

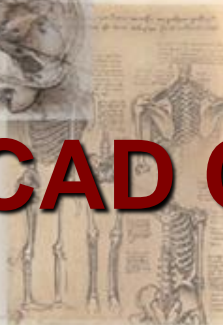


AutoCAD Lab 3

Geometric Constructions and Template Drawings

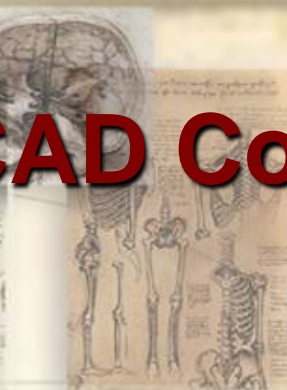
EGS 1007

Engineering Concepts and Methods



AutoCAD Construction

- **Open AutoCAD.**
- **From the pull-down menu: click on *File* -> *New* and double-click on the acad.dwt default template.**
- **Set the upper right corner limits to *12.0,9.0*, turn ON the SNAP and GRID with spacing of *0.5*.**
- **ZOOM ALL**
- **Turn OFF OSNAP, POLAR, and OTRACK.**
- **Save the drawing in your working directory as wrench.dwg.**

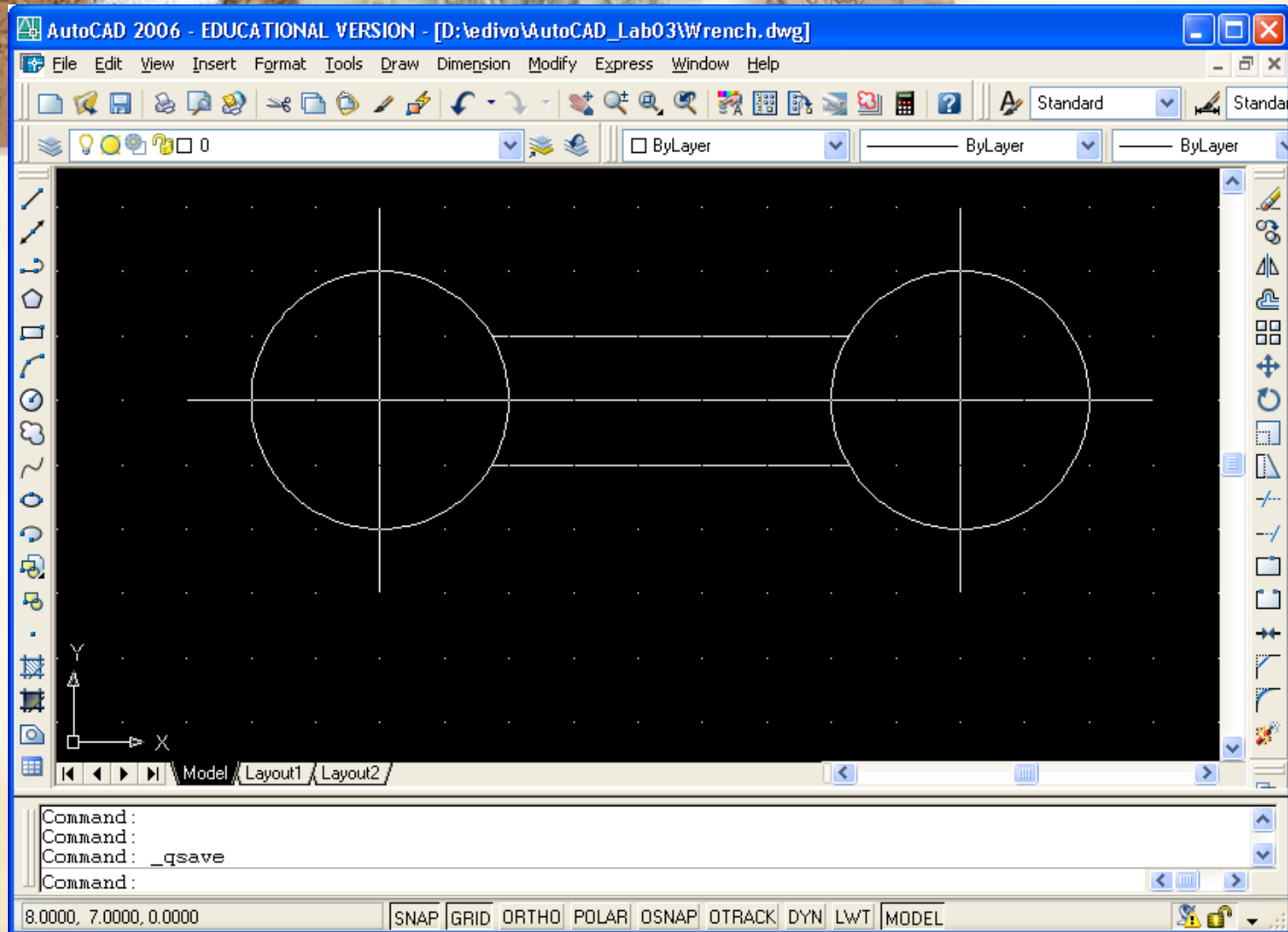


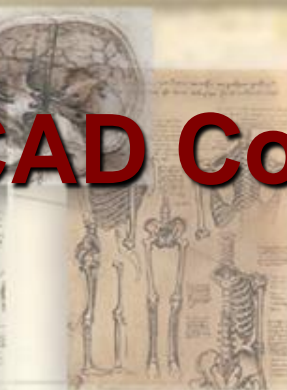
AutoCAD Construction

Draw the base of the wrench:

- Draw a horizontal line 7.5 units long (15 grid points) near the middle of the screen. (*line, click, @7.5<0*)
- Draw two vertical lines 3 units long and 4.5 units away from each other. Center them vertically and horizontally with the first line.
- Draw two circles centered at the line *intersections* with 1 unit radii.
- Copy or offset the horizontal line 0.5 units up and 0.5 units down.
- Turn off SNAP
- Trim the new lines with the circles as cutting edges.

AutoCAD Construction



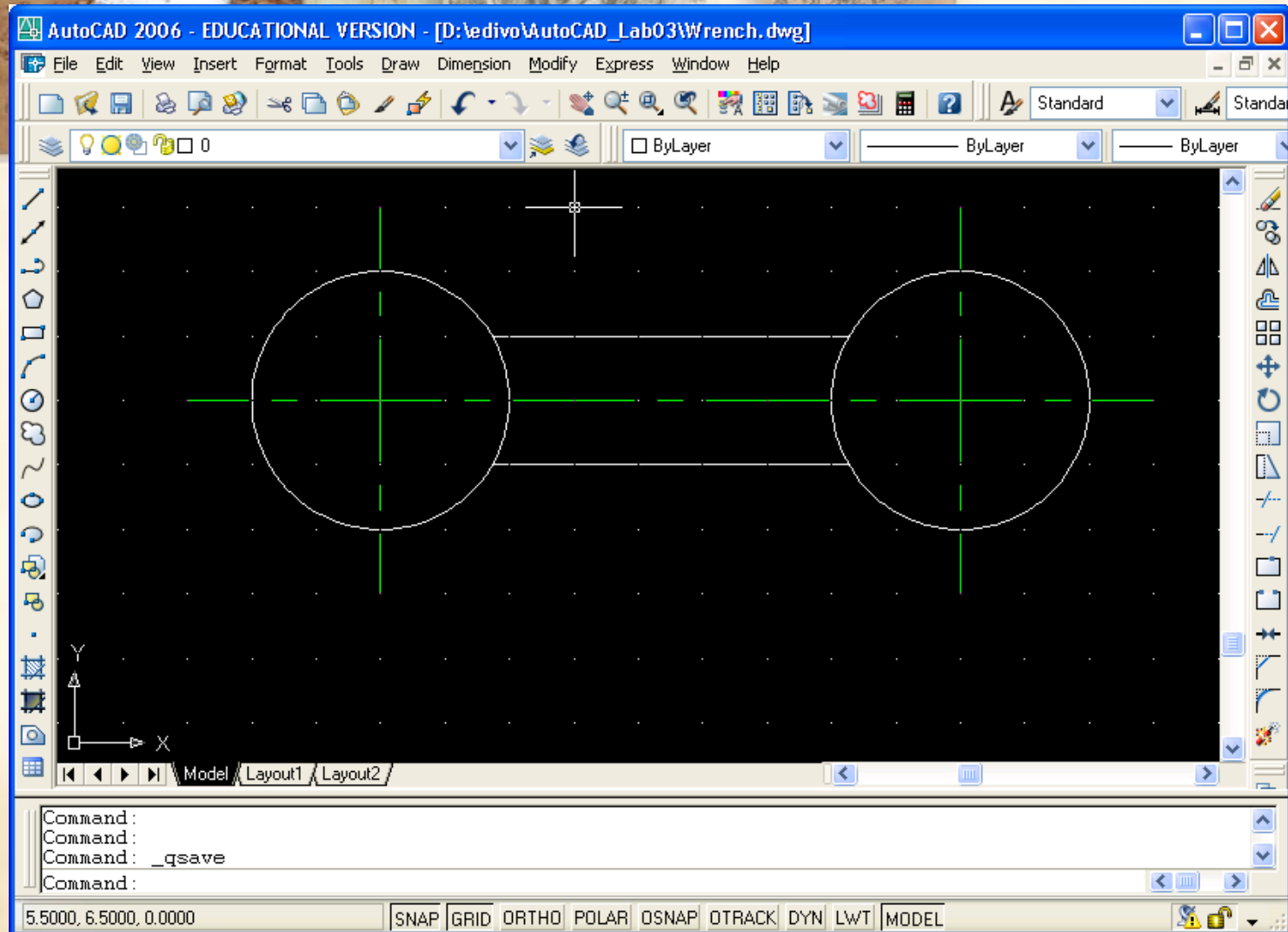


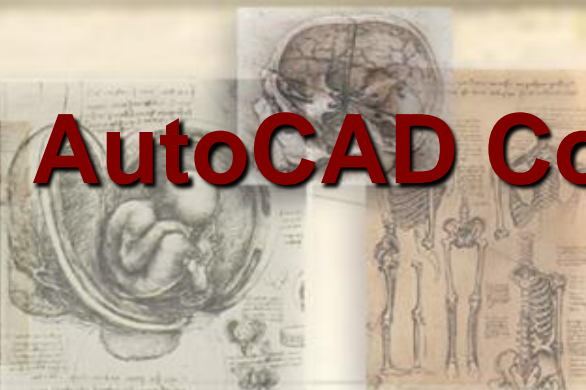
AutoCAD Construction

Add layers:

- Go to the layer control dialog box (*Layer Properties Manager*) and add a layer called *CENTERLINES*.
- Change the *linetype* for this layer to *CENTER*.
- Change the color for this layer to *GREEN*.
- Move the first three lines from layer 0 to layer *CENTERLINES*.
- Modify the *linetype* scale (type LTSCALE) to 0.75 units to visualize the center lines properly.

AutoCAD Construction



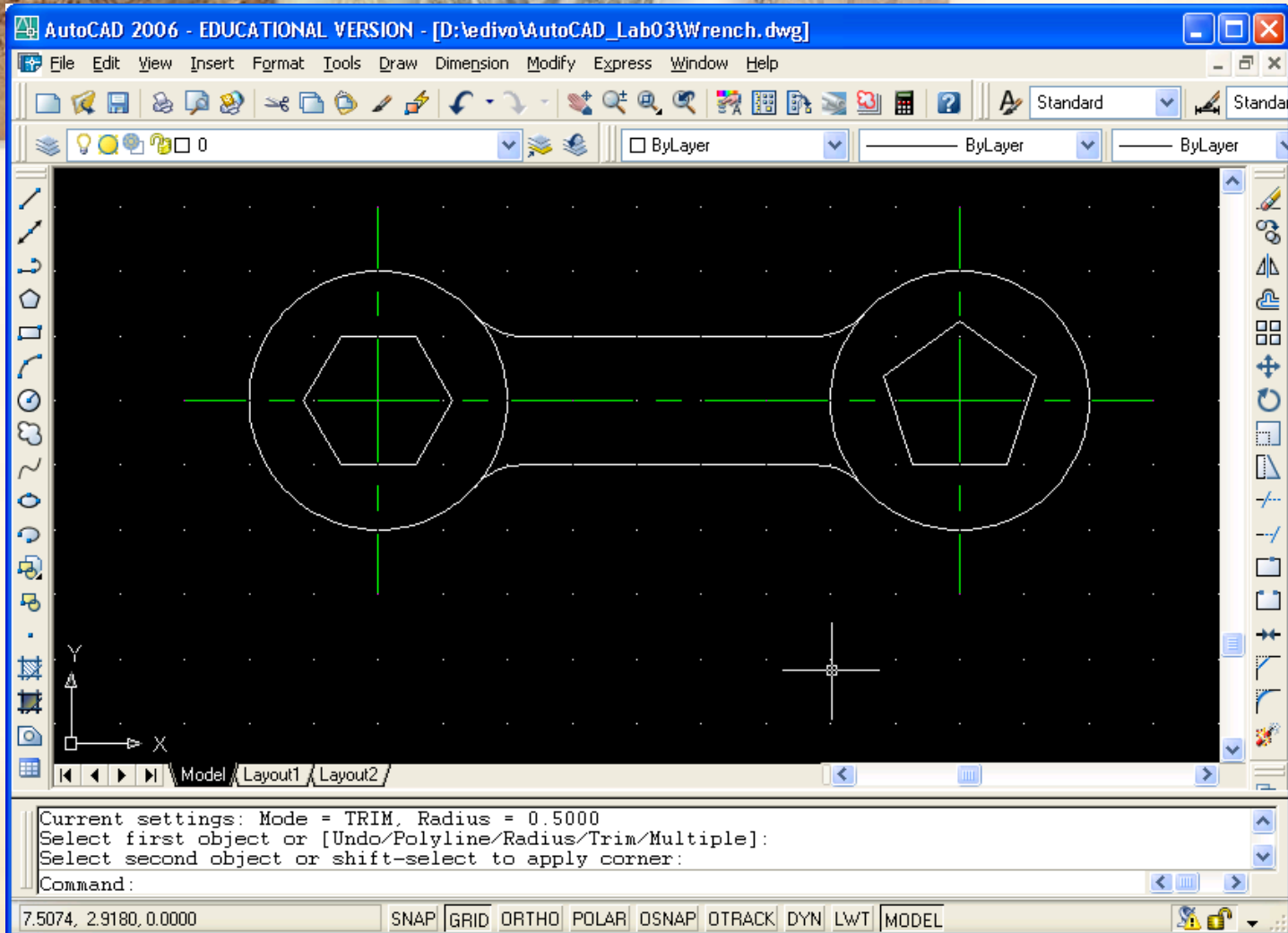


AutoCAD Construction

Add polygons:

- Fillet the handle intersections with a *radius* of *0.5* units.
- Make sure SNAP is back on...
- On layer 0, type *polygon*, enter 5 sides (*pentagon*), select the *center point* as the *right-hand-side intersection*, and select the option of *circumscribing* the polygon on a circle of *radius 0.5*. Make sure the pentagon appears with the vertex pointing upwards.
- Type *polygon*, enter 6 sides (*hexagon*), select the *center point* as the *left-hand-side intersection*, and select the option of *circumscribing* on a circle of *radius 0.5*.

AutoCAD Construction



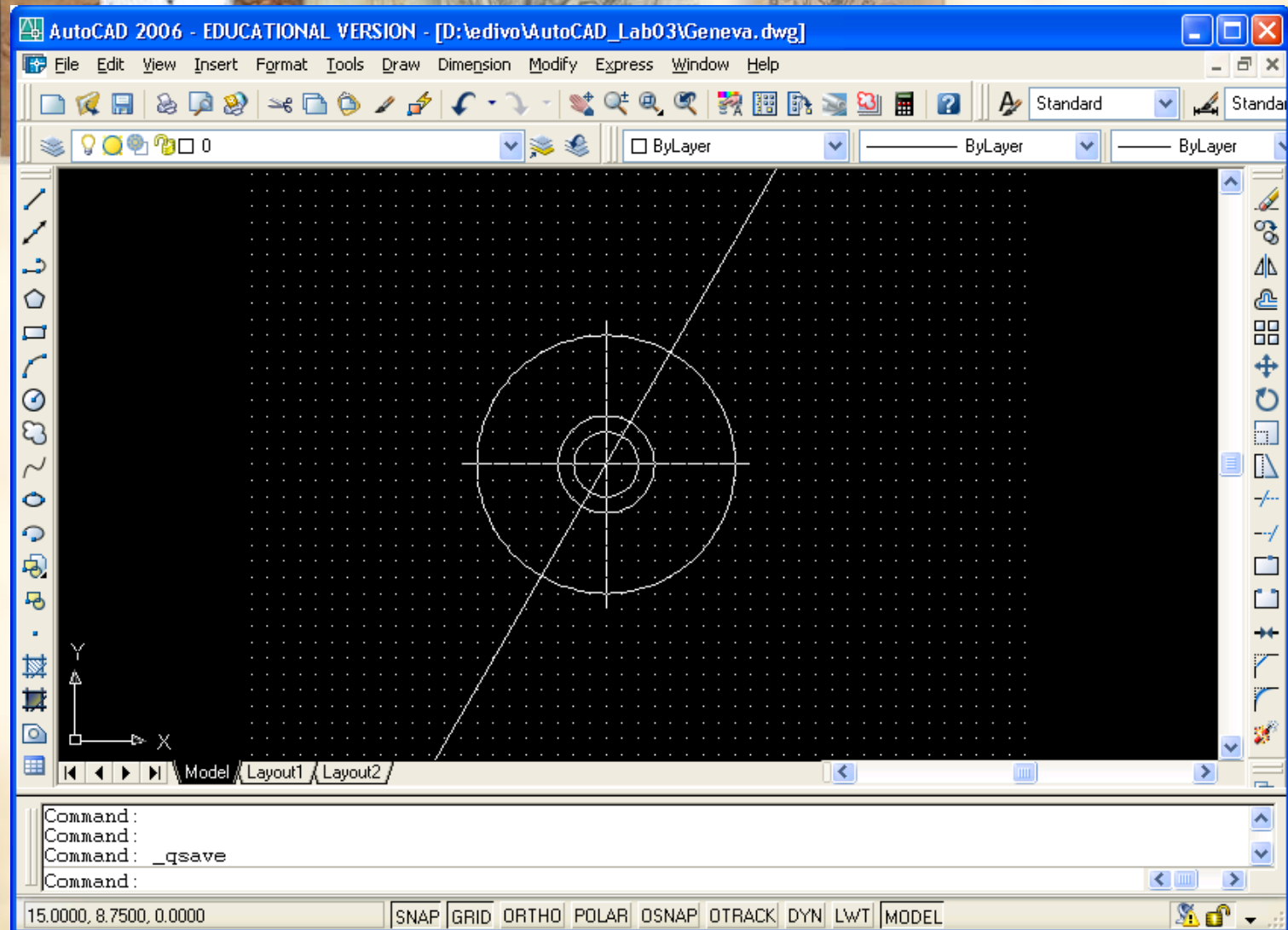


AutoCAD Construction

Create a new drawing:

- **Save** and **close** the current drawing. **Select** a new drawing from the standard template (***acad.dwt***)
- **Set** upper right corner **limits** to **12.0,9.0**
- **Set** the **SNAP** and **GRID** to **0.25** and **save** your new drawing as ***geneva.dwg***. (Geneva cam)
- <http://www.cabaret.co.uk/education/hints-and-tips/geneva-wheel-animation/>
- Turn on **GRID** and then **ZOOM ALL**
- **Draw 3 concentric circles** of diameters of **1**, **1.5**, and **4 units**, centered at **5.5, 4.5 (X,Y)**. (*c -> 5.5,4.5 ; d -> 1 ... etc*)
- Draw two **center lines** and extend them **0.25** units outside the circles.
- **Draw a construction line (XLine)** at **60 degrees** going through the center.

AutoCAD Construction



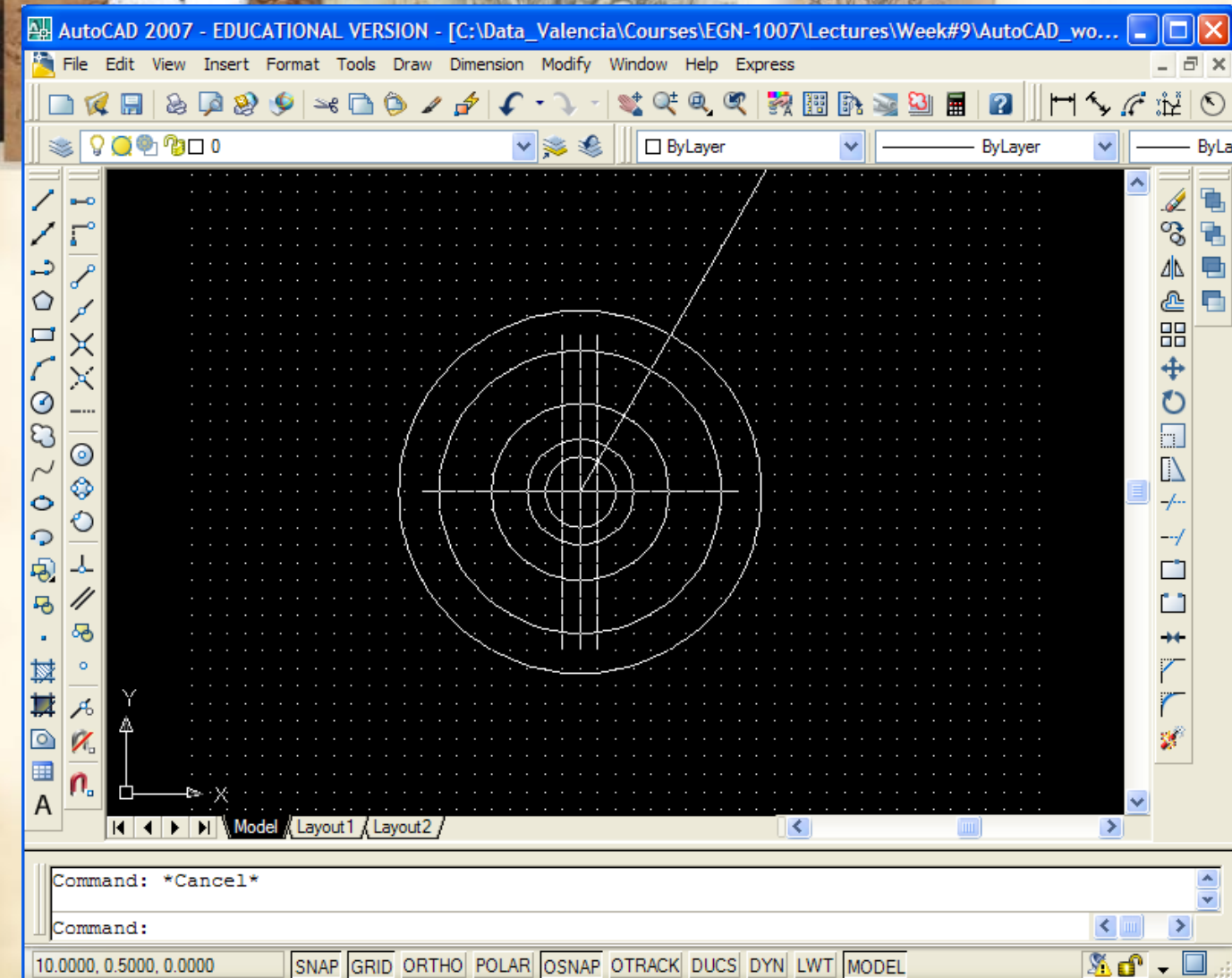


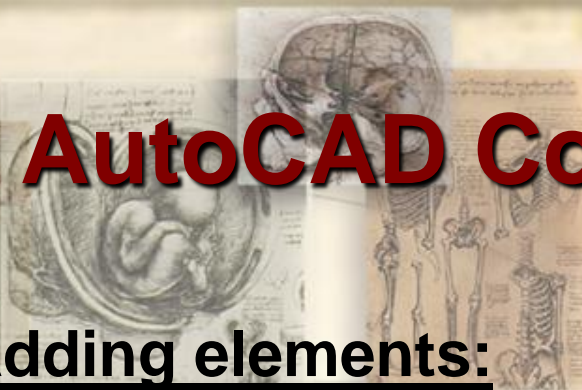
AutoCAD Construction

Adding elements:

- Offset the *vertical line 0.25* units to the left and right.
- Trim the *construction line* so it only extends *upwards* from the *center point*.
- Turn ON *OSNAP* with center and intersection modes.
- Create two concentric circles with radii 2.57 and 1.25.
- ZOOM ALL
- Then ZOOM WINDOW around drawing...

AutoCAD Construction



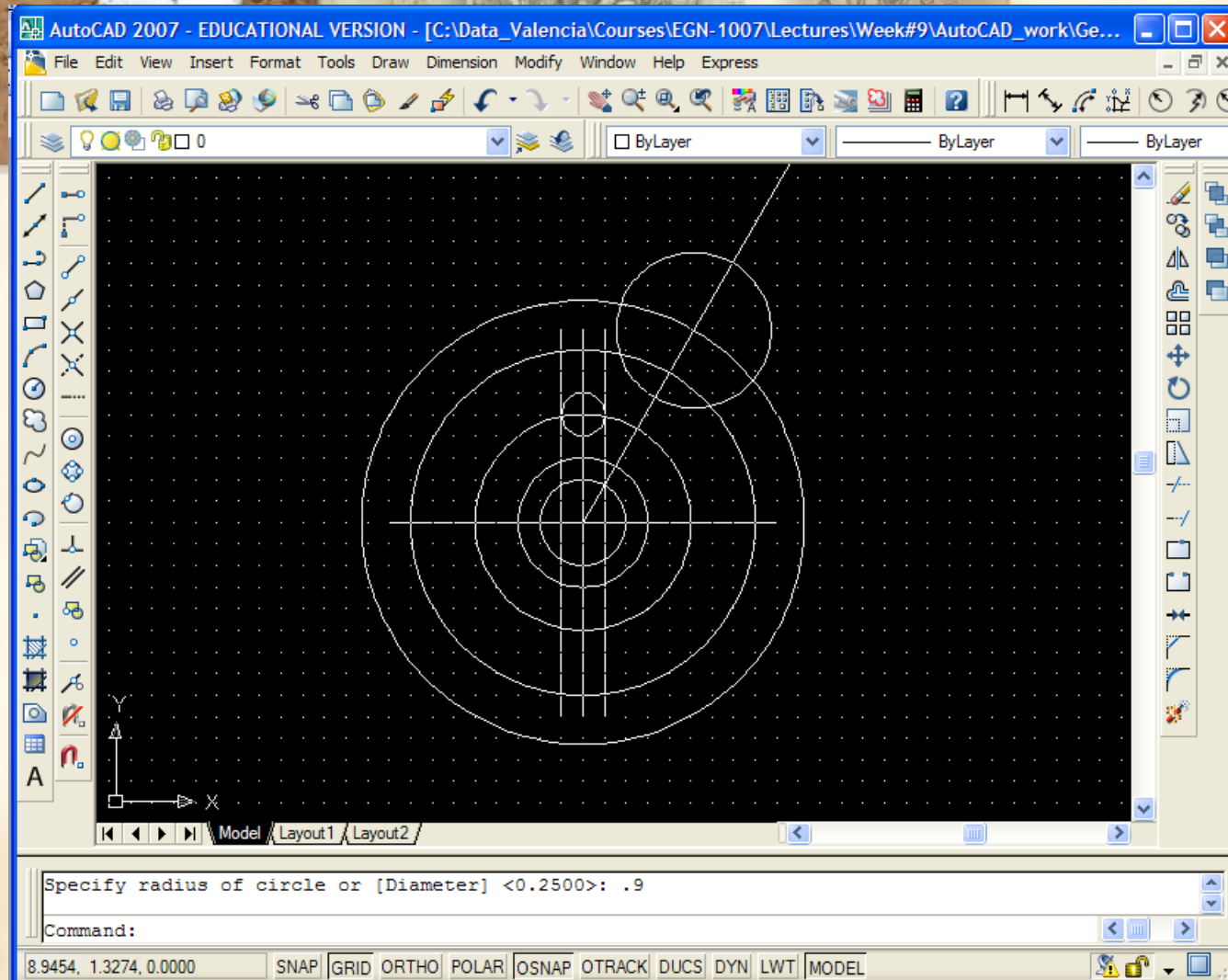


AutoCAD Construction

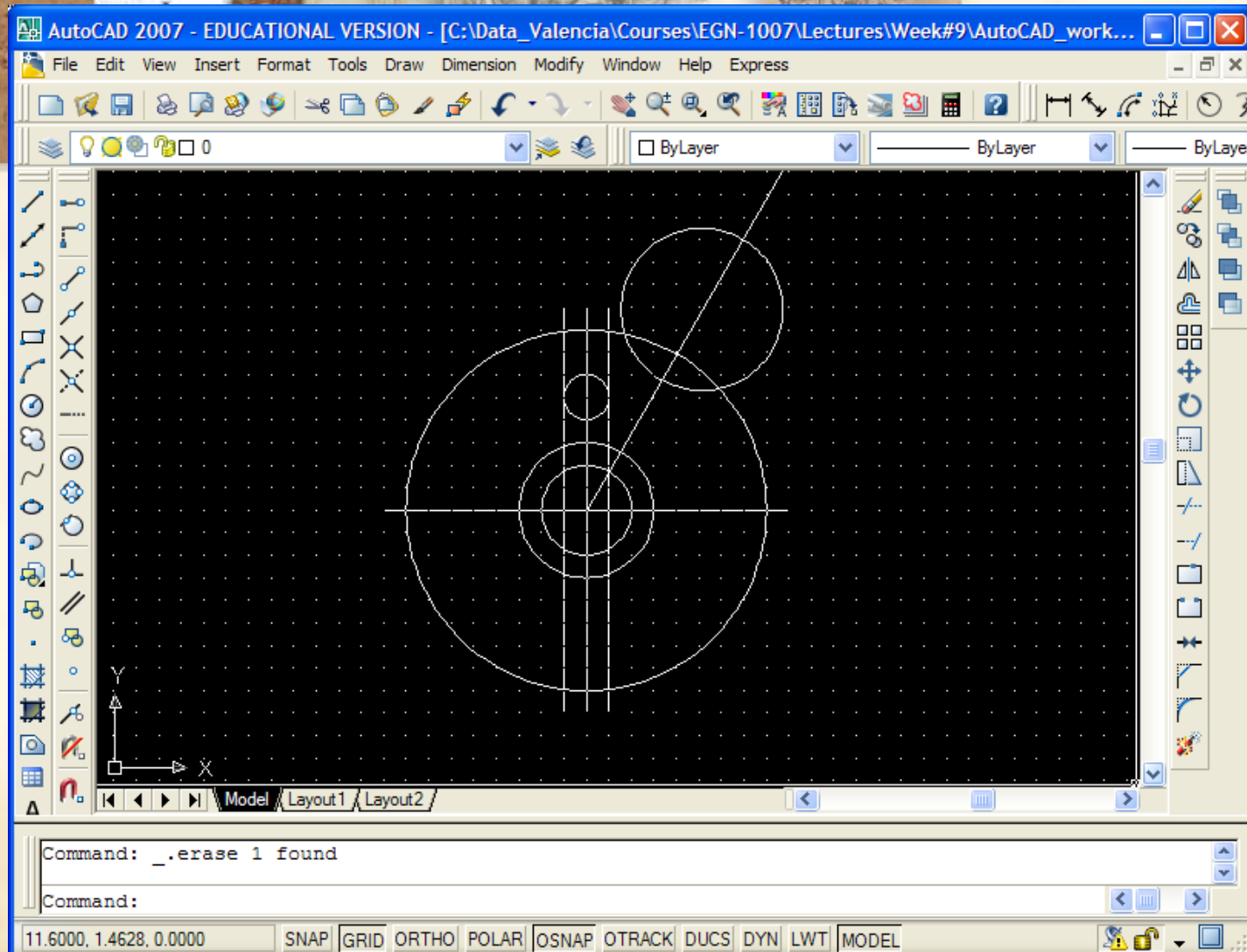
Adding elements:

- Turn SNAP off
- Draw a small circle of radius 0.25 at the intersection of the vertical line and the new circle of radius 1.25.
- Use Tools/Inquiry/Distance if not sure which circle to use...
- Draw a circle of radius 0.9 at the intersection of the construction line and the new circle of radius 2.57.
- Trim and erase objects to look as follows.

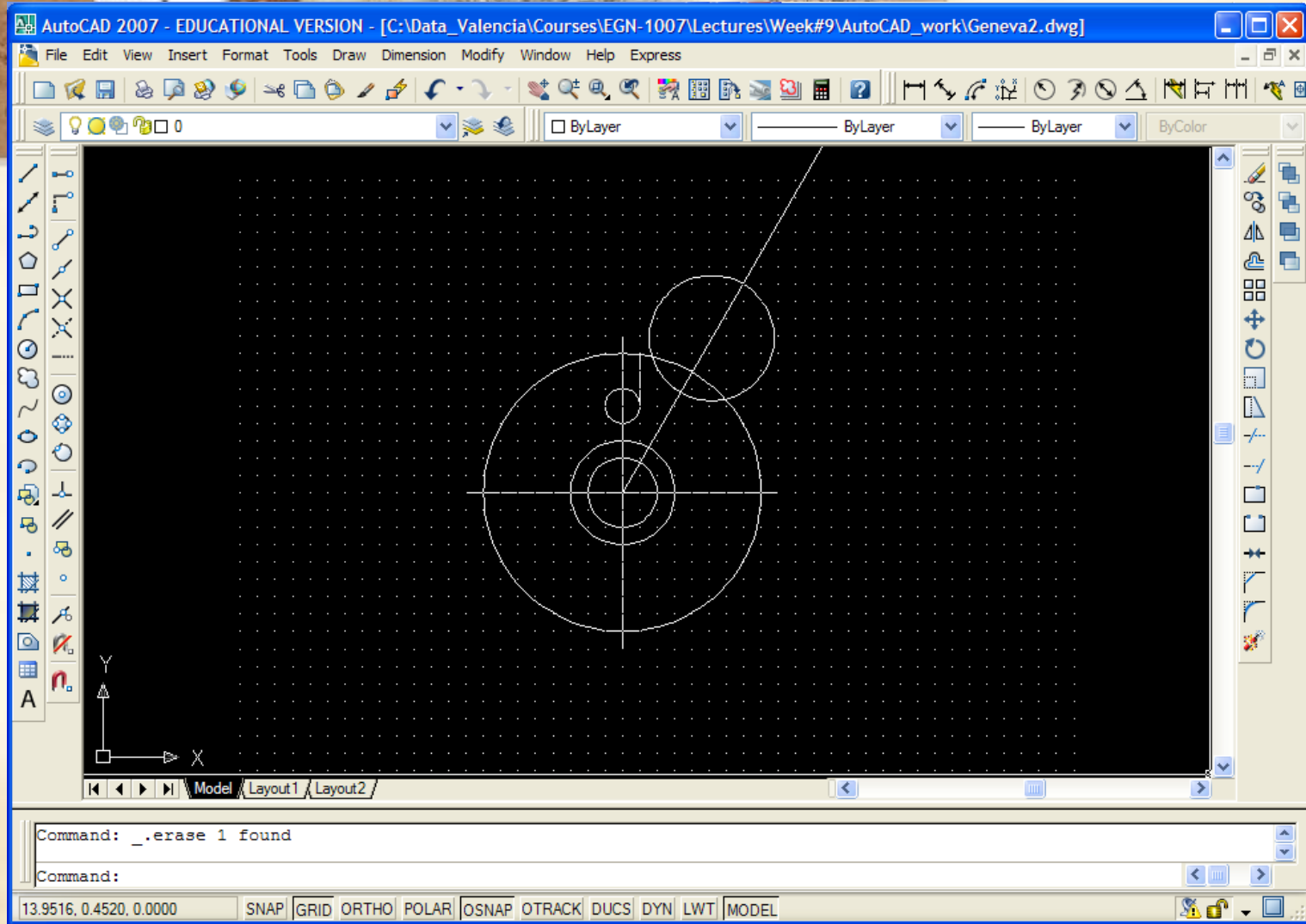
AutoCAD Construction

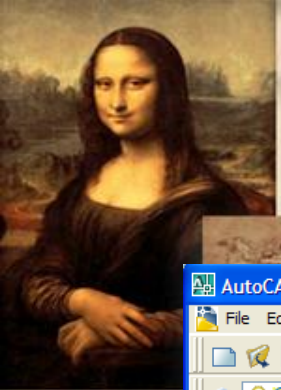


AutoCAD Construction



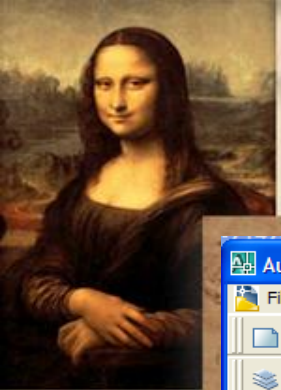
AutoCAD Construction



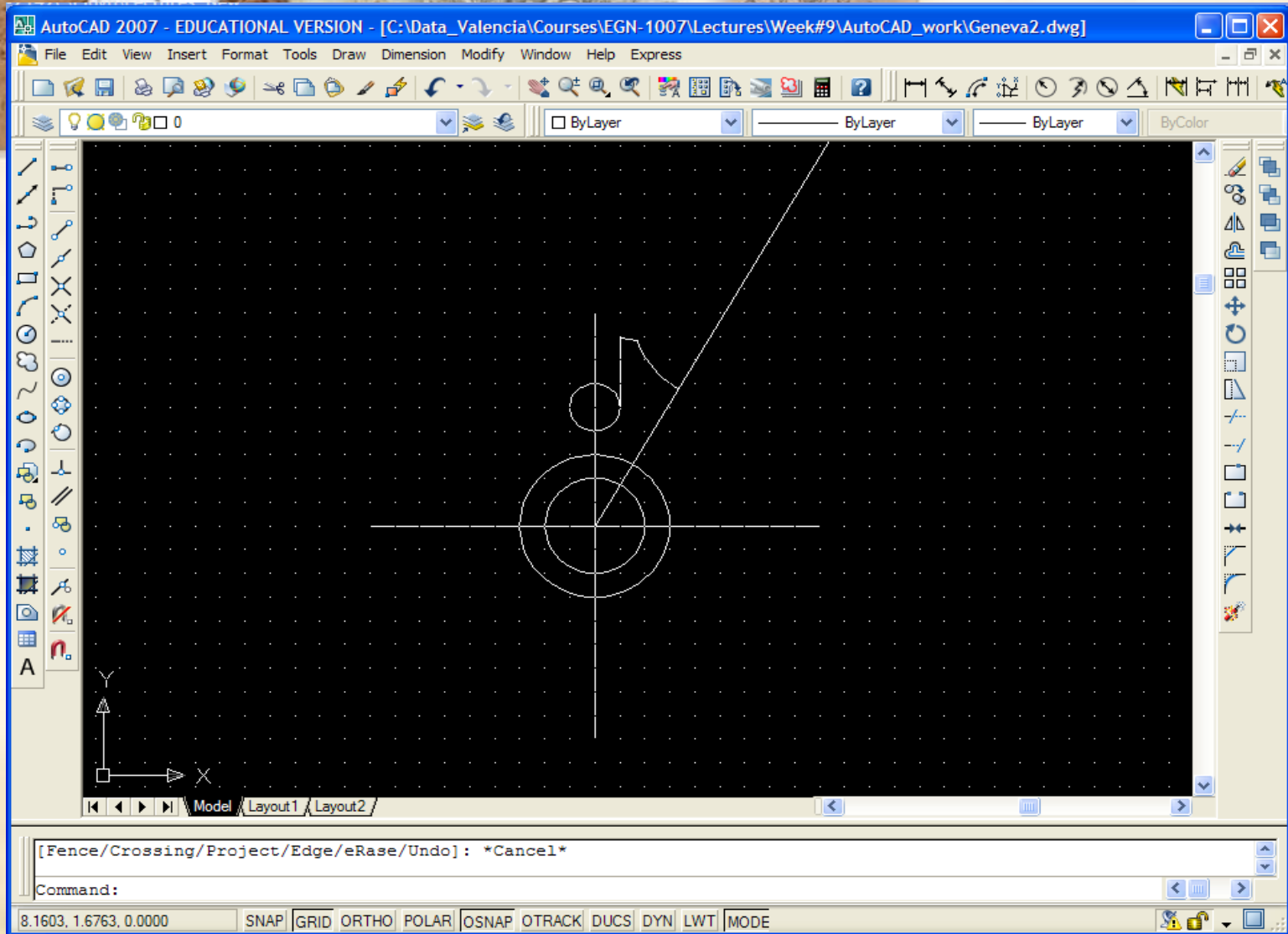


AutoCAD Construction

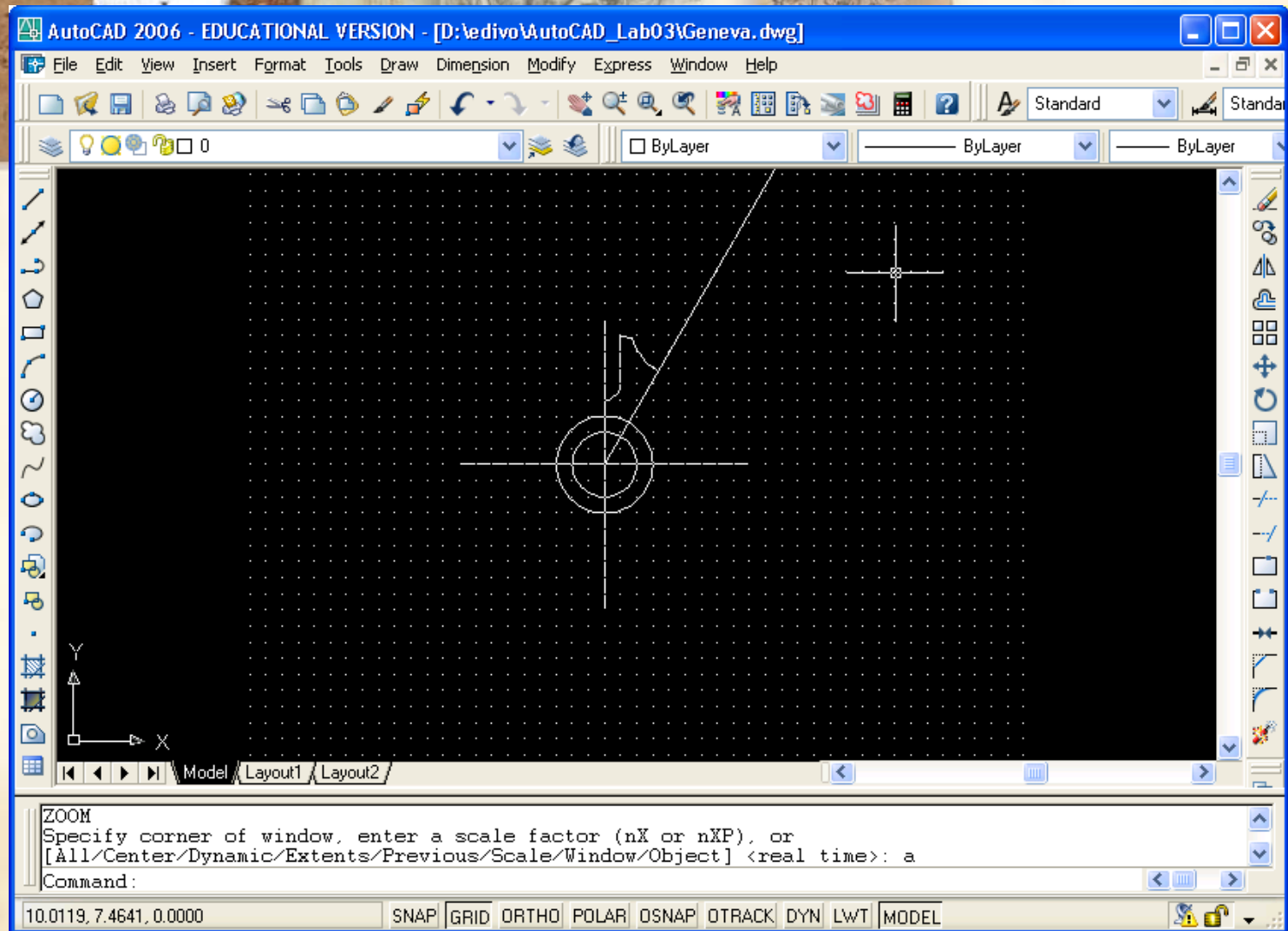
The screenshot displays the AutoCAD 2007 software interface. The title bar reads "AutoCAD 2007 - EDUCATIONAL VERSION - [C:\Data_Valencia\Courses\EGN-1007\Lectures\Week#9\AutoCAD_work\Geneva2.dwg]". The menu bar includes File, Edit, View, Insert, Format, Tools, Draw, Dimension, Modify, Window, Help, and Express. The toolbar contains various drawing and editing tools. The main workspace shows a technical drawing on a grid, featuring a central vertical axis with a horizontal line intersecting it. A large circle is centered on the vertical axis, and a smaller circle is positioned above it. A diagonal line passes through the center of the large circle. The command line at the bottom shows "Command: <Grid on>" and "Command:". The status bar at the bottom indicates coordinates (12.0984, 1.9243, 0.0000) and various system variables like SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DUCS, DYN, LWT, and MODEL.



AutoCAD Construction



AutoCAD Construction

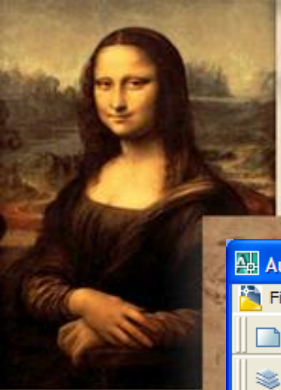




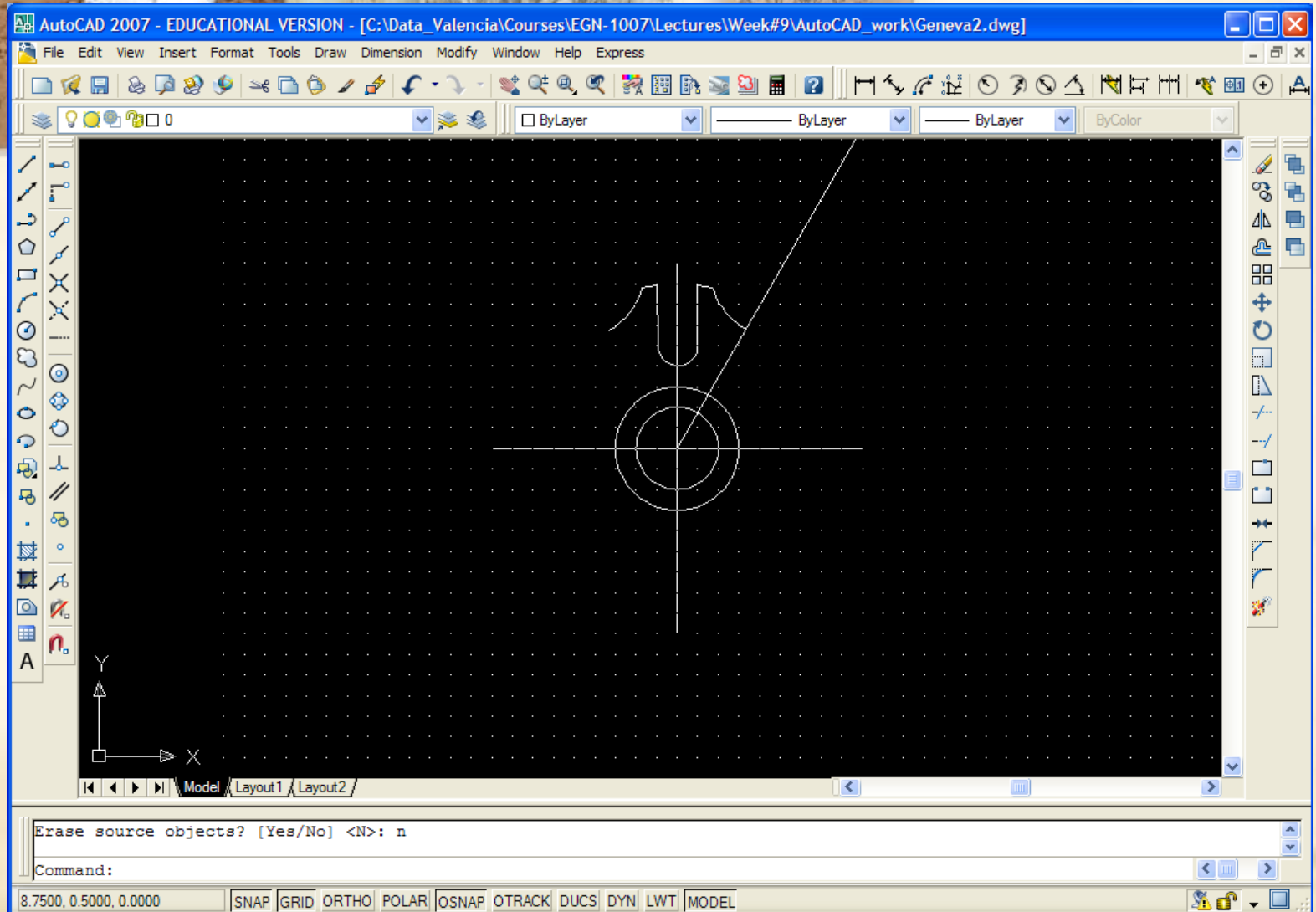
AutoCAD Construction

Mirror and array:

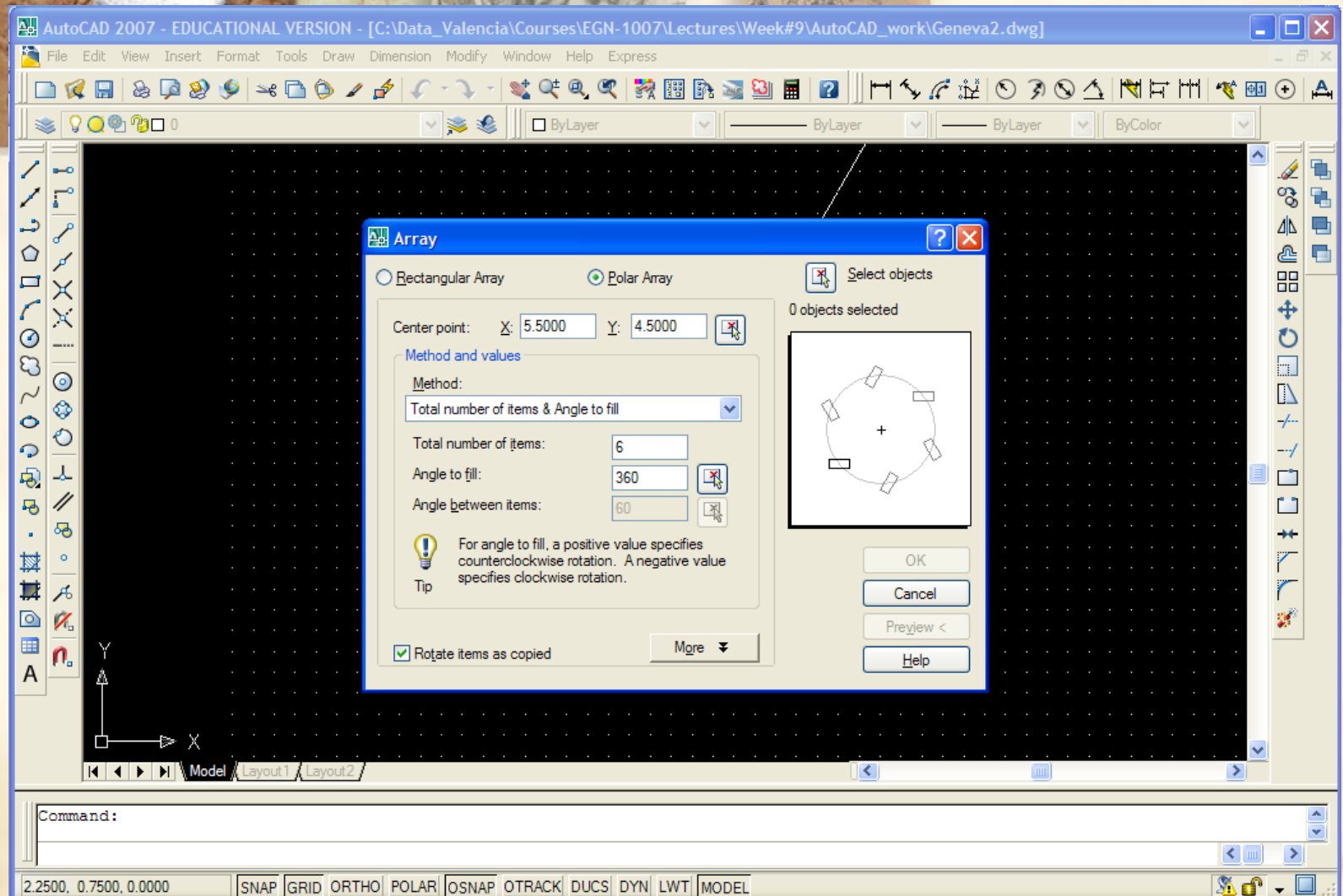
- Mirror the four objects you just trimmed using the vertical centerline as the mirror line. Make sure you select “*not to erase source objects*”.
- Now we will create a *polar array* of six with the eight objects (source and mirror). Type *array* and specify *polar* mode, with 6 items, and 360 degrees to *fill* with center 5.5, 4.5.
- Erase the *construction line* and change the properties of the *centerlines* to show center *Linetype* with *LTScale* 0.5.
- Save your work and close the drawing.

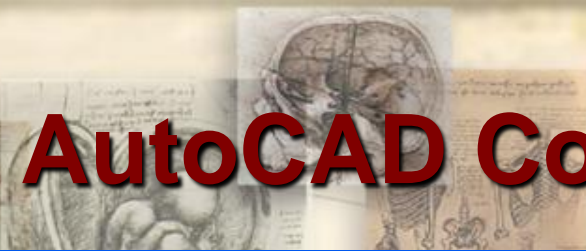
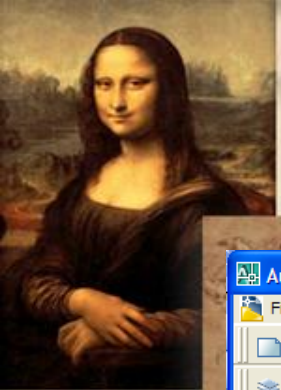


AutoCAD Construction

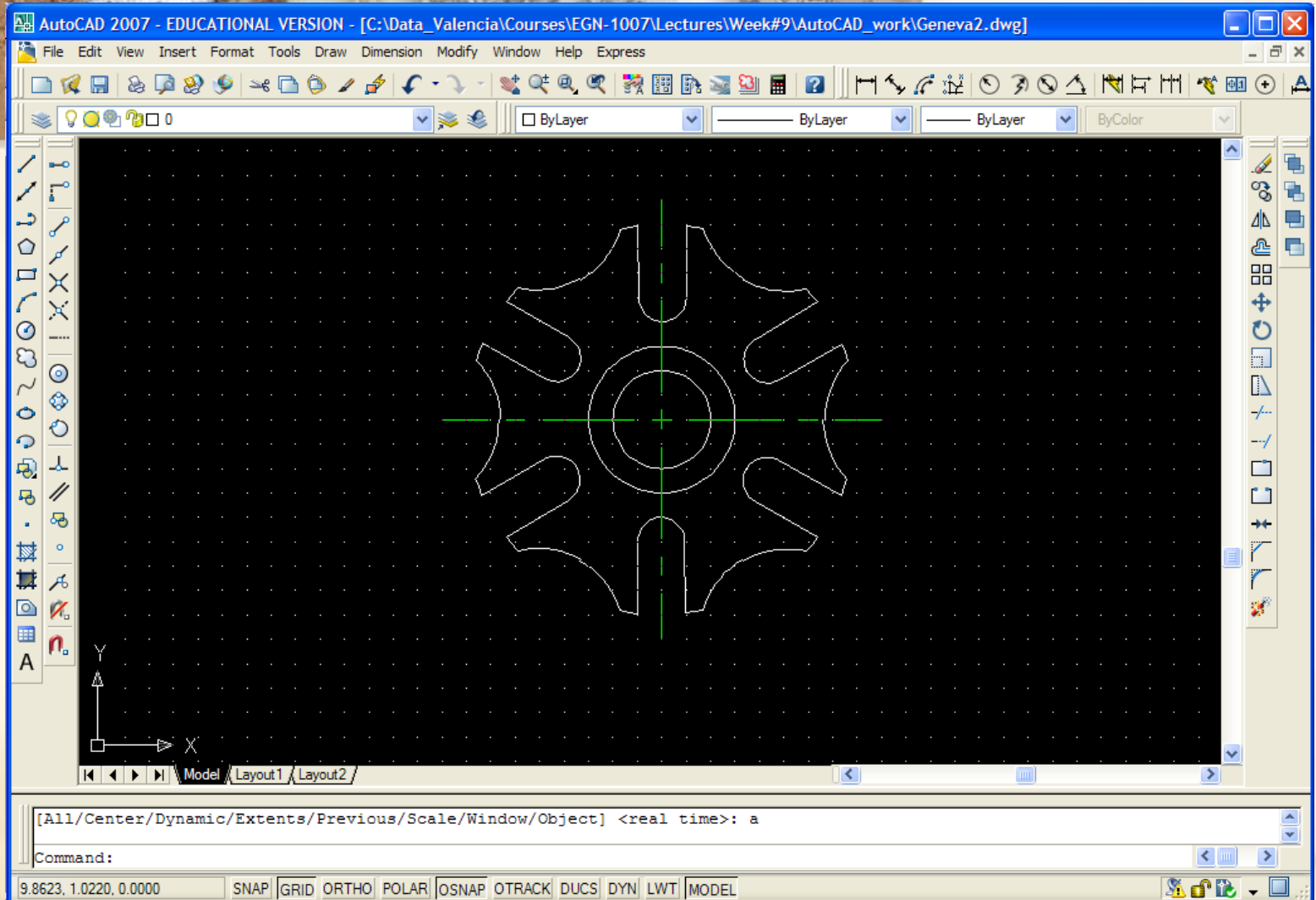


AutoCAD Construction





AutoCAD Construction



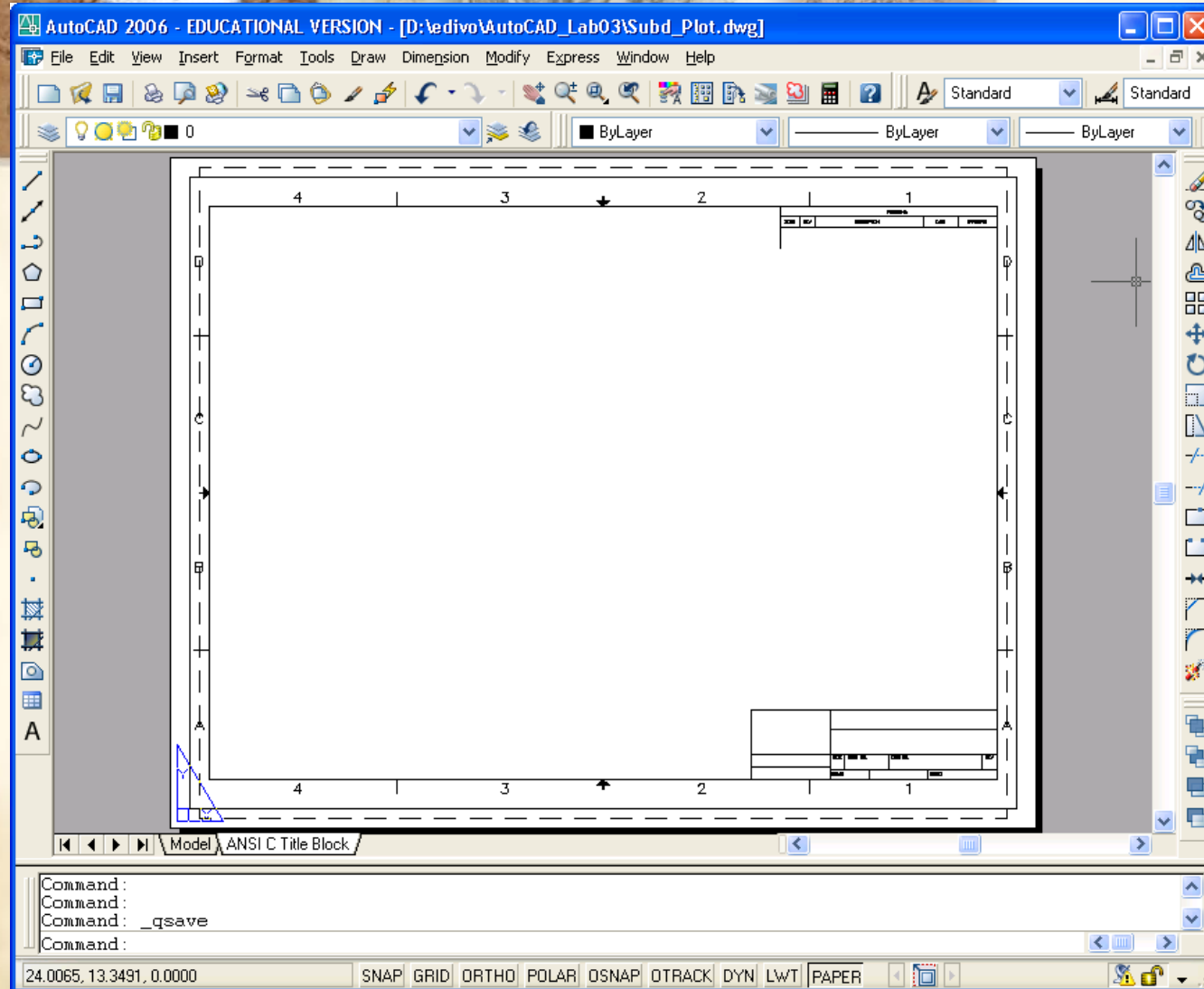


AutoCAD Templates

Create a new file from a standard template:

- Create a new file and select *ANSI C-Color Dependent Plot Styles.dwt* from the list of available AutoCAD templates.
- Save the drawing as *Subd_Plot.dwg* in your current working directory.
- ZOOM ALL
- Notice the two tabs: one for the model drawing and the other for the sheet of paper.
- The *dashed lines* around the paper sheet indicate the printing area.

AutoCAD Templates





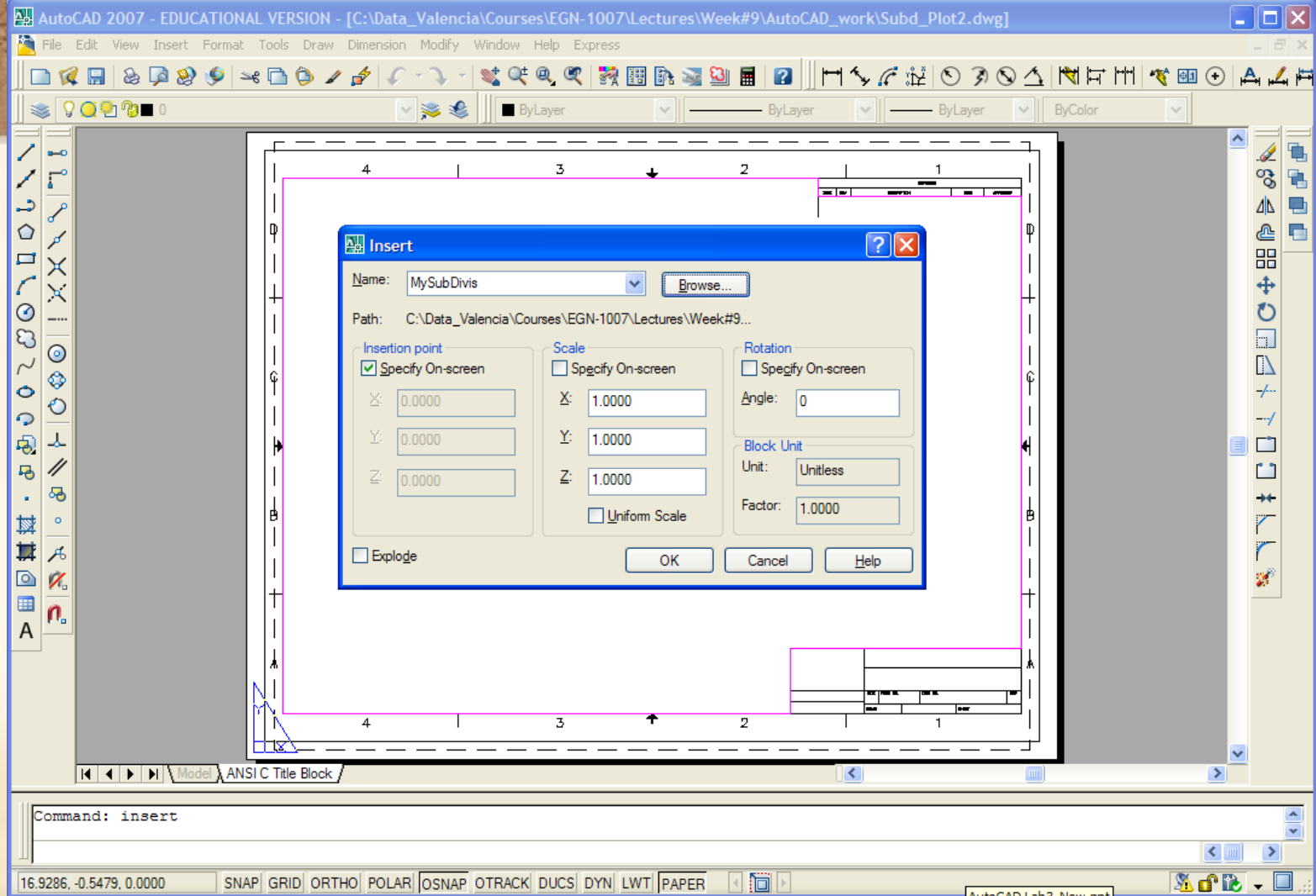
AutoCAD Templates

Inserting an object:

- Change the color of the *Viewport* layer to *magenta* and notice the boundary of the Viewport. This is the area through which the model will show.
- Change to Model Space, make sure layer 0 is current and insert an existing drawing by typing *Insert* or by clicking on the *Insert Block Icon* and selecting the file you created last lab (*MySubDiv.dwg*). Specify 0.0,0.0 as the insertion point.
- ZOOM ALL

NOTE: Skip next slide if you see your MySubDiv.dwg drawing...

AutoCAD Construction





AutoCAD Templates

Paper sheet properties:

- Change to *Paper space* and notice that nothing appears in the *Viewport*. The drawing is too large to fit.
- Change the *View Scale* of the *Viewport* by selecting the *magenta line* and clicking the *properties icon*.
- Select the *Viewport* from the *pull-down* list and change the standard scale to 1:100. (object is still too large to fit)
- Notice that it still does not fit. Change the scale using a custom value of 0.007 (~1:150)



AutoCAD Templates

Paper sheet properties:

- Back in the Paper Space notice that the object is not centered in the Viewport.
- Type *MS* to switch to *model space* or click on the *MODEL/PAPER* status button.
- Use the PAN realtime icon and select a point to PAN the *Viewport* towards the center of the object.



AutoCAD Templates

The screenshot shows the AutoCAD 2006 interface with the following details:

- Title Bar:** AutoCAD 2006 - EDUCATIONAL VERSION - [D:\edivov\AutoCAD_Lab03\Subd_Plot.dwg]
- Menu Bar:** File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
- Toolbars:** Standard toolbar, Layer Properties toolbar (ByLayer), and a toolbar with icons for light, yellow, and black colors.
- Workspace:** A site plan titled "Wannabe Heights Estates" is displayed. It features a pink boundary, a blue road labeled "EAST ST. ROAD", and ten numbered lots (1-10). A north arrow is present. The drawing is enclosed in a dashed border with grid lines labeled 1-4.
- Bottom Panel:** Shows the current layer as "ANSI C Title Block". The command line contains:
layout .
Command: .PSPACE
Command: .MSPACE
Command:
The status bar at the bottom indicates coordinates (483.1591, 1641.0603, 0.0000) and various system variables (SNAP, GRID, ORTHO, POLAR, OSNAP, OTRACK, DYN, LWT) set to MODEL.

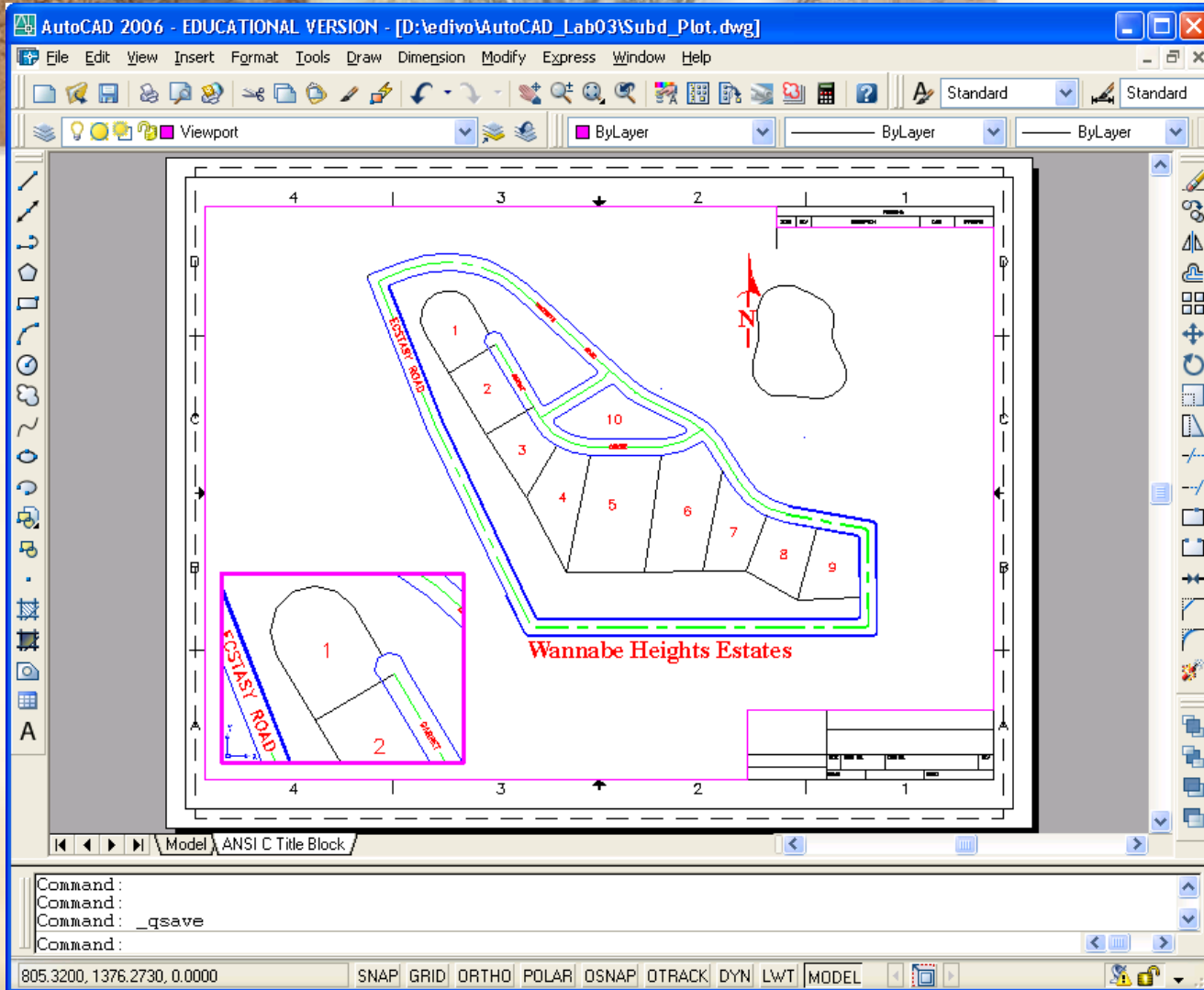


AutoCAD Templates

Create a new Viewport:

- Click the *status button* to go back to *Paper* space, make the *Viewport layer* current, and turn OFF OSNAP.
- From the pull-down menu select: *View -> Viewports -> 1 Viewport*.
- Select two corners near the bottom-left side of the current Viewport to create an additional floating *Viewport*.
- Make the new *Viewport* active by double-clicking inside of it and zoom around Lot 1.

AutoCAD Templates





AutoCAD Templates

Creating your own templates:

- You can create your own *templates* by starting a new drawing from a standard template and saving as an AutoCAD *template* file (.dwt).
- Properties such as font size, type, colors, viewports, layouts, etc may be preset to be saved with the template.
- In addition, all layers and specific layer properties can be pre-generated for further use.