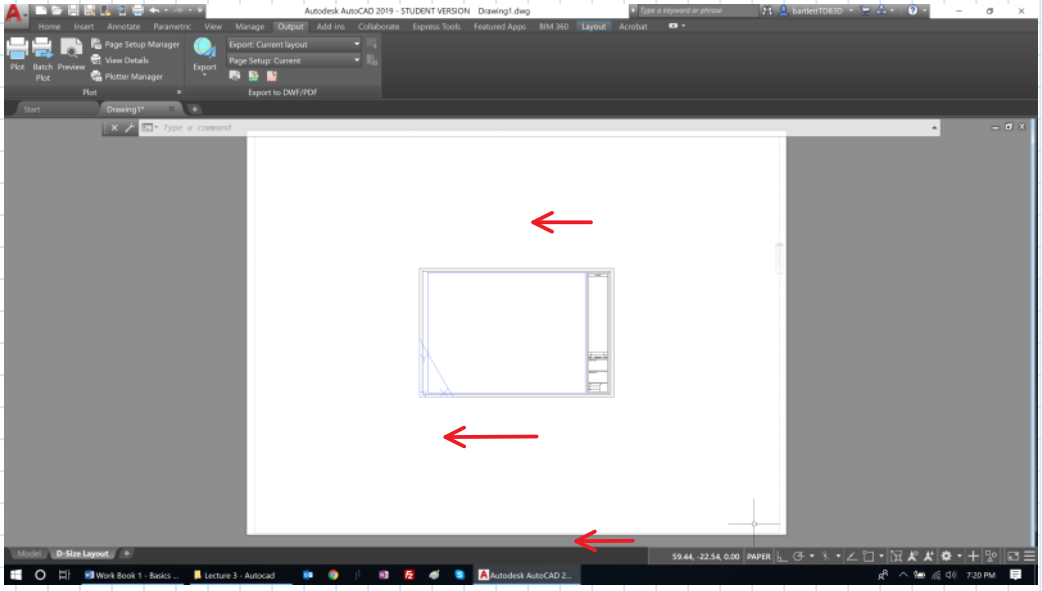
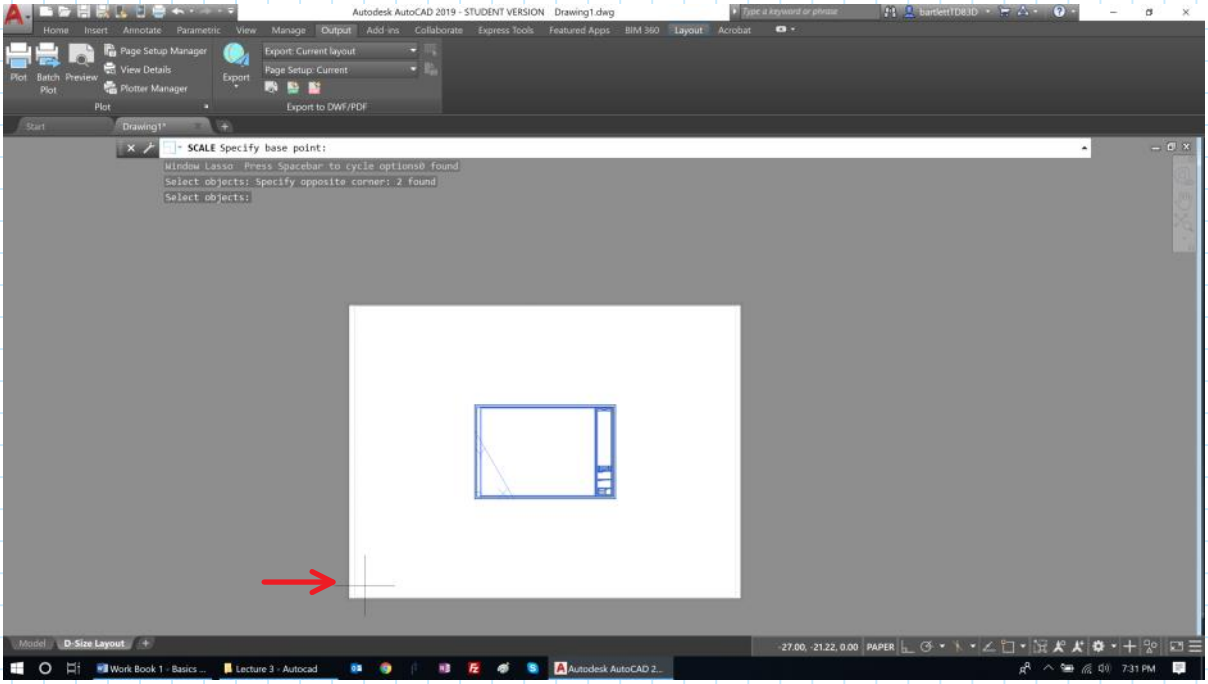


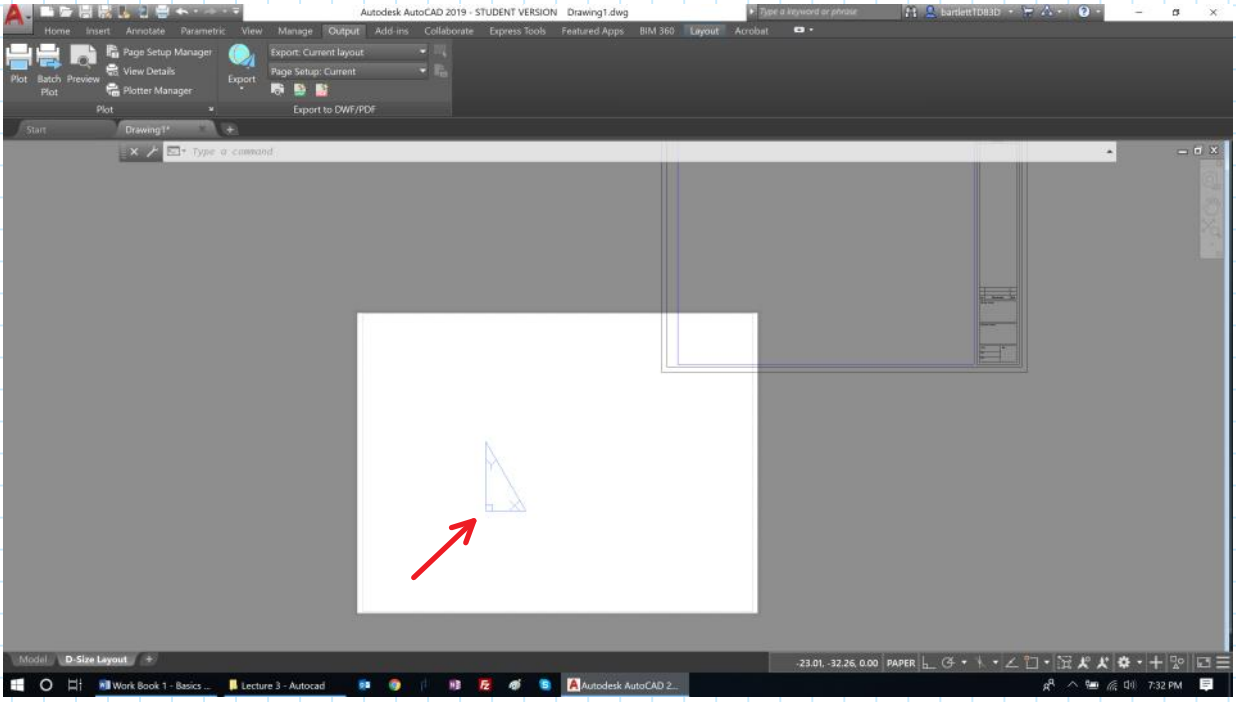
Note that the title block is too small and needs to be enlarged. Do this by typing Scale in the command box and select the title block.

Preparing Drawing Space for Coordinates (cont.)

Wednesday, February 1, 2023 1:48 PM



Select the base point in the lower left-hand corner of the drawing. Push the cross-hairs to the right and the drawing box will increase in size.



The Scale 1:5 allows for drawing objects to fit on the “D” size drawing. (Remember we need enough room for the all objects and the dimension lines)

Preparing Drawing Space for Coordinates (cont.)

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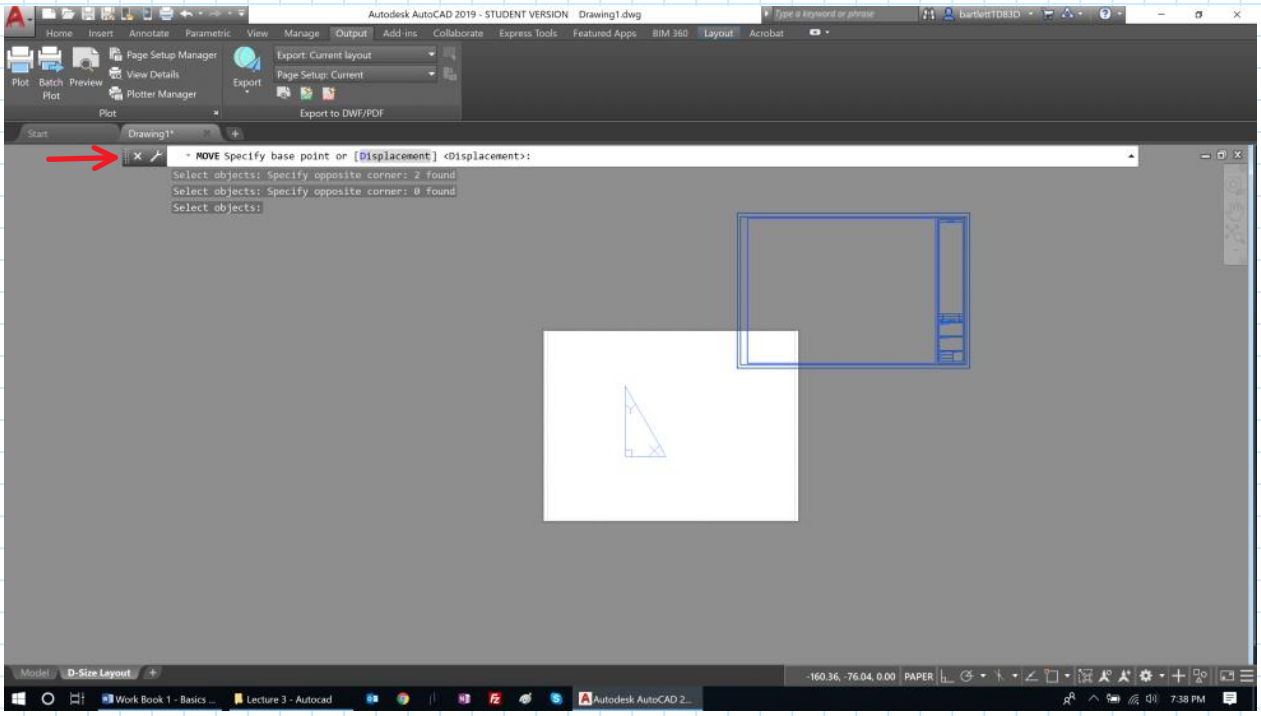
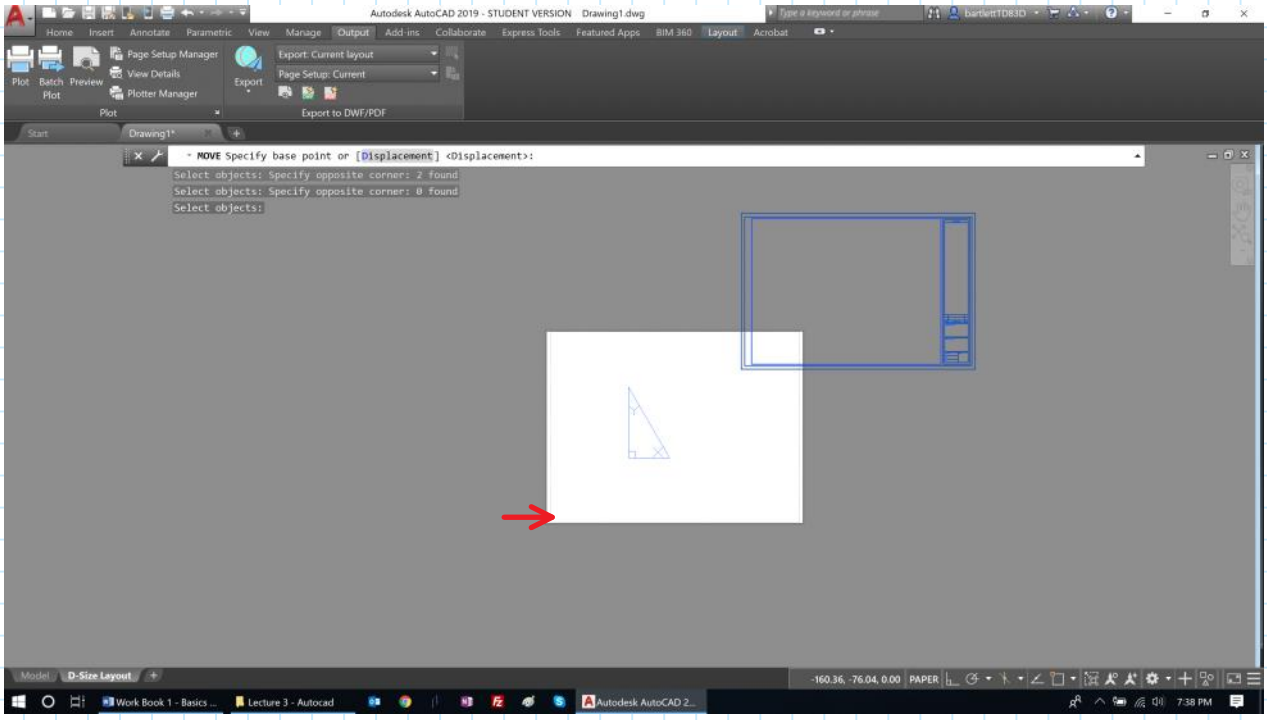
Strike the enter key.



. .



Select the second point at the lower corner of the drawing and drag the title block back onto the paper.

Preparing Drawing Space for Coordinates (cont.)

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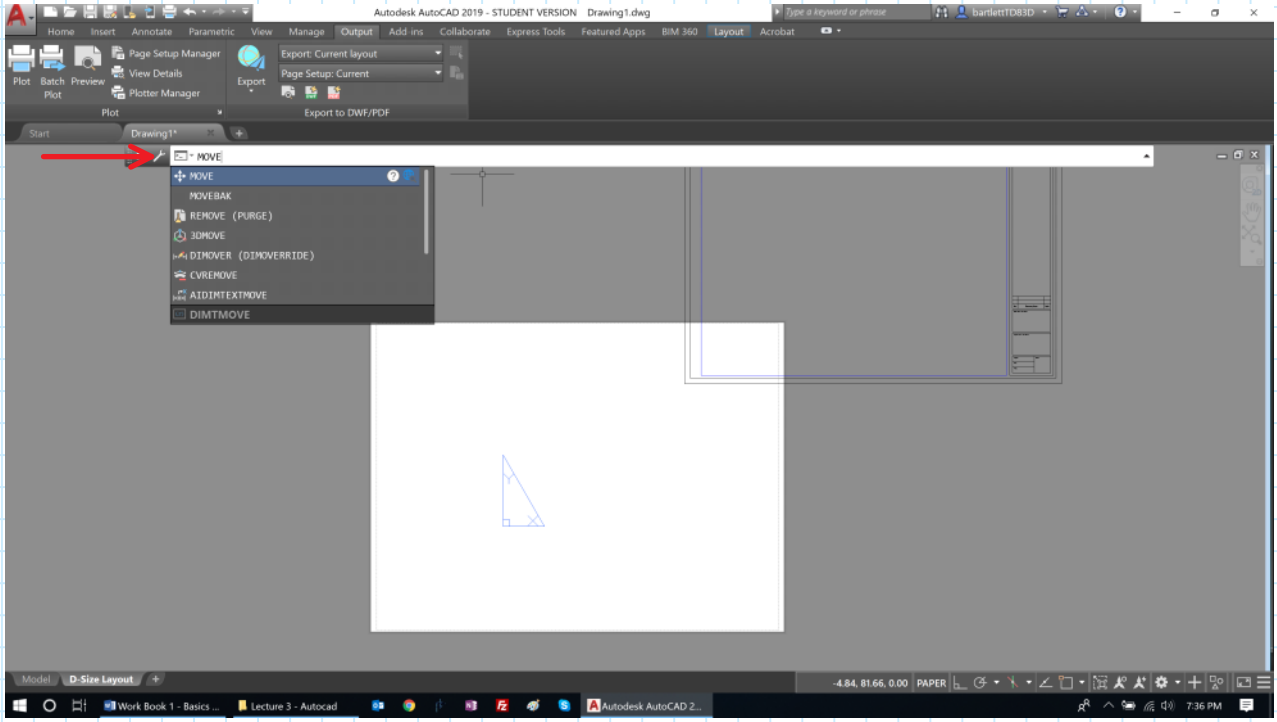

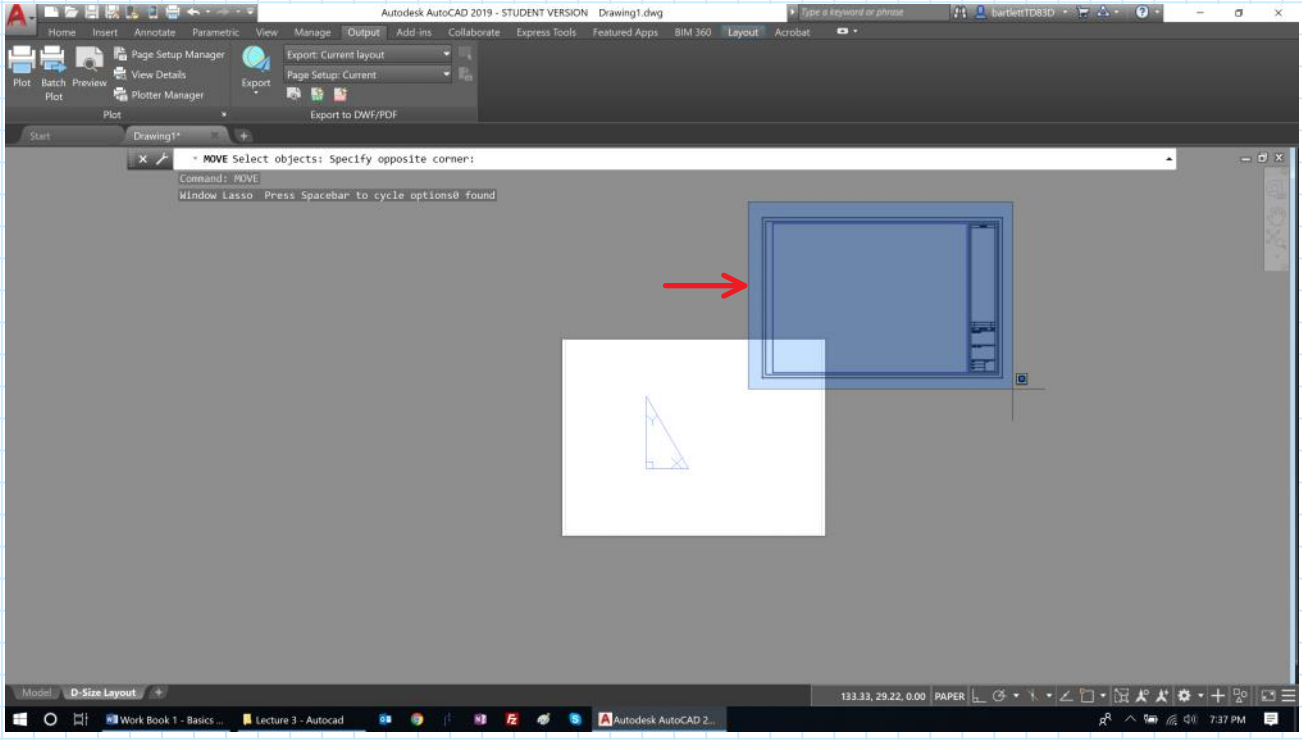

Preparing Drawing Space for Coordinates (cont.)

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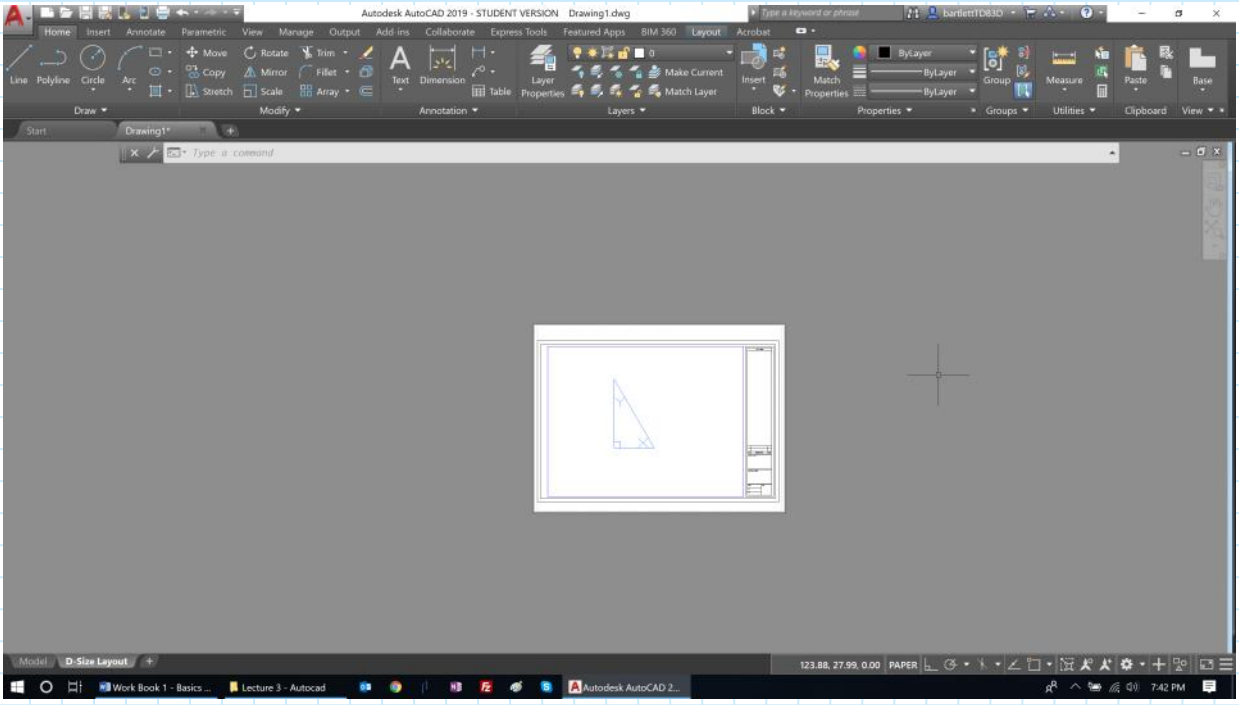

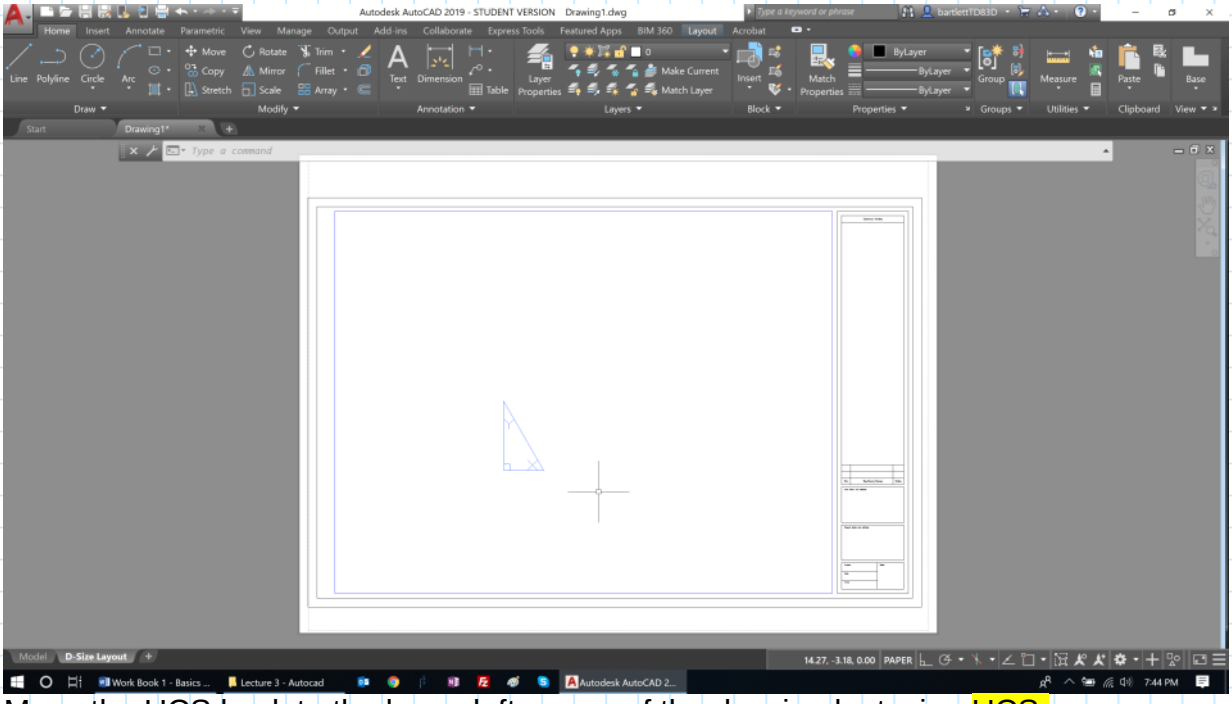

Move the UCS back to the lower-left corner of the drawing by typing UCS (User Coordinate System) in the command line.

Preparing Drawing Space for Coordinates (cont.)

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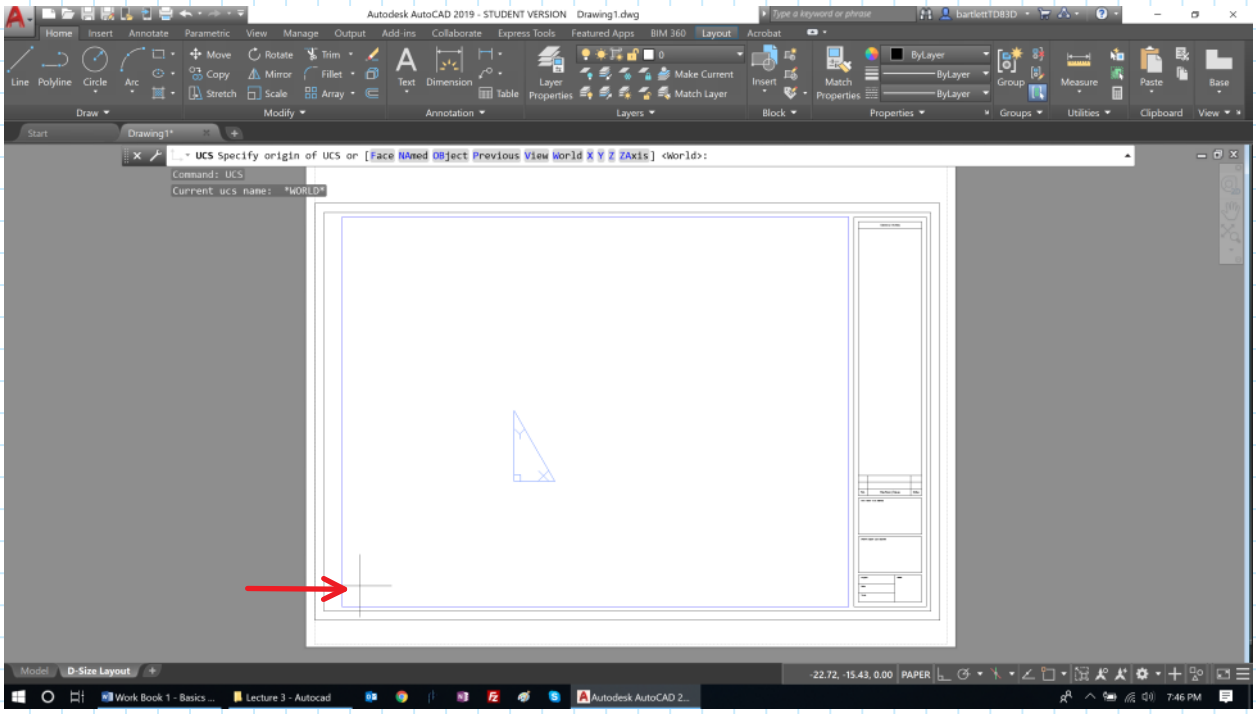
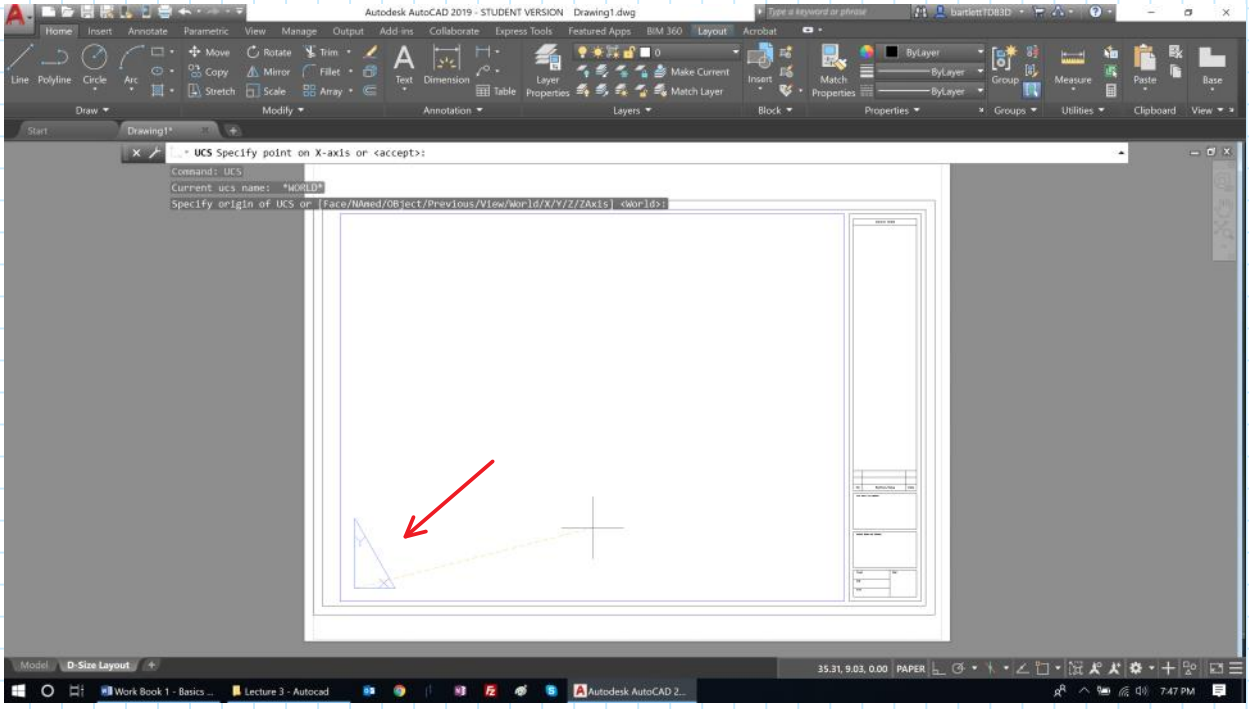


Click on the lower-left corner of the drawing to move the coordinate system to that location and strike the enter key.



Isometric versus Orthographic View

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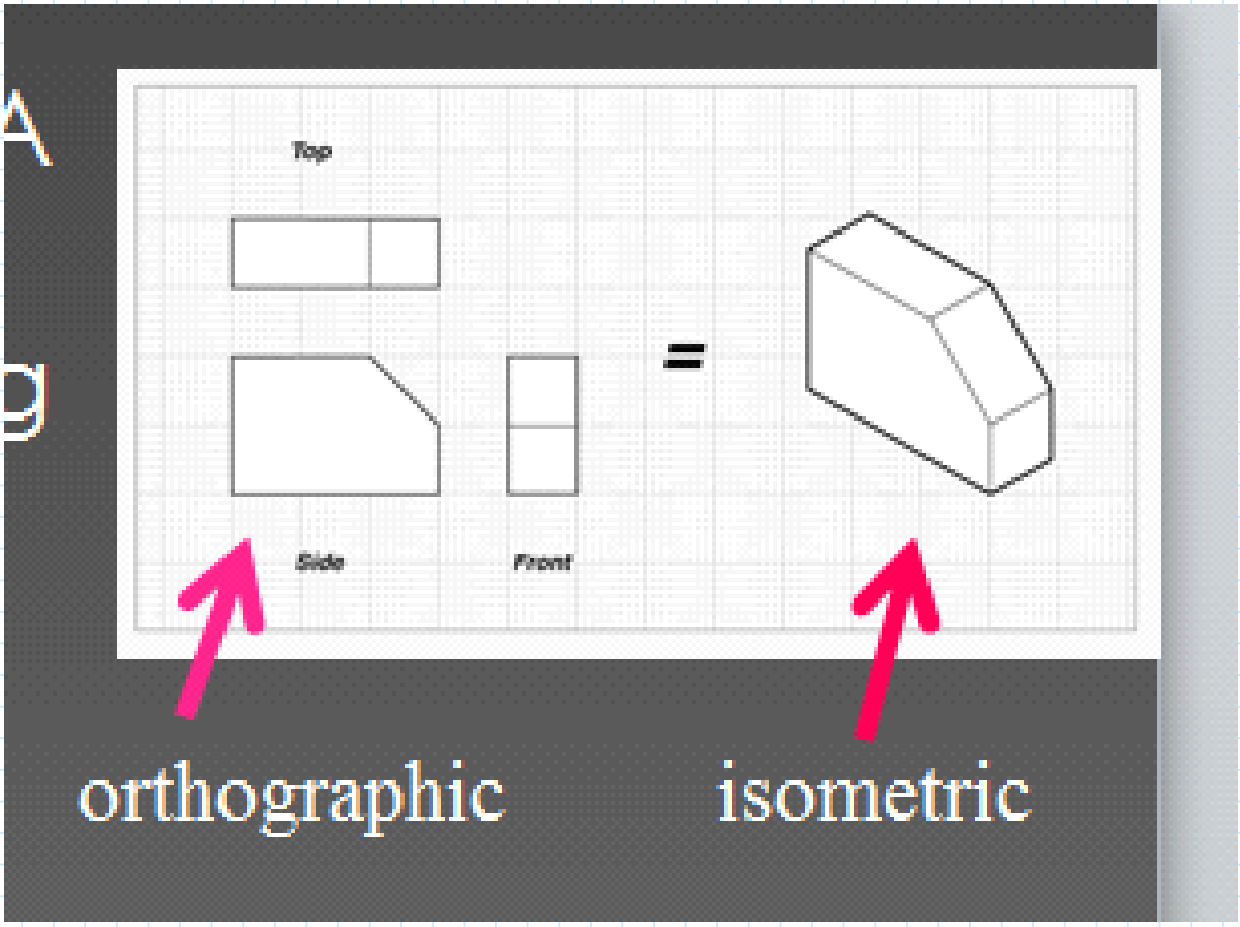

https://o.quizlet.com/jyokiXb0TBX3eEJKoz4G4A.png

Preparing Drawing Space for Coordinates (cont.)

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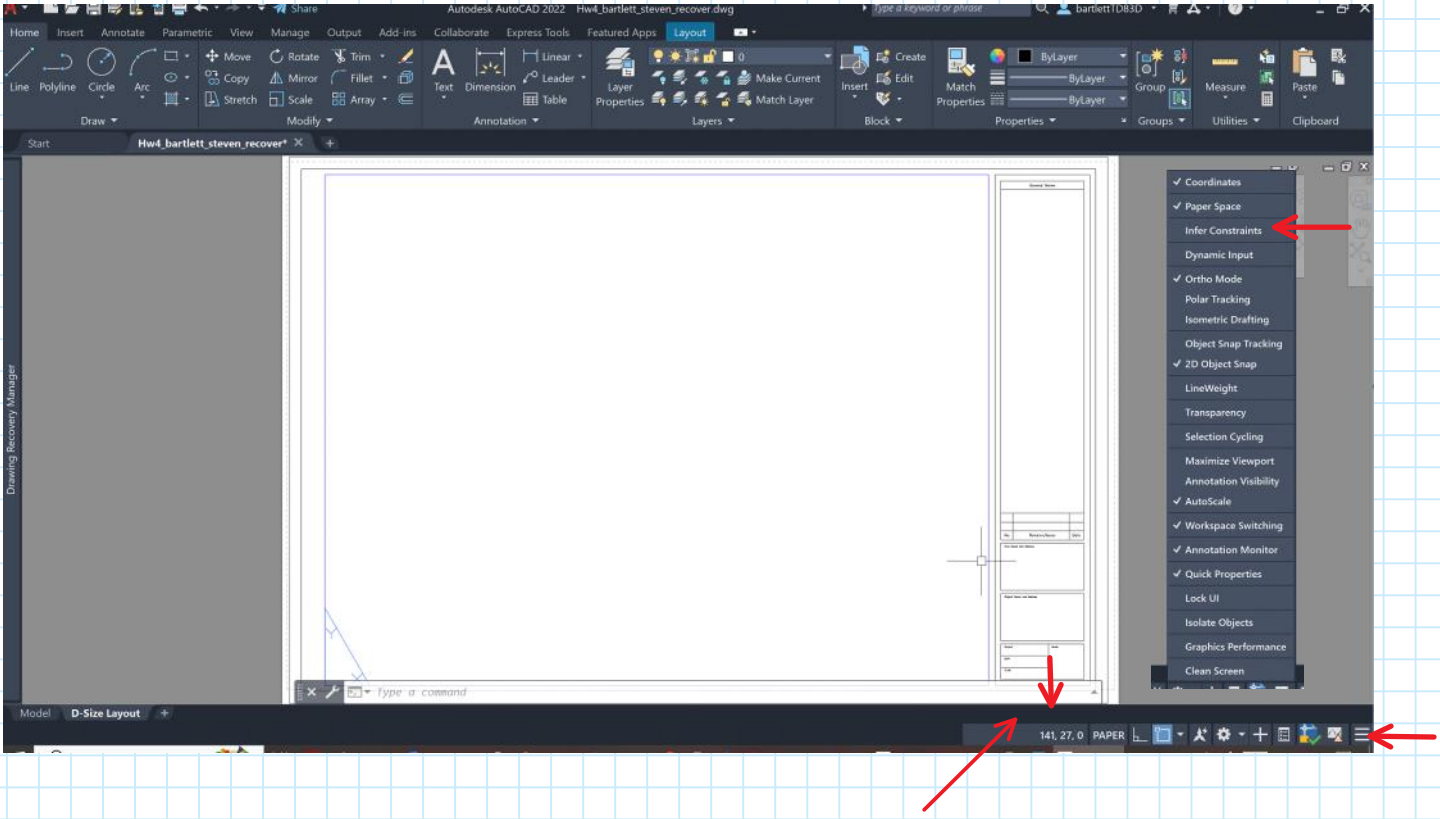
Turn on the coordinate system by selecting the pop-up menu at the bottom of the screen, then select coordinates in the pop-up menu. The coordinates will then be displayed.



Verify that your drawing object(s) will fit in these dimensions. Remember to account for dimension lines. For this homework, we need about 140 units in the x direction.

Orthographic View of a 3D Projection

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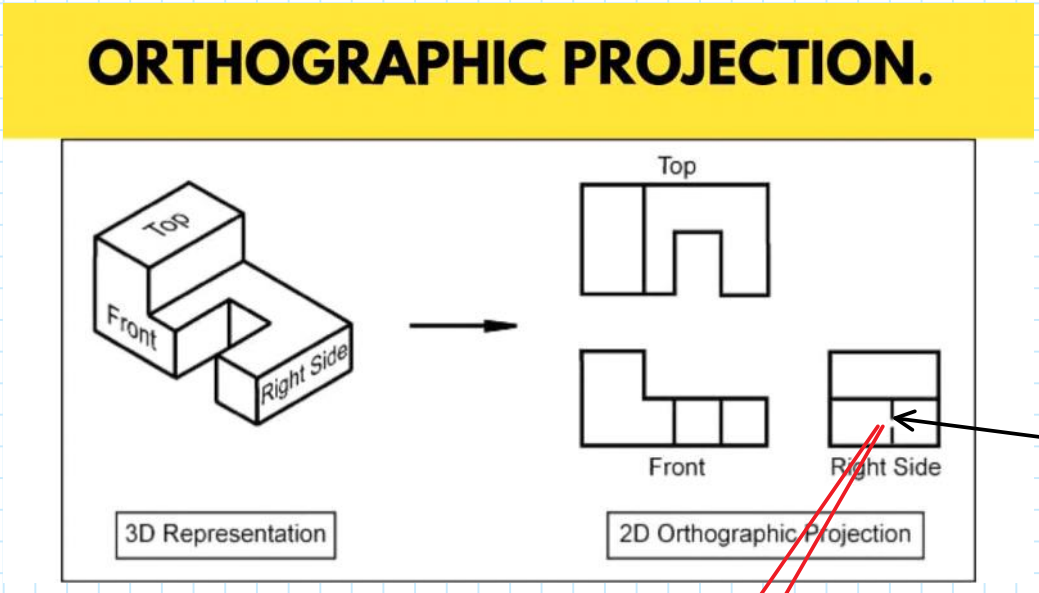

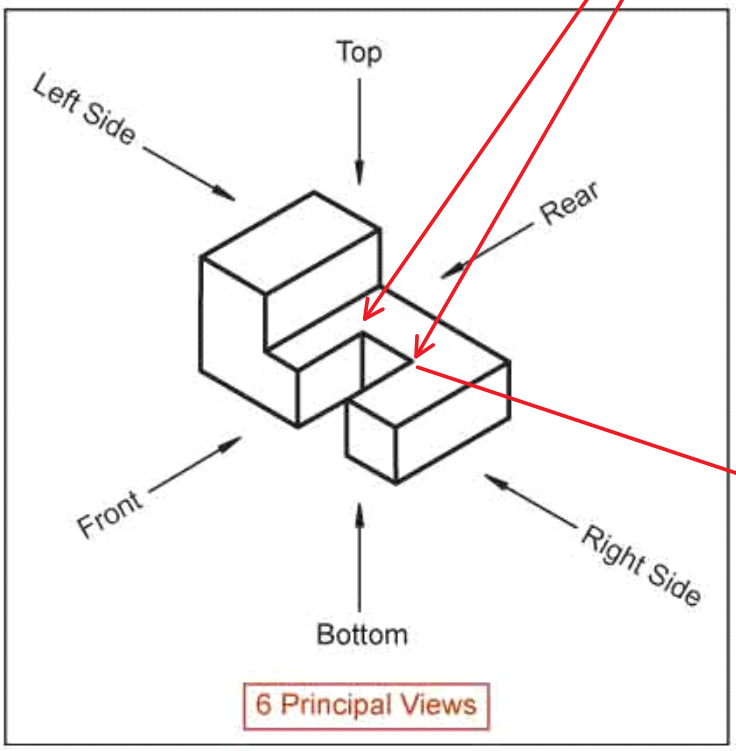

This is a hidden line. This type of line shows an interior line or feature that is present in the 3D object but is not directly observable from the particular view being drawn. Hidden lines are usually shown as dashed or dotted lines.

Dashed line

– – – – – – –

Dotted line

. . . . . .

https://civilseek.com/orthographic-projection-drawing/

Orthographic Projections

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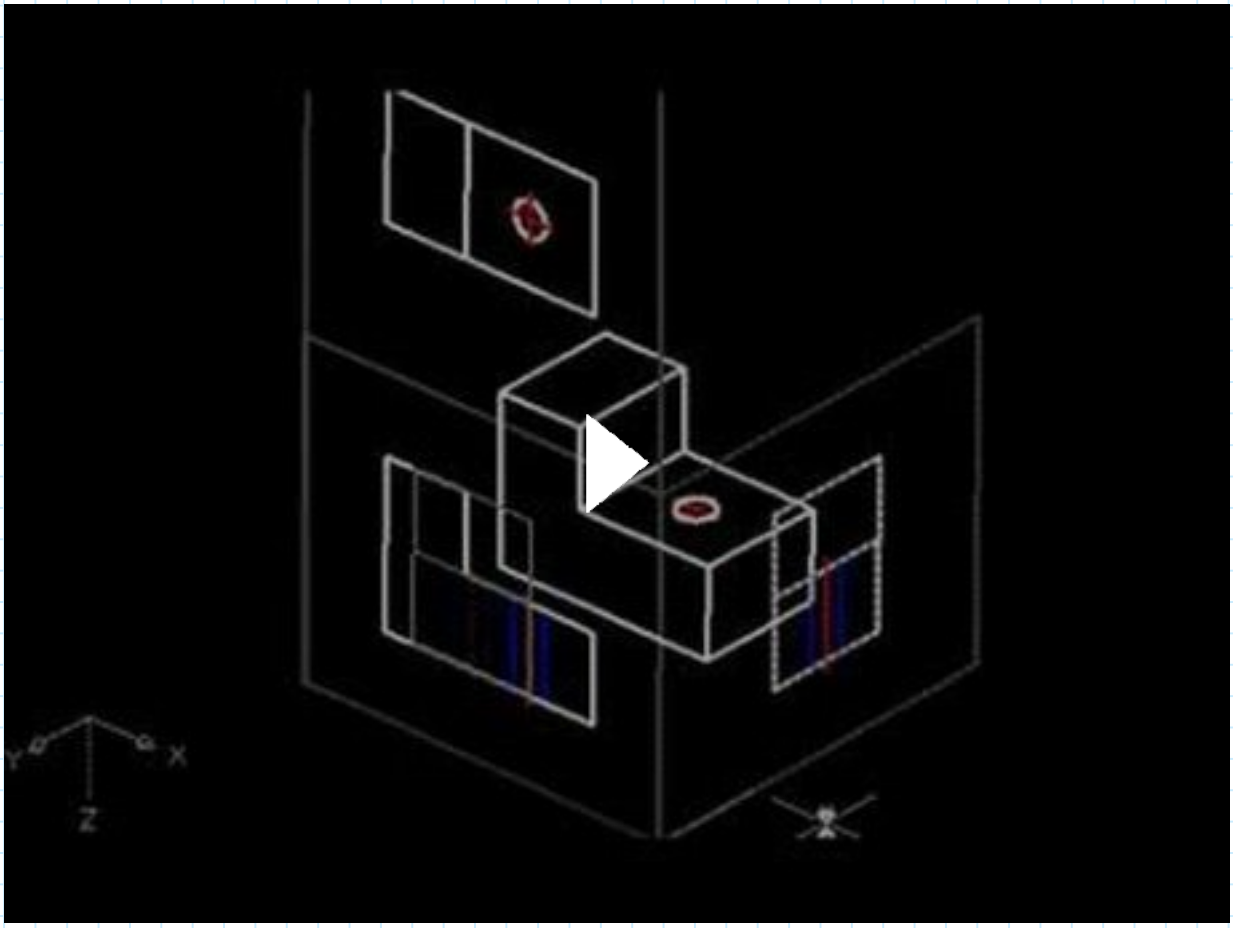
Orthographic Projection

ManufacturingET



Note: This video does not have sound. It shows construction of the top, front and side orthographic projections for an isometric drawing.

Examples

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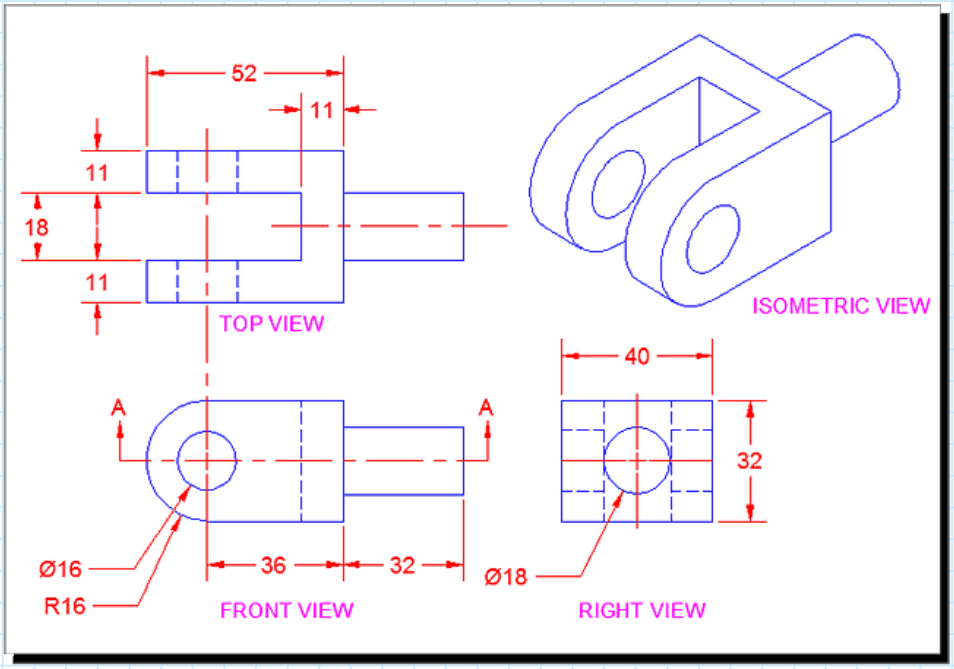
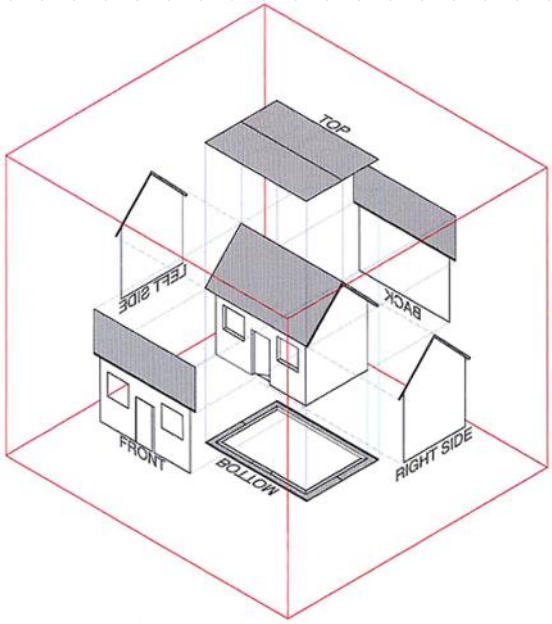
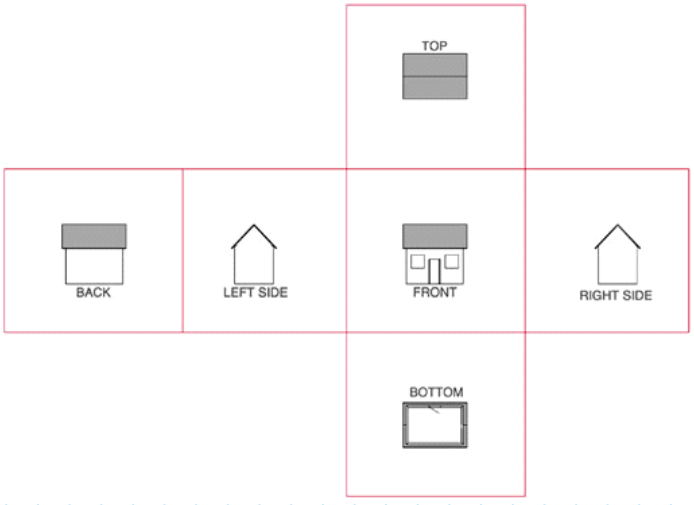


https://www.mycadsite.com/tutorials/level_1/orthographic-projection-in-AutoCAD-tutorial-1-12.htm

Example 1 (Note for your assignment, you do not need to include the isometric view that is shown in the upper right corner of the drawing.)



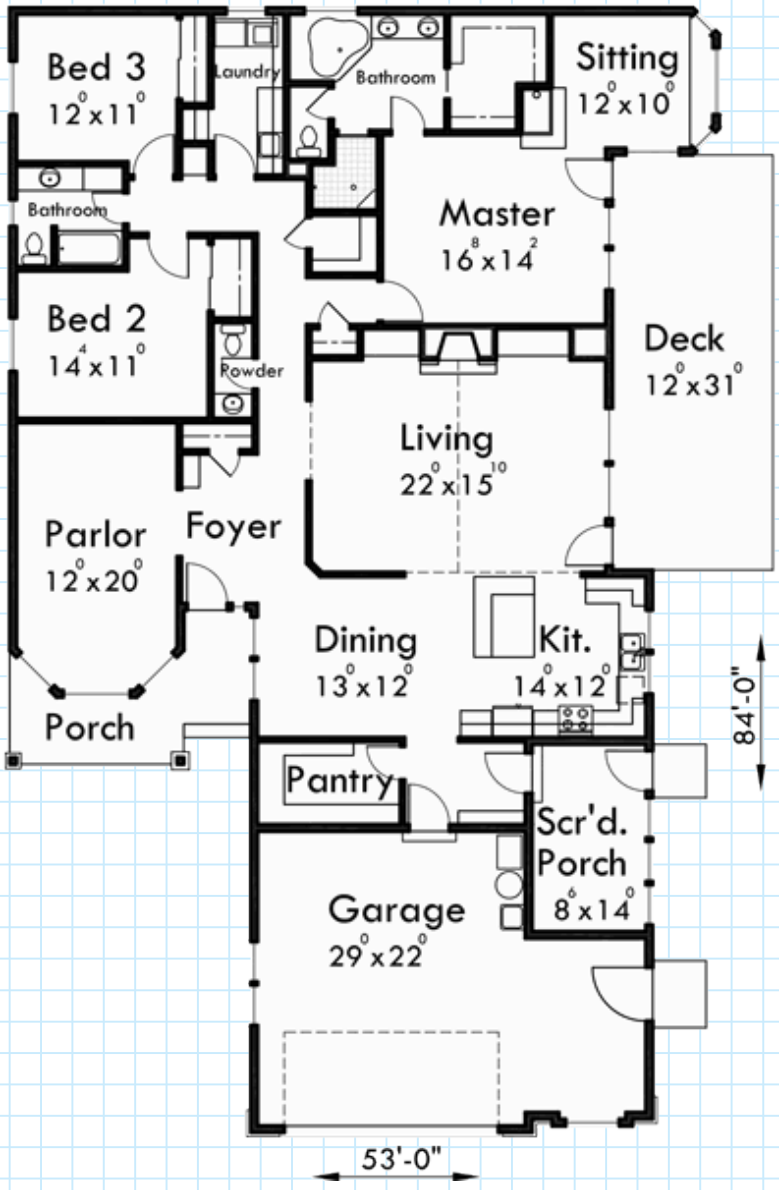


http://faculty.arts.ubc.ca/rgardiner/crslib/drft_1/orthint.htm

Example 2 - Orthographic projection of a house.

Examples (continued)

Friday, January 27, 2023 1:48 PM



Floor Plan (top view inside)

Examples (cont.)

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https://www.houseplans.pro/plans/plan/10079

Front View

Left View

Right View

Rear or Back View

Examples (continued)

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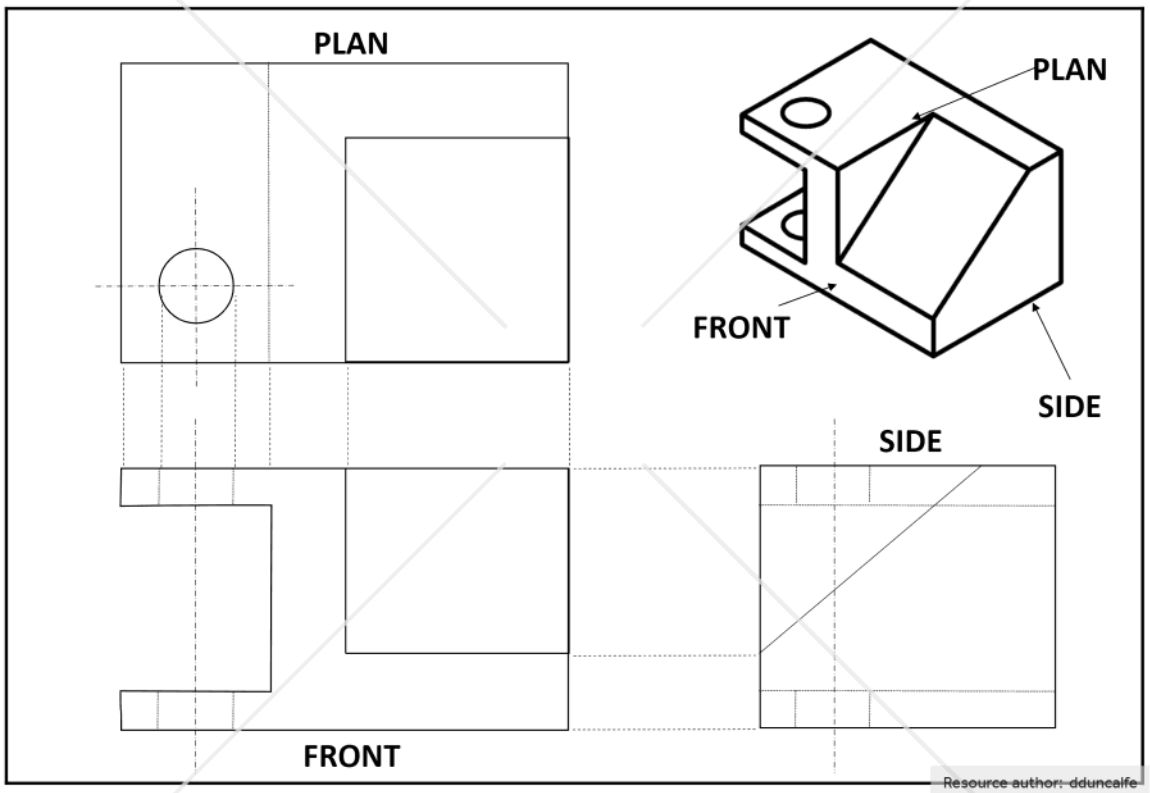

Example 3. (This example shows proper layout of the object, but does not include dimensions. You must include dimension for your assignment).

https://www.tes.com/teaching-resource/orthographic-worksheet-11294520

Making Orthographic Projections

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[Engineering Drawing Orthographic Projection lecture | Vidyalankar Classes]

Vidyalankar Group of Educational Institutes

Making Orthographic Views in AutoCAD

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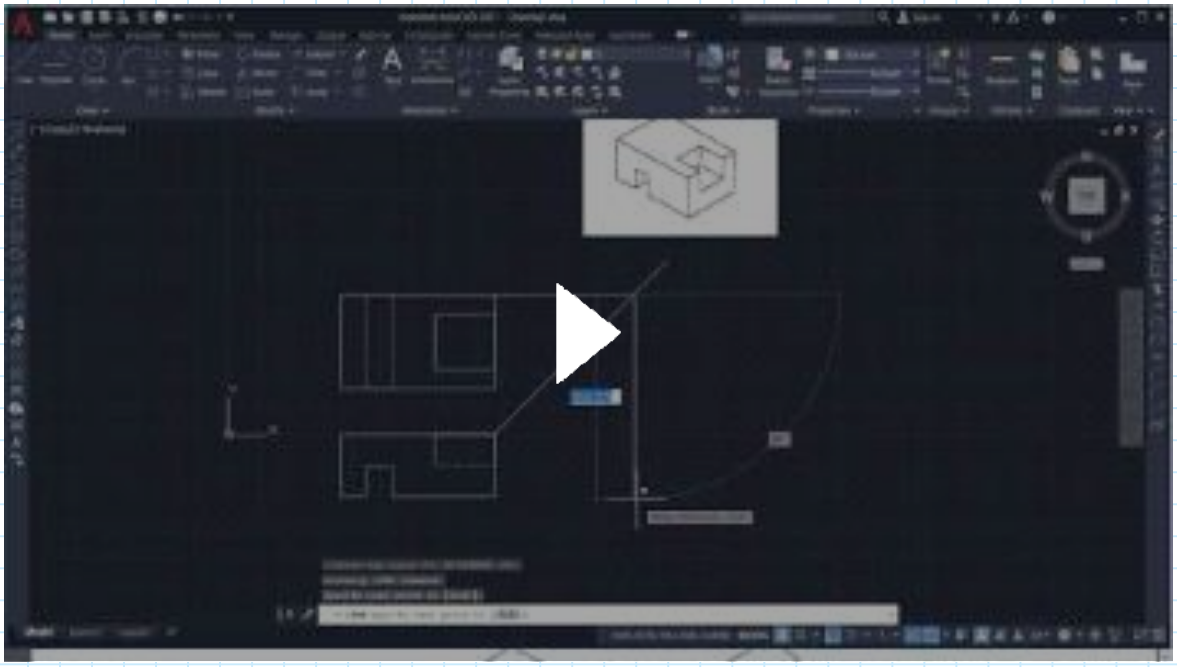
[AutoCAD Orthographic Projection Example 1 [Multi View Drawing]]



Tips

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Selection of View.

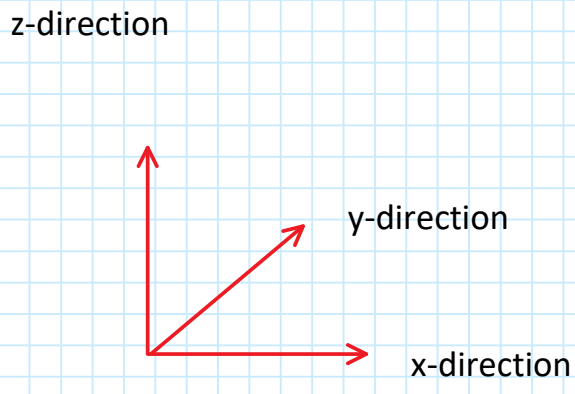
Following points should be kept in mind at the selection of view,
1. The more detailed view should be selected.
2. The selection of view with maximum detail should be made.
3. The selection of view with more internal details should be made.
4. The selection of view of required details should be made.

From <https://civilseek.com/orthographic-projection-drawing/>

Rules of Orthographic Drawing.

Following rules should be followed while forming orthographic drawing.
1. Front view and top view always form over/under each other. That is top view is at the top of the drawing and front view is at the bottom.
2. The front view shows the length and height of an object. (Length = x-direction, Height = z-direction).
3. The side view shows the breadth and height of an object. (Breath = y-direction, Height = z-direction.
4. The top view shows the length and breadth of an object.
5. Side view is placed beside the front view.
6. Projection line always forms by the meeting of two surfaces.
7. The hidden detail of an object is always shown by a dashed or dotted line. This is called a hidden line.

From <https://civilseek.com/orthographic-projection-drawing/>



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