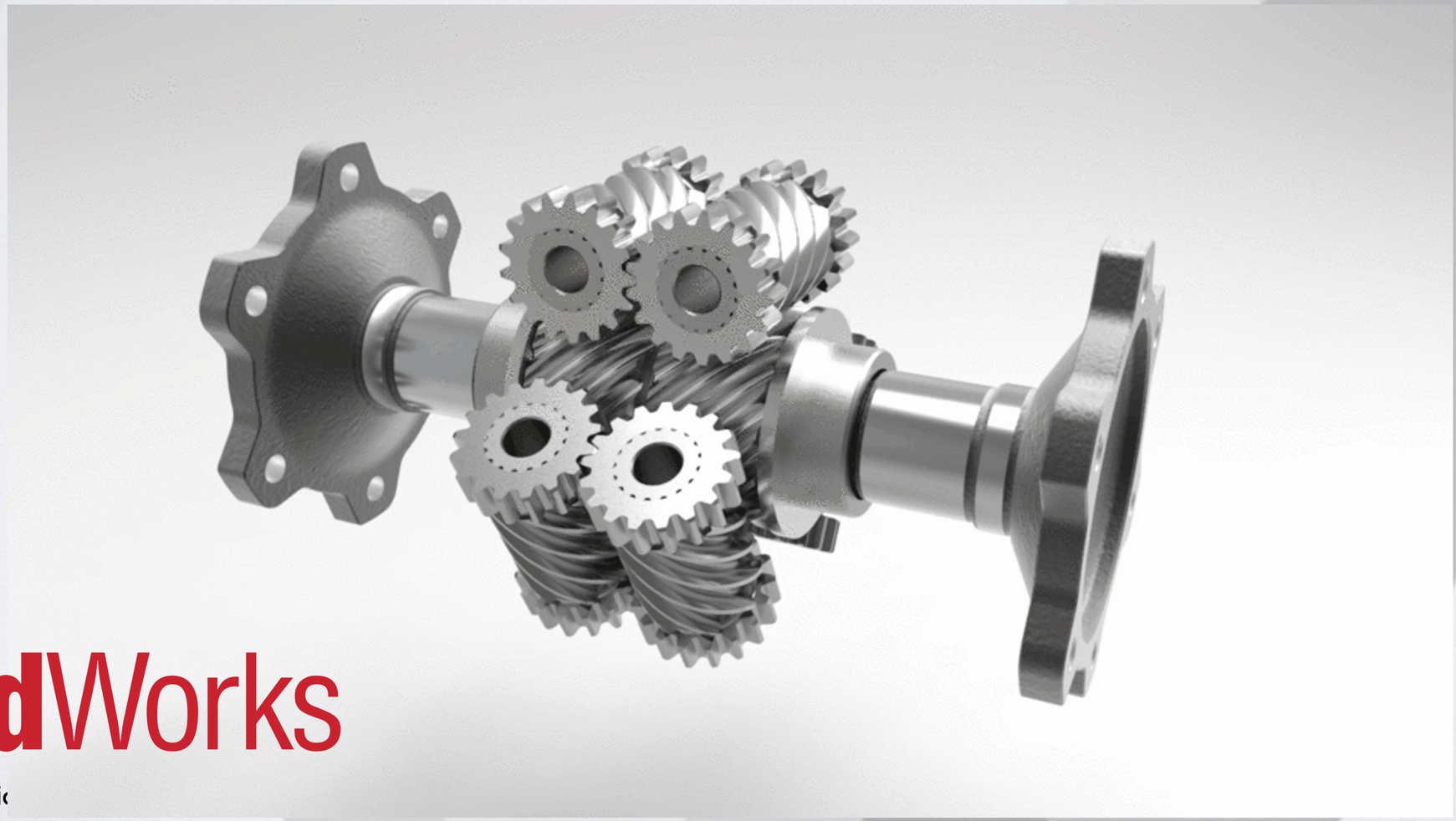
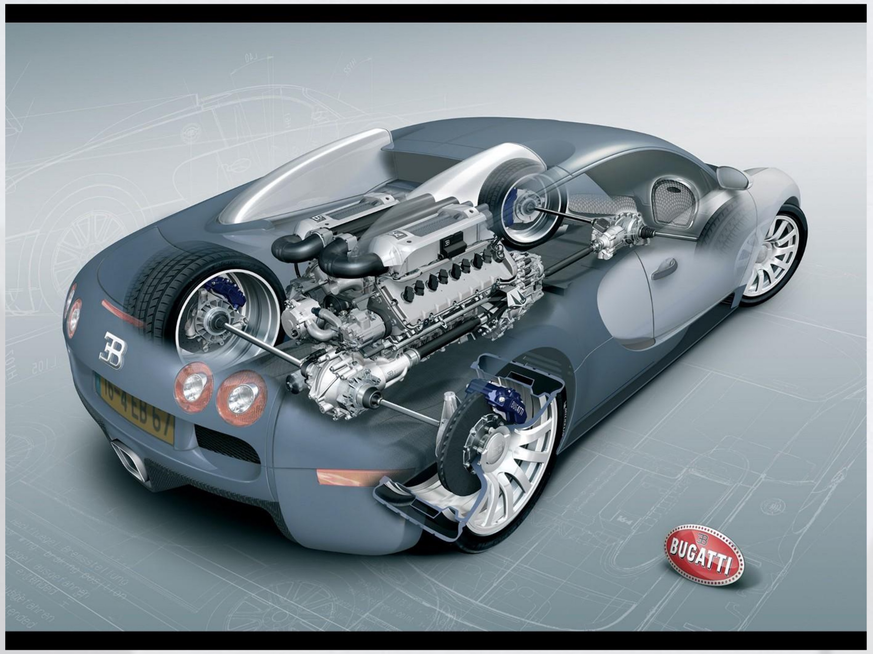
Welcome to SolidWorks

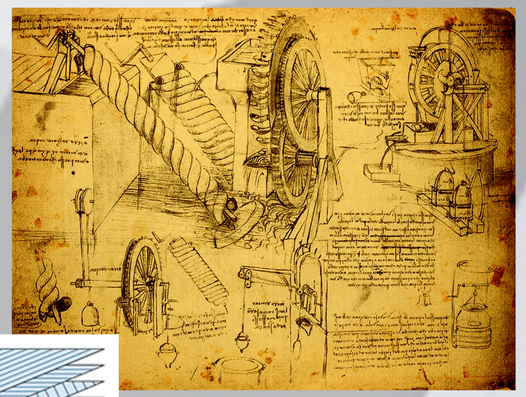


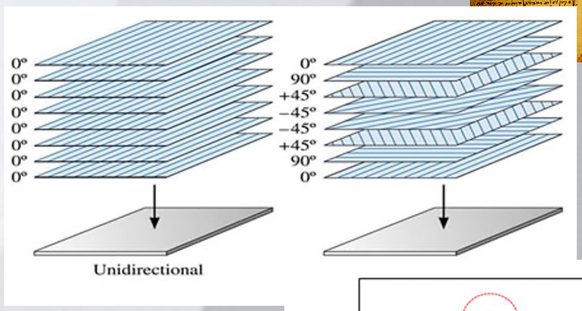
SolidWorks

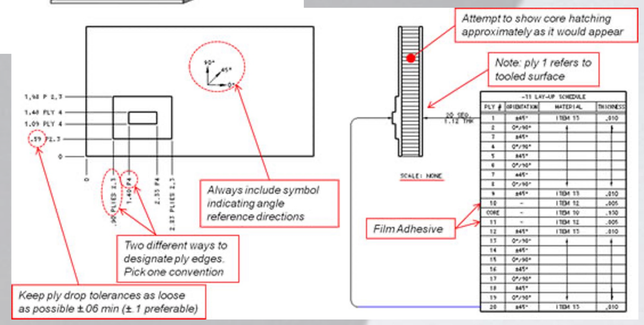
Virtual Reality Applicatio

Computer Aided Design (CAD)









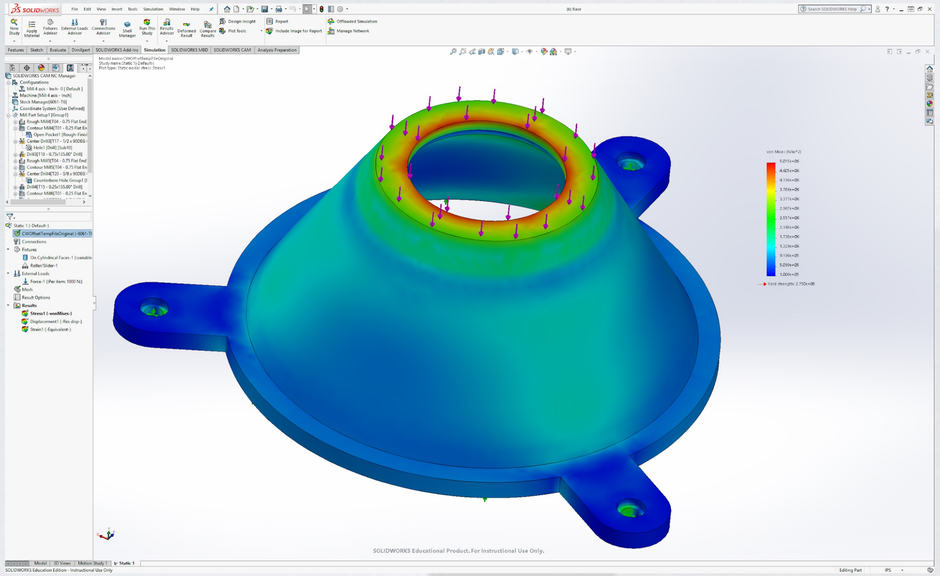
Part

Assemblies

Drawings

Virtual Reality Applications Center

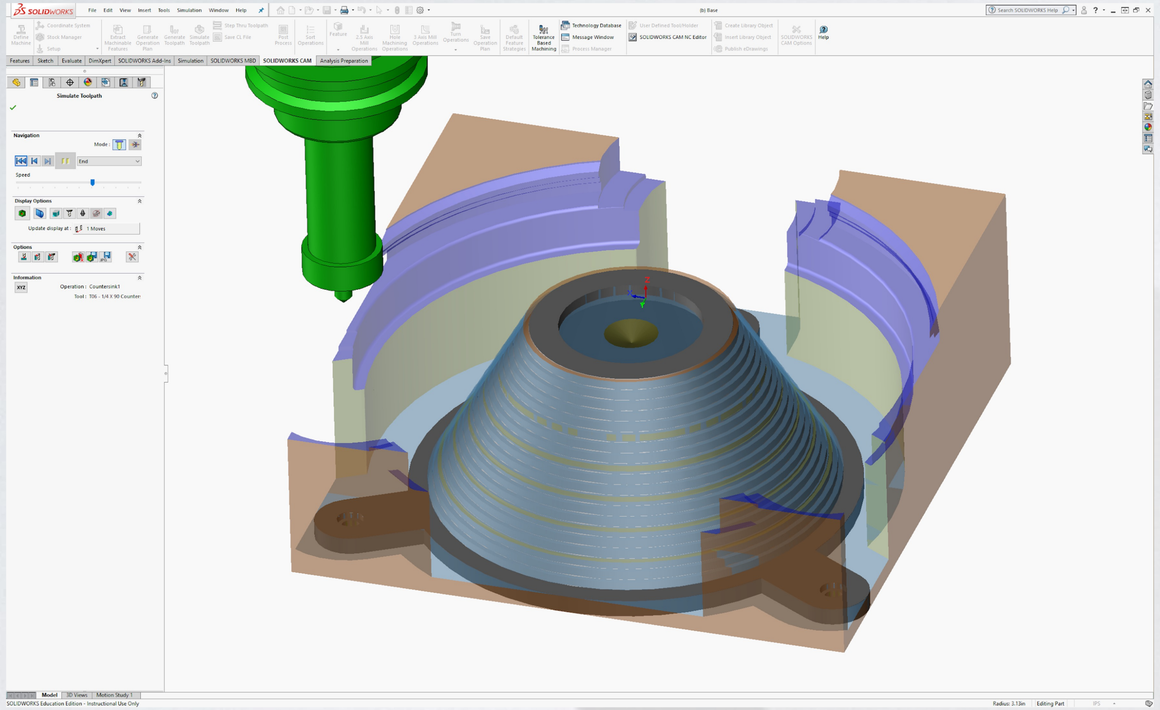
Design Analyses



Finite Element Analysis (FEA)

Topology Optimization

Production Preparation

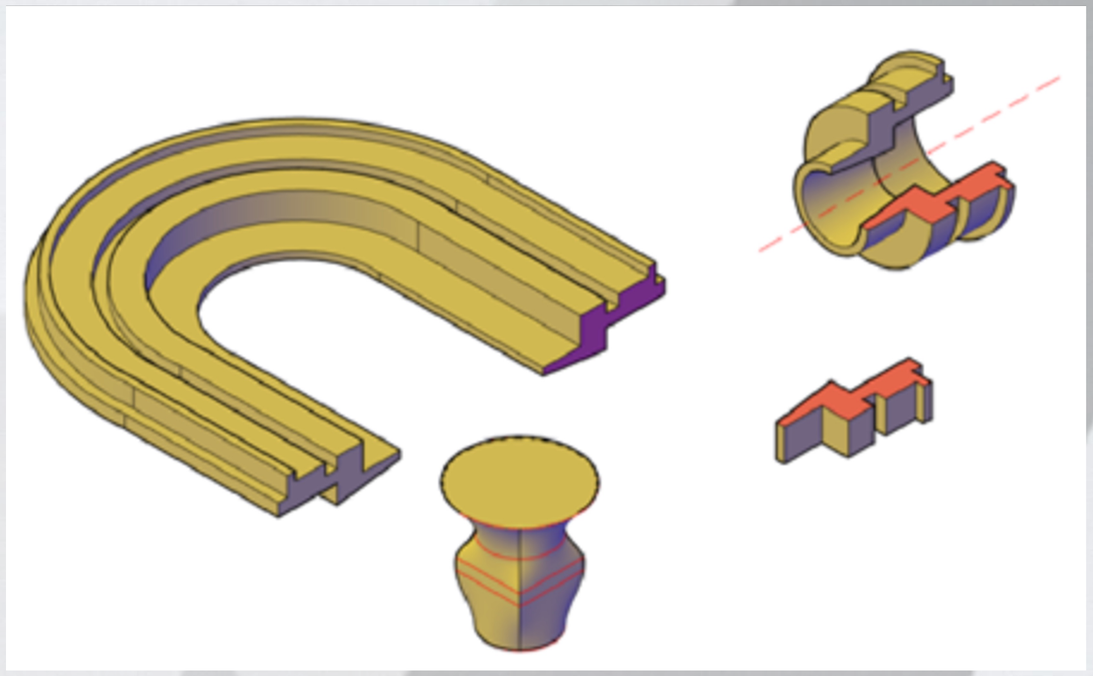


Computer Aided Manufacturing (CAM) Simulation

CAD to XR (AR/VR/MR/Web)

Solid Modeling

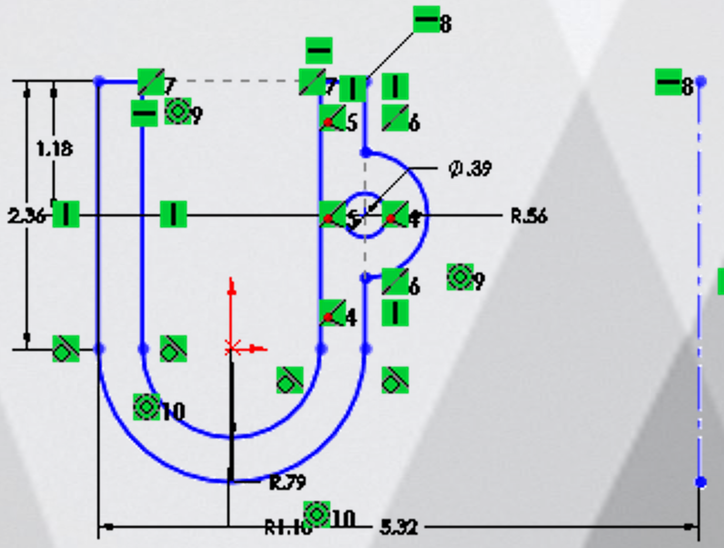
- Defined by:
  - Boundary representation (B-rep)
    - connected surfaces create an inside and outside of the part
- Have these properties:
  - Mass
  - Volume
  - Moment of inertia

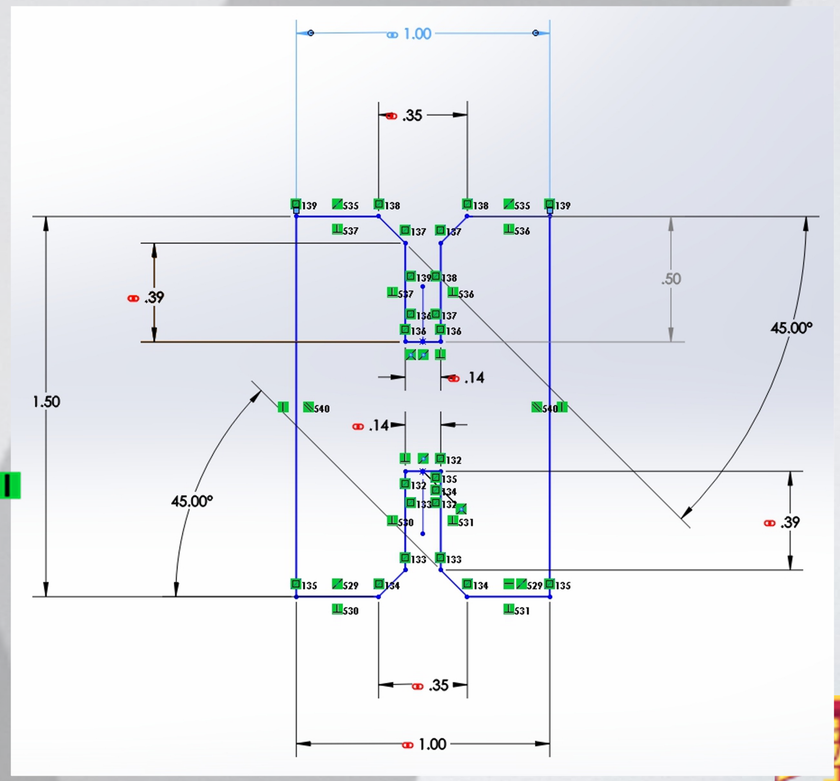


Constraints

- Defined as a limitation or restriction
- Apply constraints to any geometry drawn in Solidworks (under the discretion of the user)

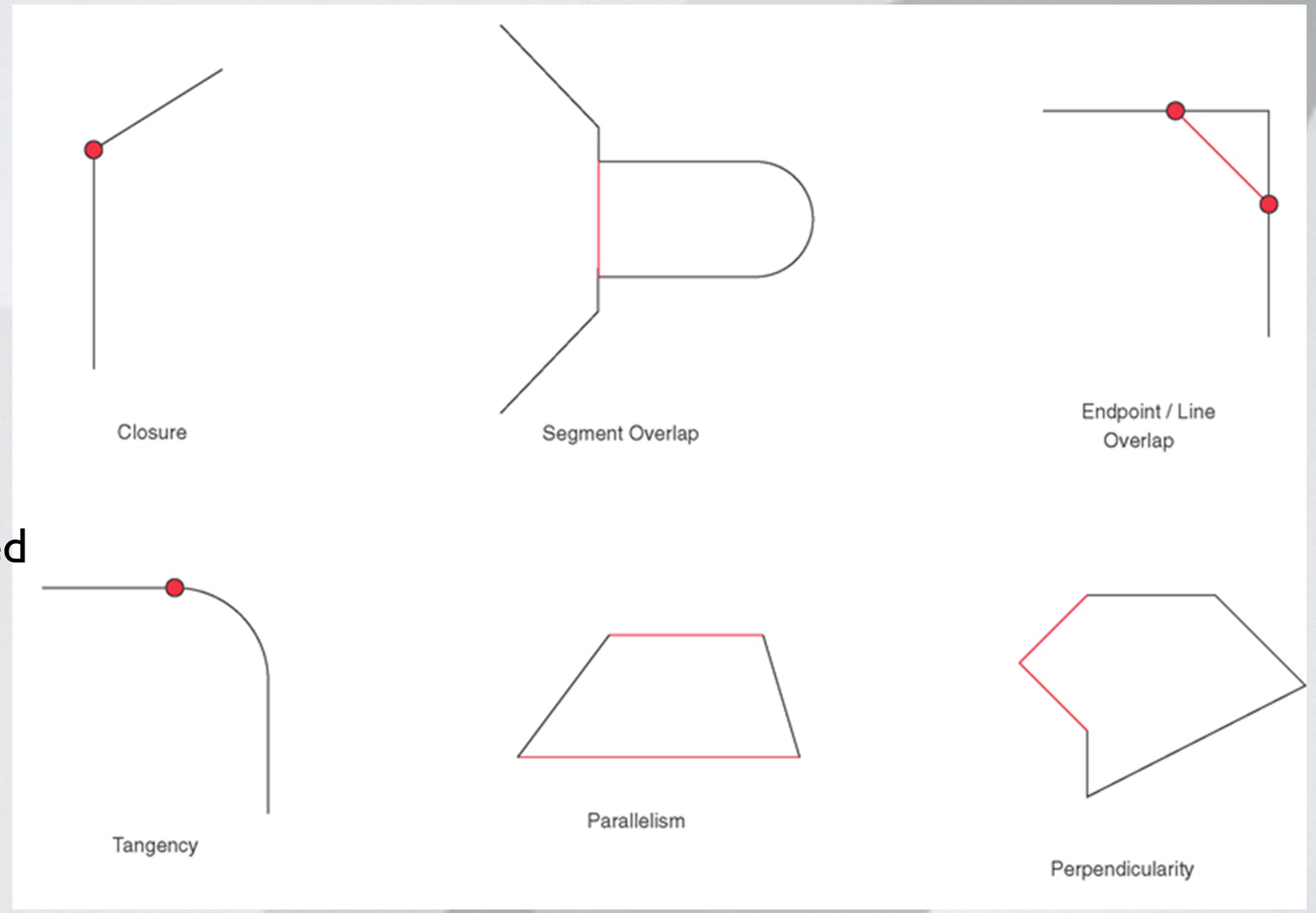
*Constraints in Solidworks look like this.



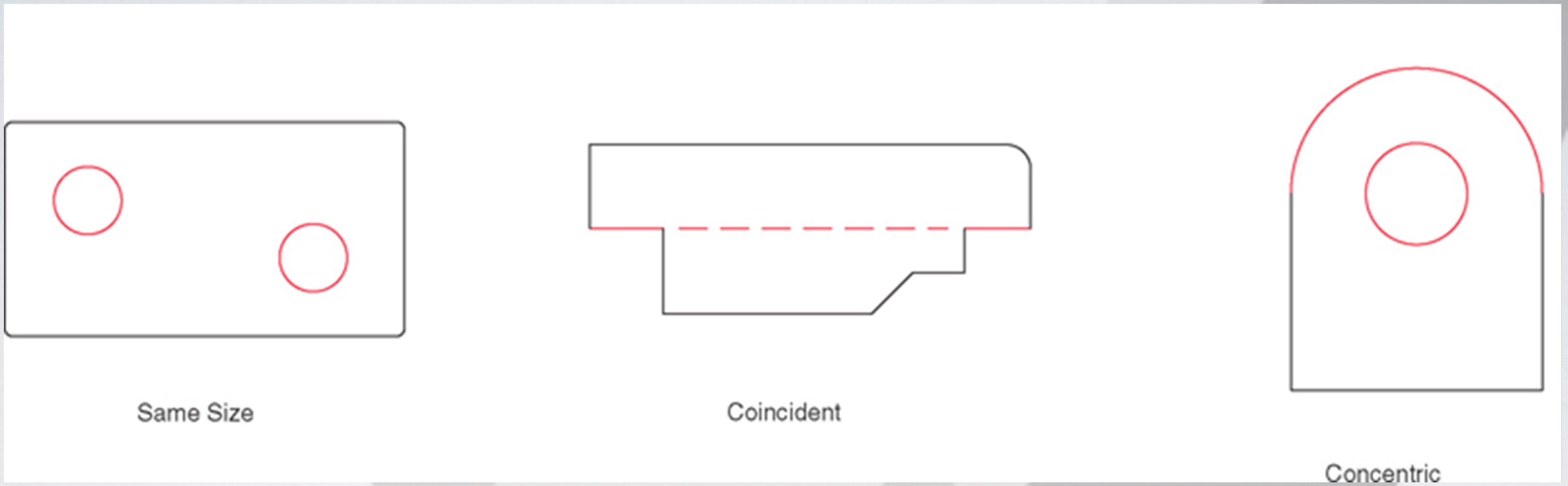


Implicit Constraints

- Geometric relationships implied by the way the profile is drawn and interpreted by Solidworks
  - Note: Solidworks only makes closed profiles, so your profiles must have closure.

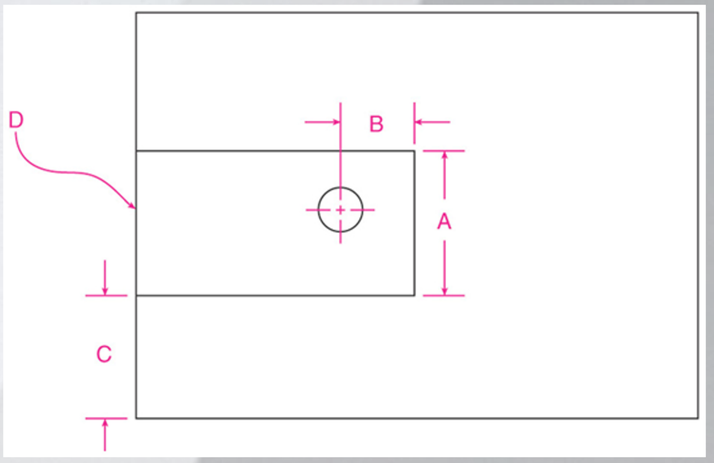


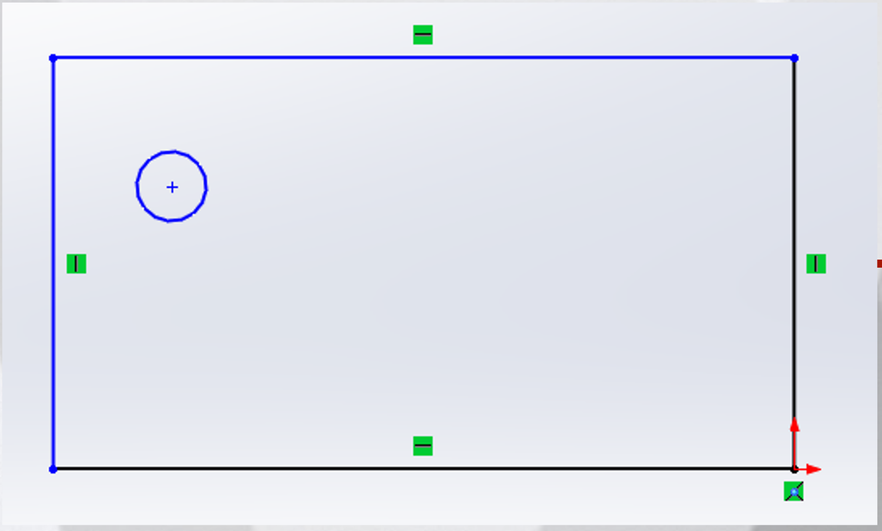
More Implicit Constraints

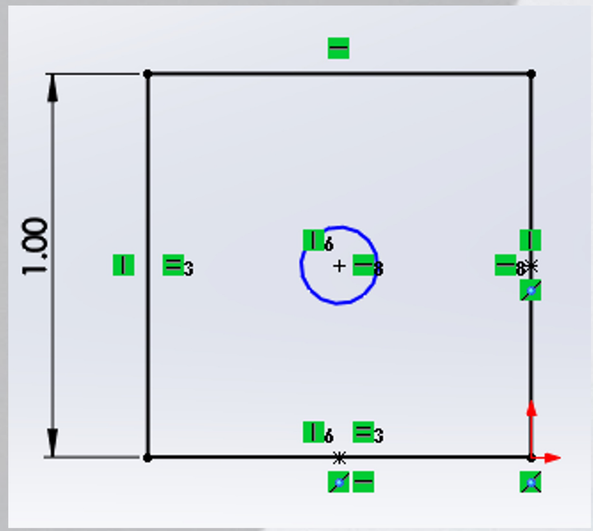


Explicit Constraints

- Defined by the operator
  - Dimensional constraints: assigning a specific length to a line, radius to a circle, etc.
  - Geometric constraints: specifying the ways in which lines/shapes/features relate to one another



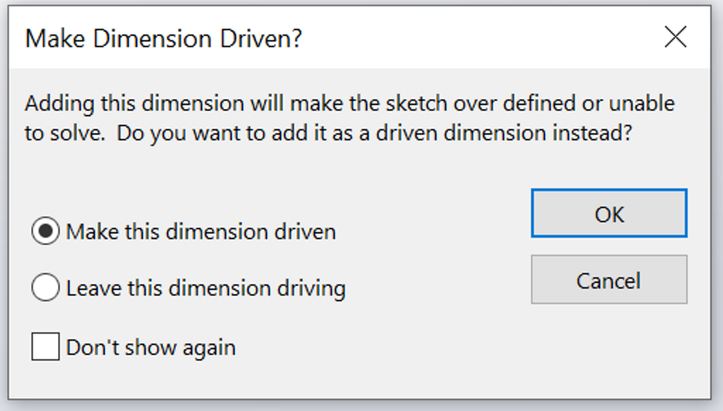


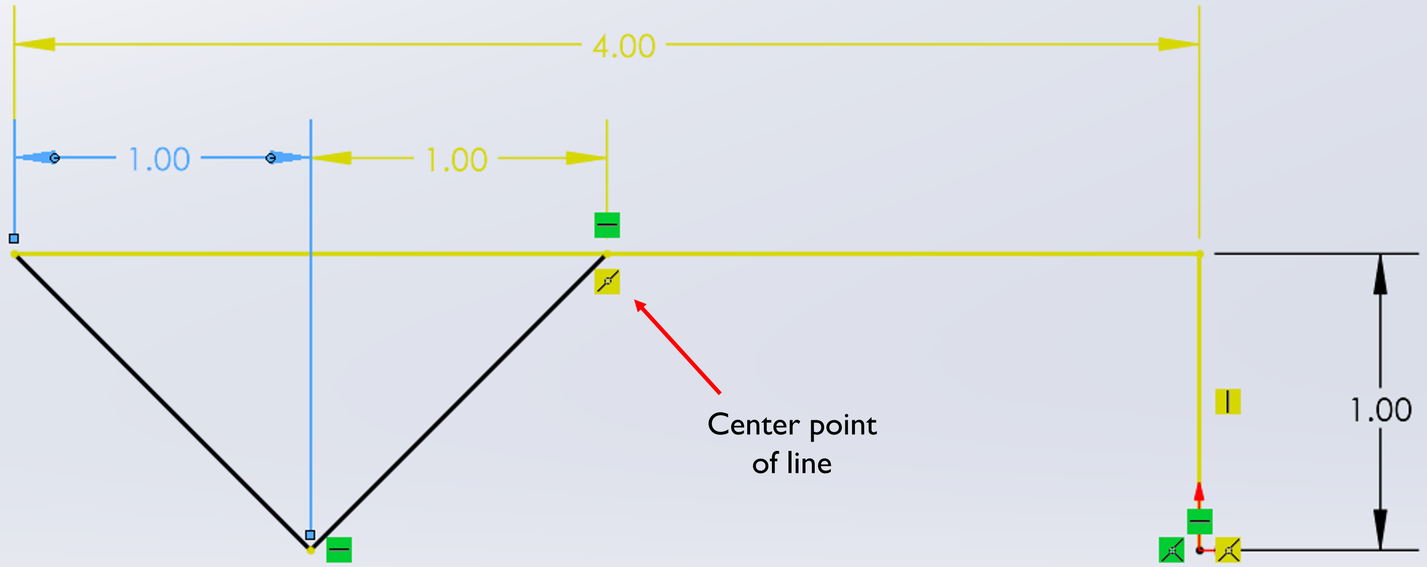


Levels of Constraint

- Fully constrained
  - Every element has been completely dimensioned/specified
- Underconstrained
  - Not all elements are dimensioned/specified (leaves interpretation up to Solidworks)
- Overconstrained
  - Adding a new constraint would conflict with existing constraints (Solidworks won't let another dimension be added)

Example of an Overconstrained Sketch



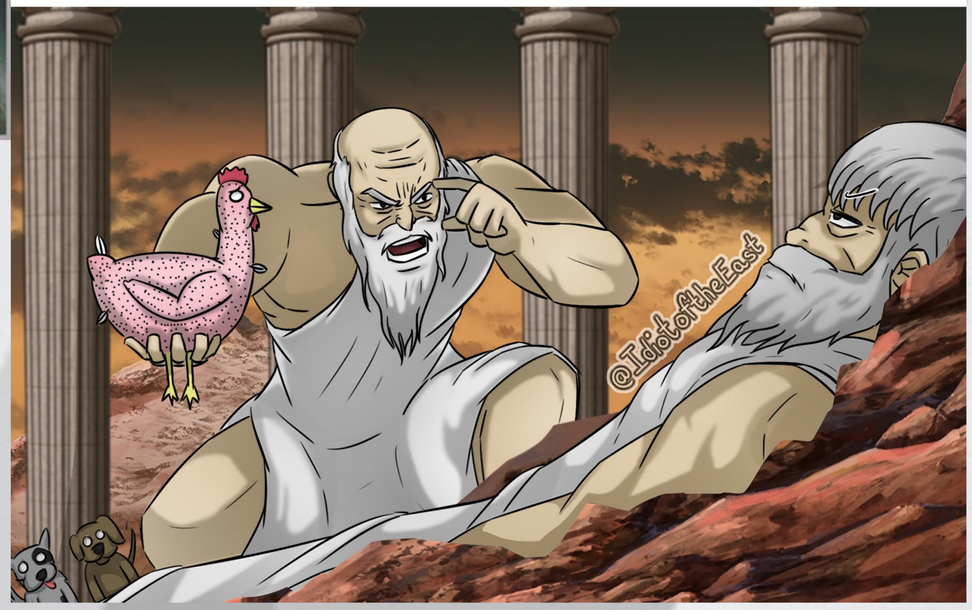


Driven Dimension: is *driven by* the model *Changing the model → changes this driven dimension value

Driving Dimension: *drives* the model *Changing this driving dimension → changes the model

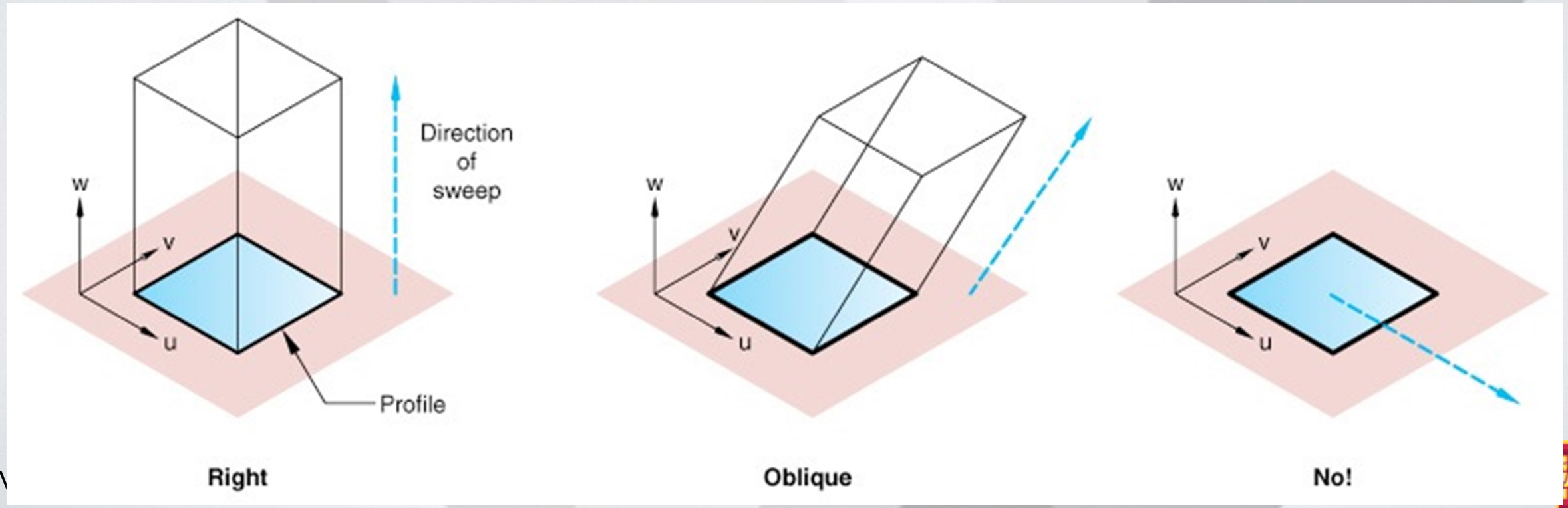
You can't just define man as "featherless bipeds"! I mean look at this chicken I just plucked! Does this featherless biped look like a man to you?!

THINK PLATO THINK!

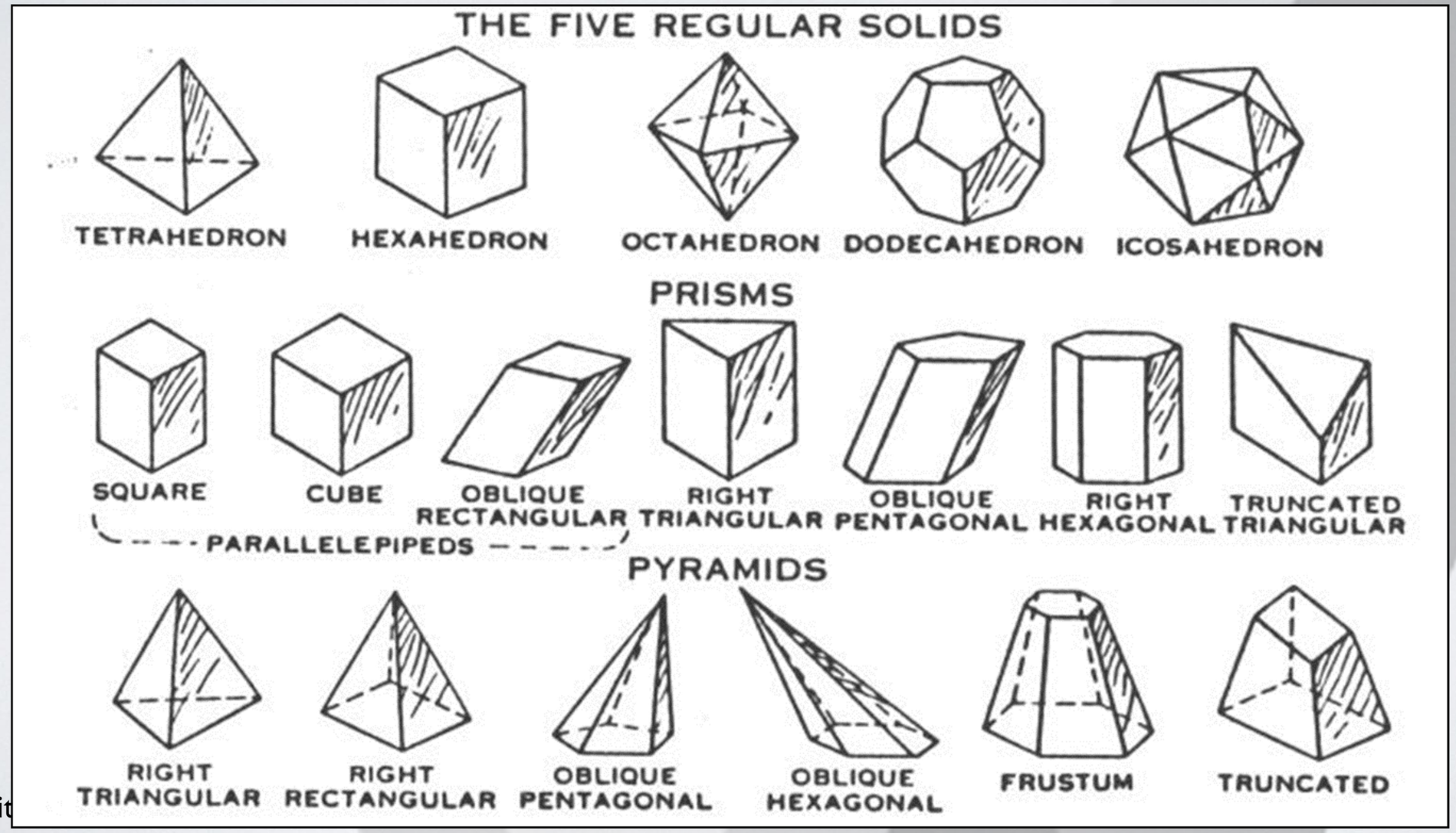


One of the basic steps…Extrusion

- Linear Extrusion: starts with closed polygon (profile) drawn on a plane, and then swept along a defined path for a defined length

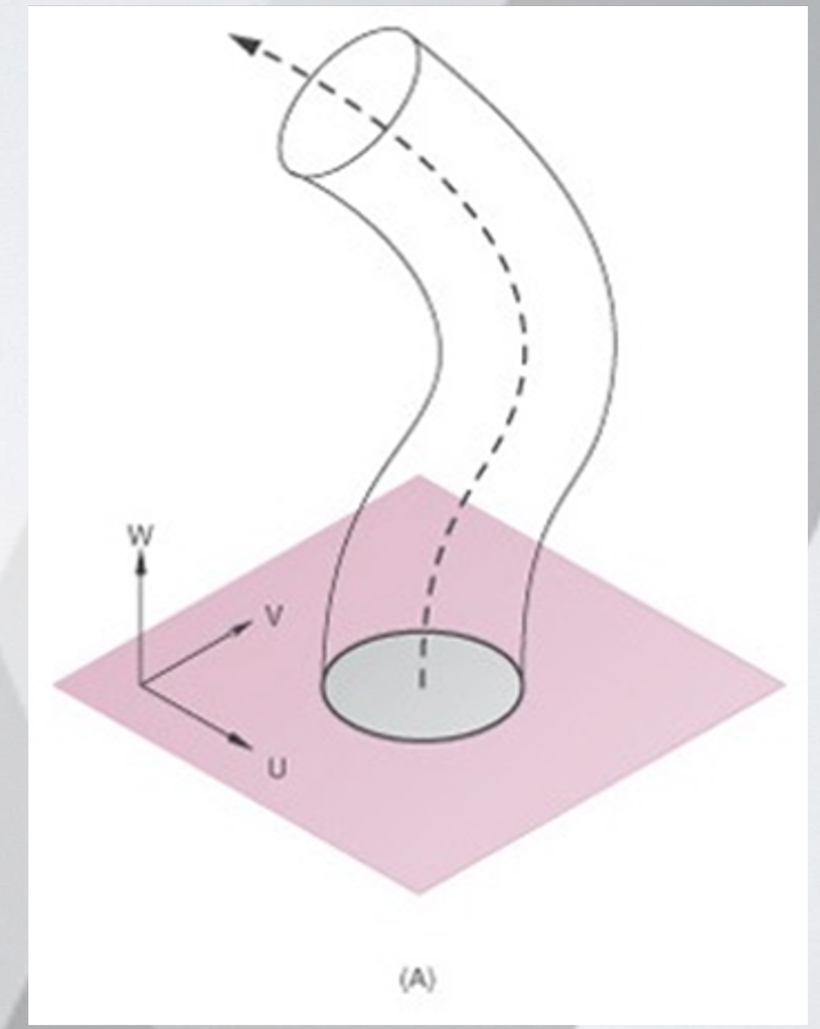


Extruding a primitive shape allows you to make some of these 3D objects…



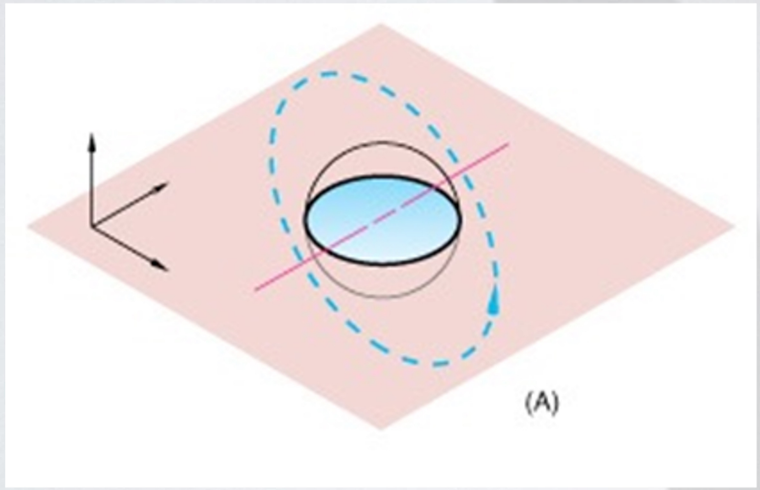
Path-based Extrusion

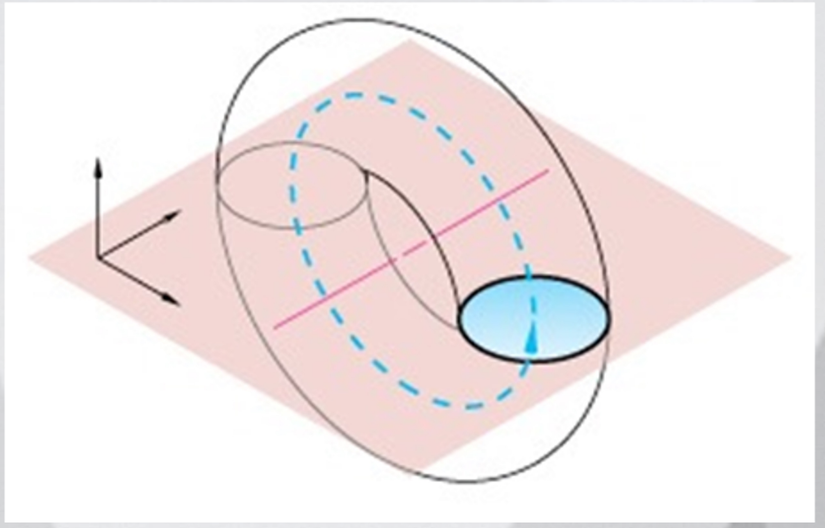
- Sweep: create a profile and define its path to be extruded along

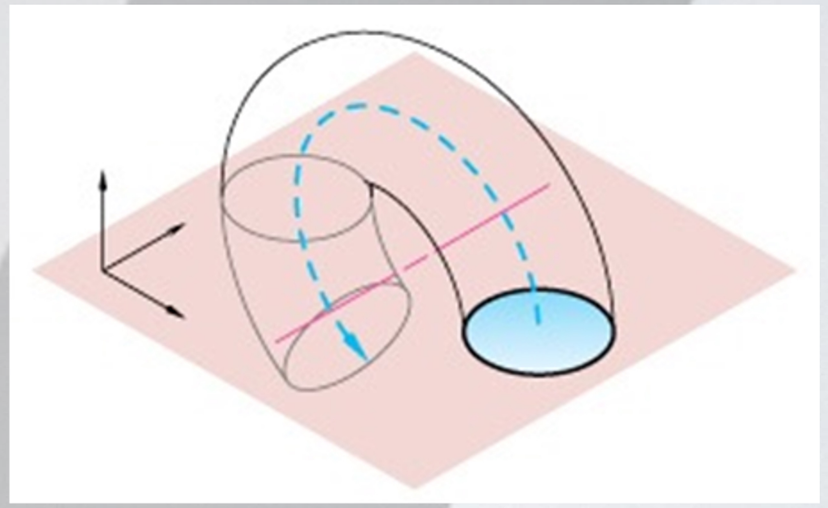


Revolute Extrusions

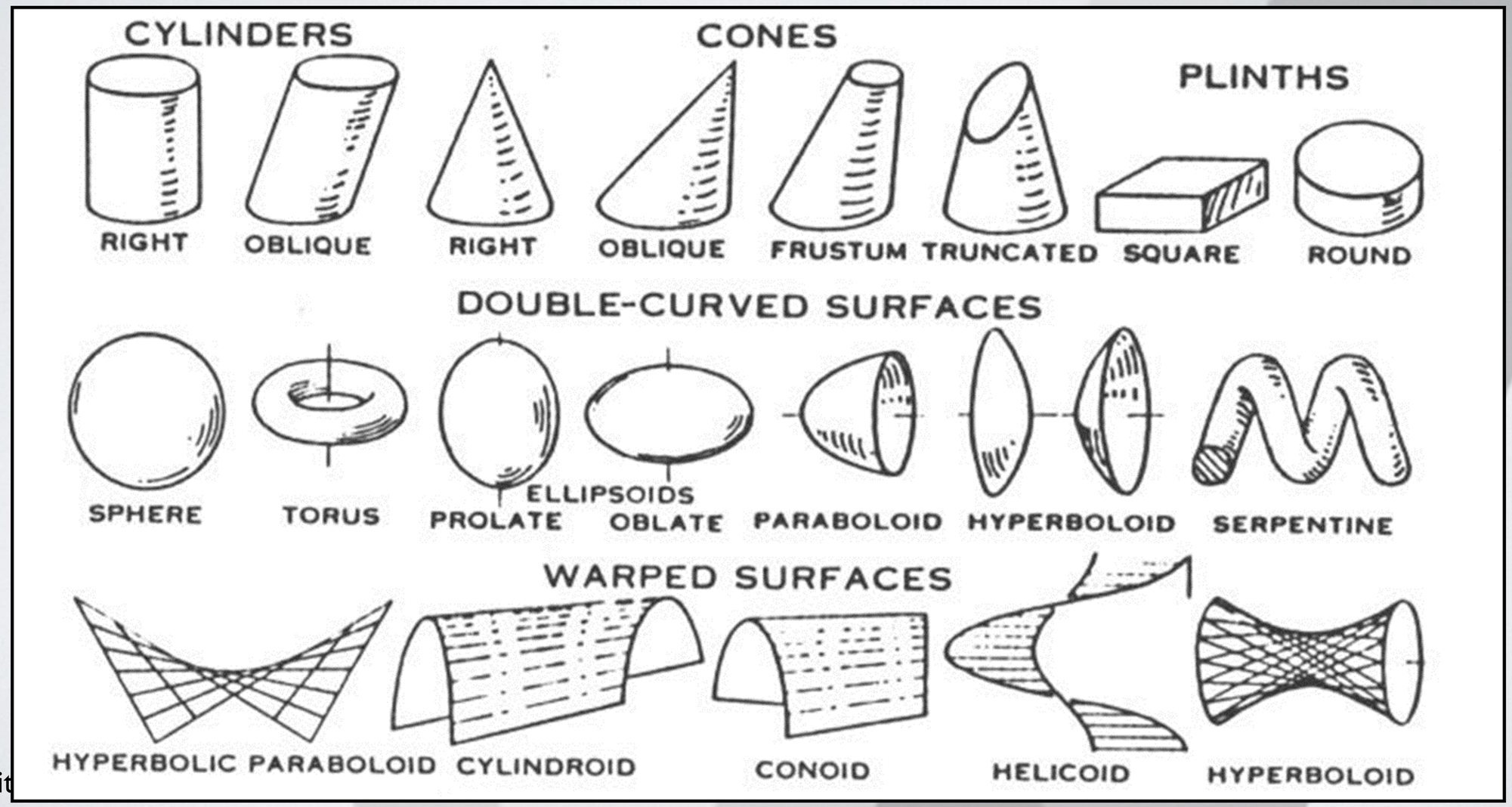
- Start with a drawn profile and define an axis of rotation about which the profile is rotated for a defined angle.



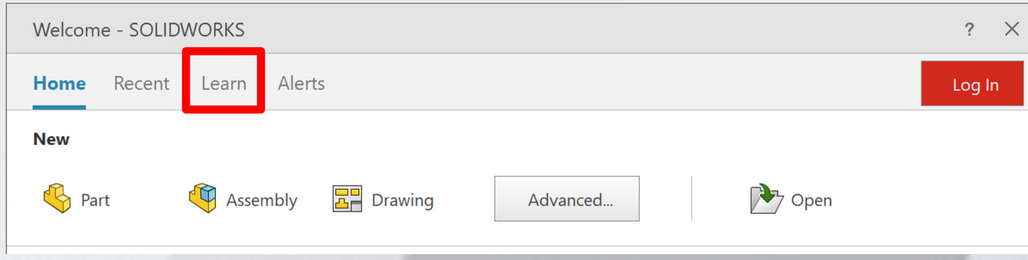
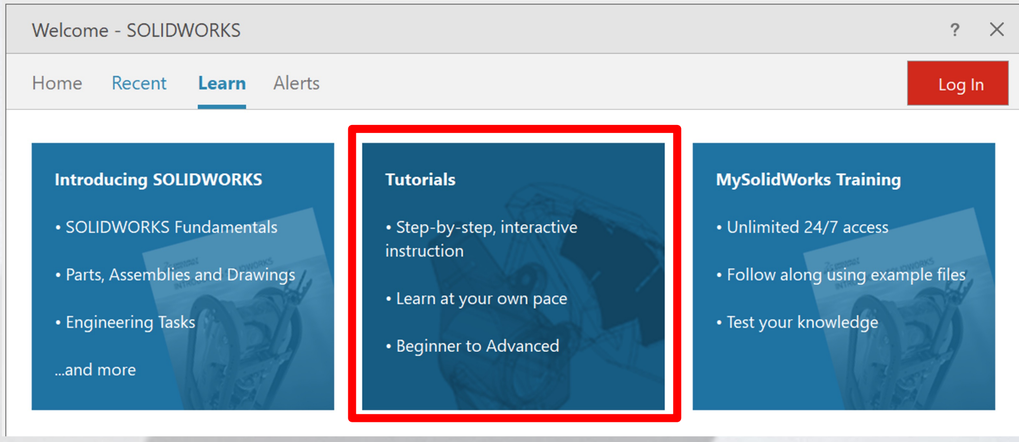
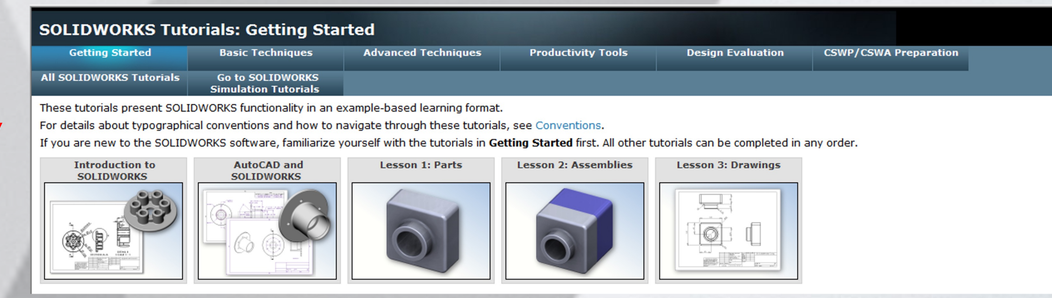




Path-based and Revolute Extrusions allow you to make some of these 3D objects….



Activity

- Complete the **Lesson 1: Parts tutorial**
  - How to get there: Tutorials>Getting Started>Lesson 1: Parts
- Complete **Revolves and Sweeps tutorial**
  - How to get there: Tutorials>Basic Techniques>Revolves and Sweeps

***Let me know if you have any questions!