



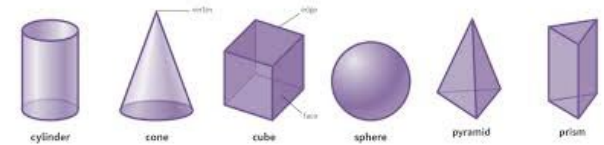
AutoCAD Level 3

Session 05









AGENDA

- **CREATING SOLID PRIMITIVES**
- **CREATING CROSS SECTIONS/ SLICE**
- **FLAT SHOT COMMAND**
- **SHELL COMMAND**
- **HELIX COMMAND**

Primitive Solid Shapes



- A primitive solid is a 'building block' that you can use to work with in 3D. Rather than extruding or revolving an object, AutoCAD has some basic 3D shape commands at your disposal. From these basic primitives, you can start building your 3D models. In many cases, you get the same result from drawing circles and rectangles and then extruding them, but doing it one command is generally faster. Using these with Boolean operations can be a very effective way of drawing in 3D. There are eight different primitives that you can choose from .
- Lets see how we can do the following shapes using draw commands along with either extrude or revolve:
- Box- rectangle, extrude with taper =0
- Sphere- Half a circle, revolved 360d degrees
- Cylinder- Circle, extrude with taper =0
- Cone- Circle, extrude with taper > 0
- Wedge- ucs, pline, extrude
- Torus- circle, revolve away
- Pyramid- rectangle, extrude with taper > 0
- Polysolid- Pline, extrude with taper =0

BOX	 Box
SPHERE	 Sphere
CYLINDER	 Cylinder
CONE	 Cone
WEDGE	 Wedge
TORUS	 Torus
PYRAMID / PYR	 Pyramid
PSOLID	 Polysolid

Primitive Solid Shapes

- **Command: PSOLID**
POLYSOLID Specify start point or
 [Object/Height/Width/Justify]
 <Object>: H
 Specify height <96.0000>: 9
 Specify start point or
 [Object/Height/Width/Justify]
 <Object>: W
 Specify width <6.0000>: 1
 Specify start point or
 [Object/Height/Width/Justify]
 <Object>: J
 Enter justification
 [Left/Center/Right]
 <Center>: C
 Specify start point or
 [Object/Height/Width/Justify]
 <Object>: <Pick points>

- **Command: CONE**
 Current wire frame density:
ISOLINES=4
 Specify center point for base of cone or [Elliptical] pick a point
 Specify radius for base of cone or [Diameter]: 4
 Specify height of cone or [Apex]: 8

- **Command: TORUS**
 Current wire frame density:
ISOLINES=4
 Specify center of torus: pick a point
 Specify radius of torus or [Diameter]: 3
 Specify radius of tube or [Diameter]: .25

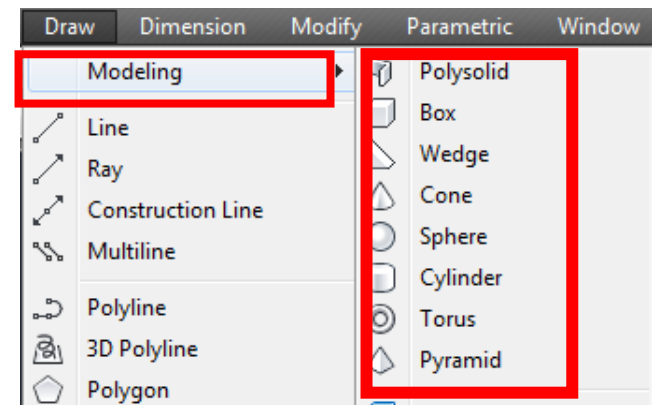
- **Command: BOX**
 Specify corner of box or [Center]: pick a point
 Specify corner or [Cube/Length]: @5,7
 Specify height: 10

- **Command: box**
 Specify corner of box or [Center]: pick a point
 Specify corner or [Cube/Length]: @5,7,10

- **Command: BOX**
 Specify corner of box or [Center] <0,0,0>: <pick point>
 Specify corner or [Cube/Length]: C
 Length: 4

- **Command: SPHERE**
 Specify center point or [3P/2P/Ttr]: <PICK POINT>
 Specify radius or [Diameter] <2.3756>: 6 <ENTER>
 Half is below ground

- **Command: PYRAMID**
 4 sides Circumscribed
 Specify center point of base or [Edge/Sides]: s
 Enter number of sides <4>: 5
 Specify center point of base or [Edge/Sides]:
 Specify base radius or [Inscribed]: 5
 Specify height or [2Point/Axis endpoint/Top radius]: 6



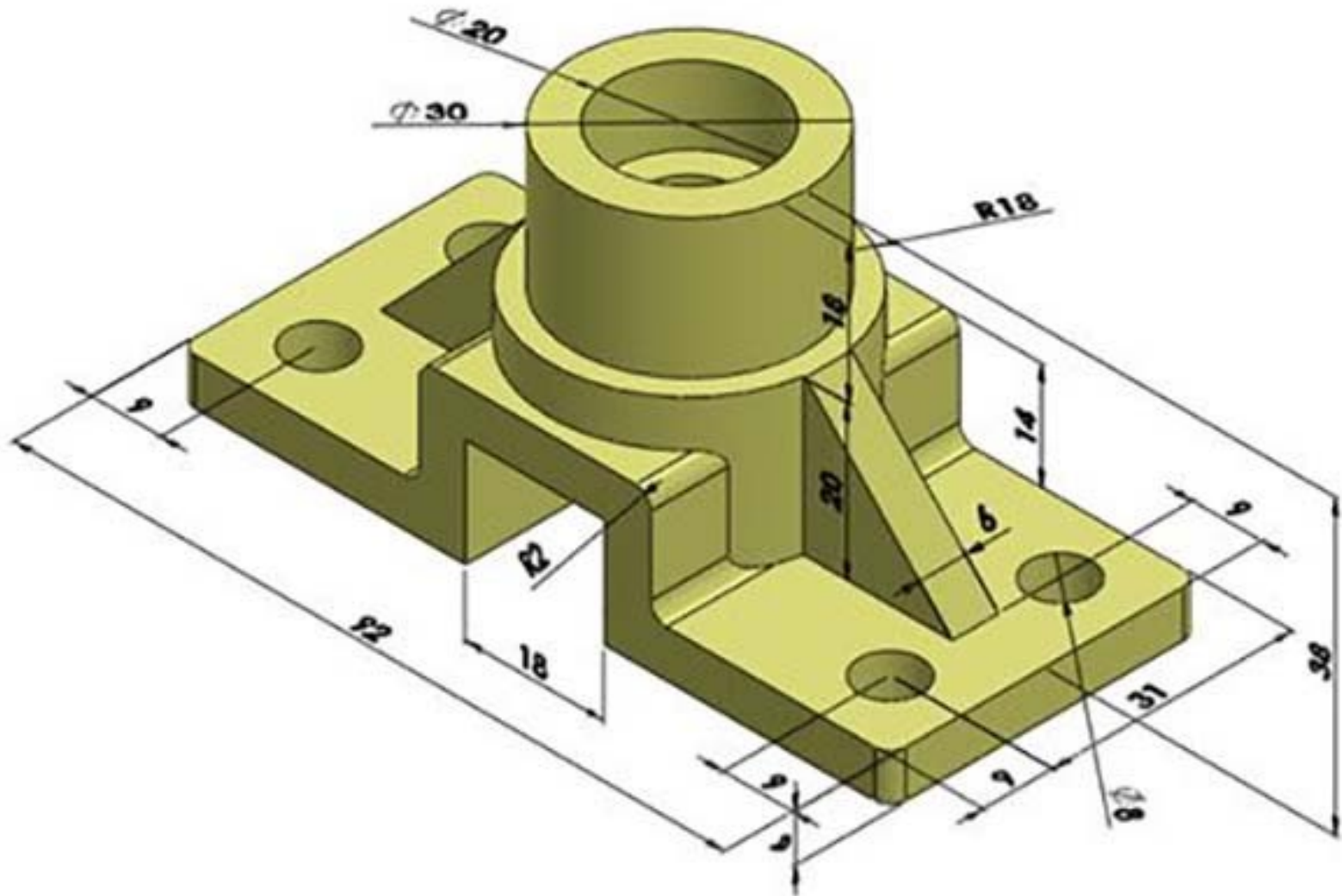
- **Command: WEDGE**
 Specify first corner of wedge or [Center] <0,0,0>: <PICK>
 Specify corner or [Cube/Length]: @5,2,4

▪ Always adjacent to the first point

▪ Always along y axis

- **Command: CYLINDER**
 Current wire frame density:
ISOLINES=4
 Specify center point for base of cylinder or [Elliptical] <0,0,0>: <PICK POINT>
 Diameter/ <Radius>: 2.5
 Center of other end/ <Height>: 1.2

Exercise 10

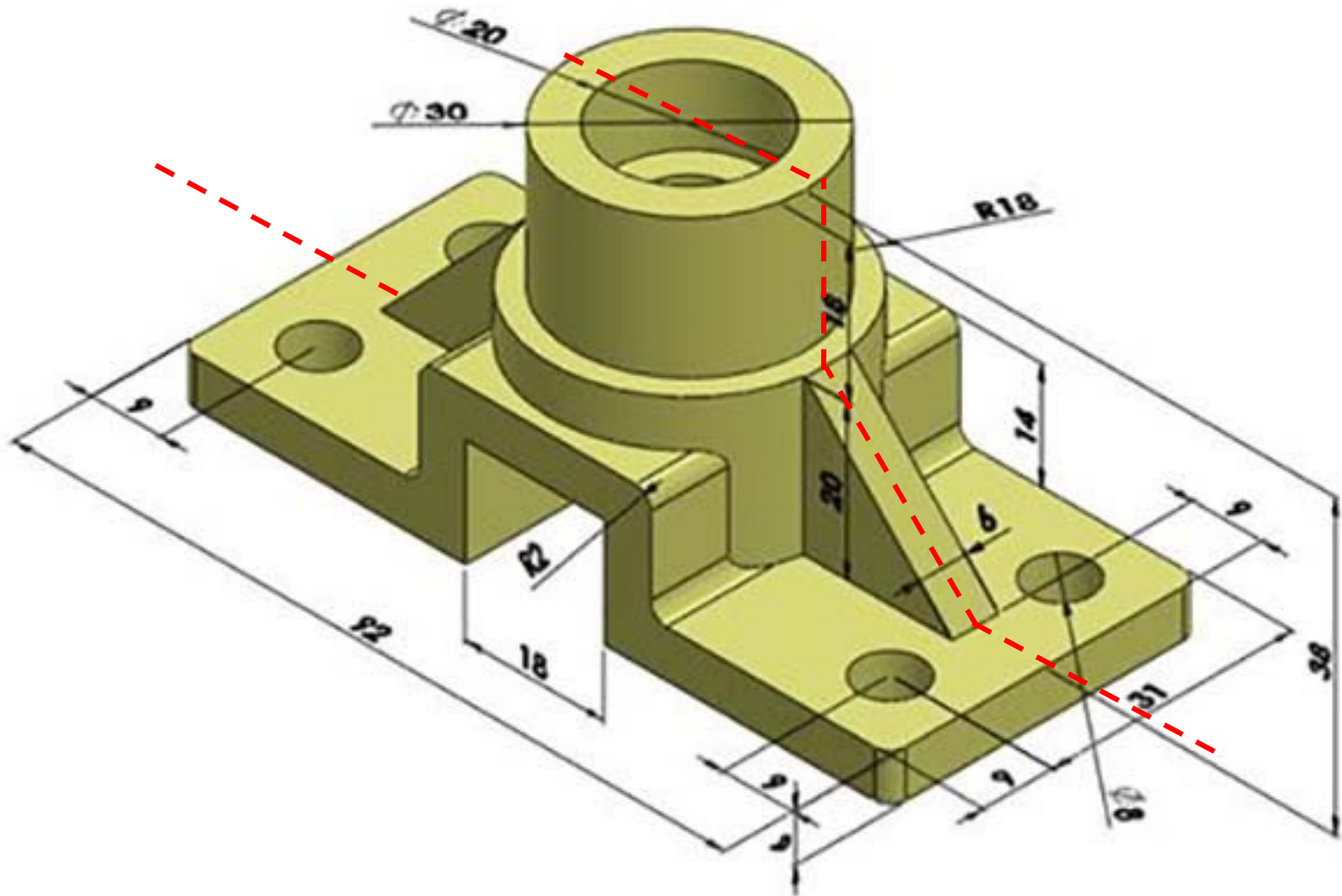


Introduction to Sectional Views

- An example of a section is shown by taking a whole apple and slicing it in half. The view of the inside surface is called a section view or cross



Exercise 11- Cross Section



Slice Command to create a section

- The slice command enables you to cut an object into 2 separate pieces.
- We can use the slice command to create a section view of a three dimensional model

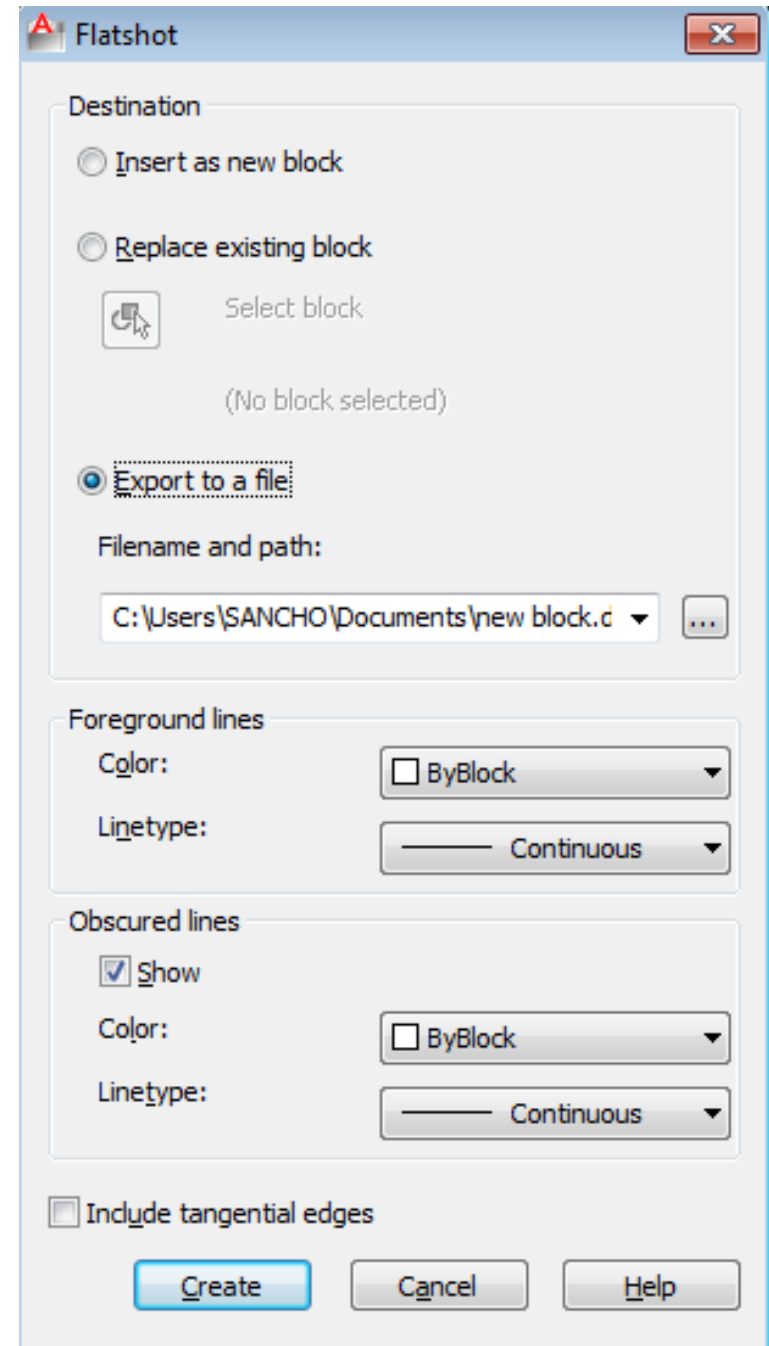


- The cutting plane is the surface that the object is cut along.



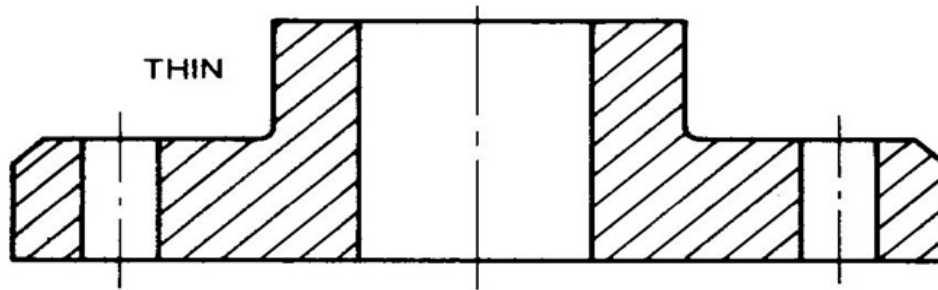
Flat shot command

- FLATSHOT is a great command to use to quickly generate 2D drawings from 3D objects.
- STEPS:
- Create your 3D model.
- Change the 3D view to see what you need in your 2D view.
- On the command line, type in FLATSHOT.
- You have three choices; insert a new block, replace Existing Block, or save as an external file. Depending on your needs, pick the appropriate method to creating your view. The external file option is great for sending views to clients. There are also options to display (or not to display) hidden lines. And you can change linetypes.

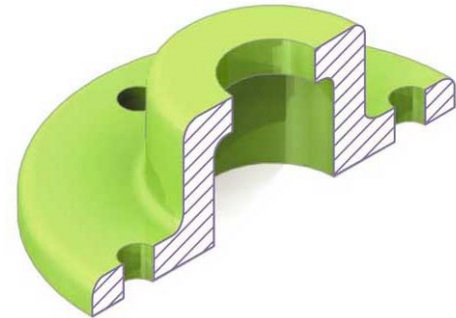


Section Lining

- Section lining, sometimes referred to as **cross-hatching**, is used to indicate material in the sectioned part.
- Section lines are places on any surface that touches the section plane.



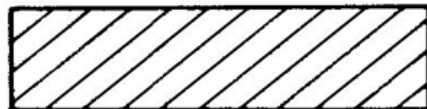
Section lines.



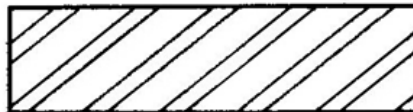
Linework

- Thin and Dark
- 45°, 30°, or 60°
- Spaced approximately 3mm small part, 10mm large part

Note: 45° always first choice and avoid lines parallel to object lines.



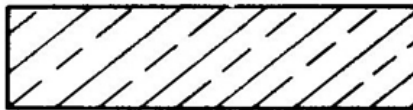
CAST IRON



STEEL



BRASS, BRONZE,
COPPER, etc.



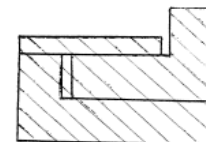
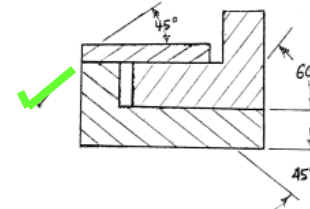
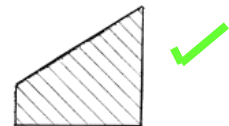
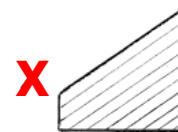
WHITE METAL, ZINC,
LEAD, BABBITT



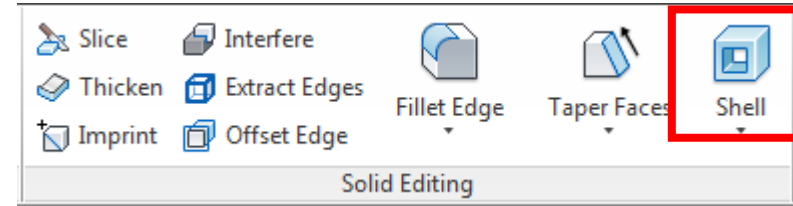
MAGNESIUM, ALUMINUM



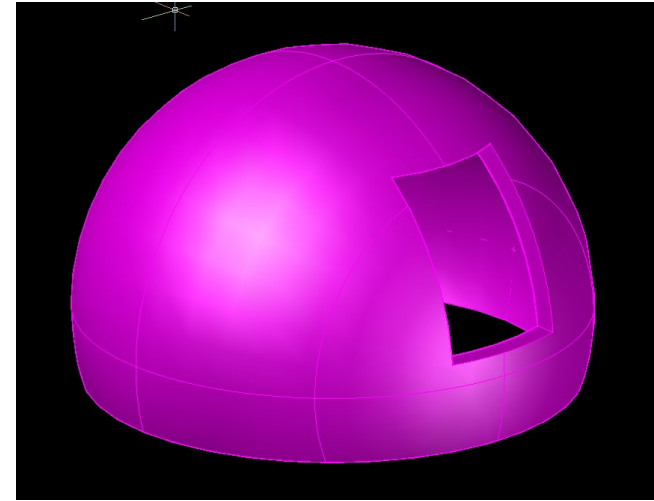
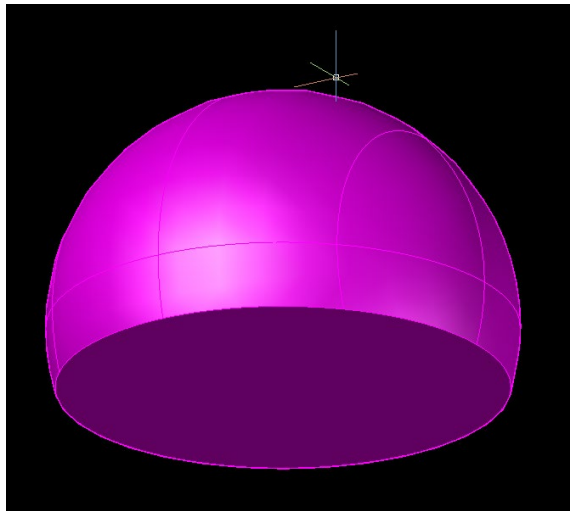
PLASTIC, RUBBER, etc.



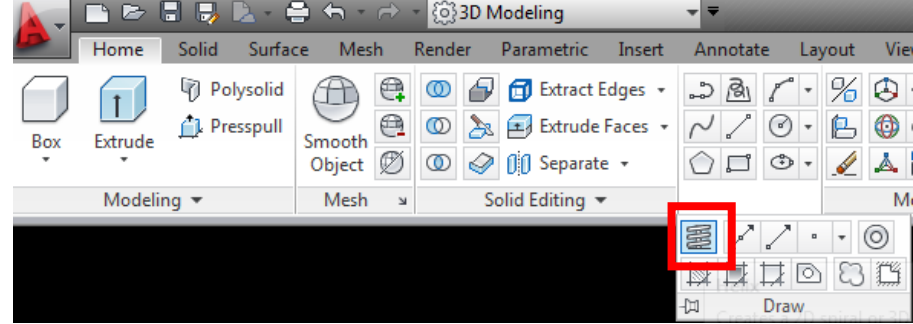
Shell command (solid)



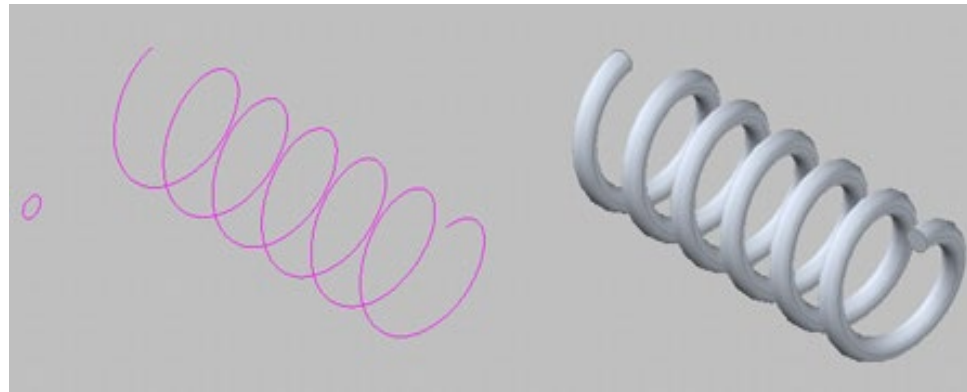
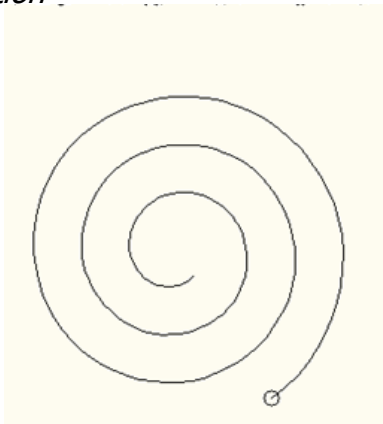
- Convert a 3D solid to a hollow wall, or shell.
- When you can convert a solid object to a shell, new faces are created by offsetting existing faces inside or outside their original positions.



Helix command



- Creates a 2D spiral or 3D spring.
- Use a helix as a sweep path for the SWEEP command to create springs, threads, and circular stairways.
- Command entry: *helix*
- Number of turns = 3 (default)
- Twist = CCW (default)
- Specify center point of base: *Specify a point*
- Specify base radius or [Diameter] <1.0000>: *Specify a base radius, enter d to specify the diameter, or press ENTER to specify the default base radius value*
- Specify top radius or [Diameter] <1.0000>: *Specify a top radius, enter d to specify the diameter, or press ENTER to specify the default top radius value*
- Specify helix height or [Axis endpoint / Turns / turn Height / tWist] <1.0000>: *Specify a helix height, or enter an option*



Exercise 12

