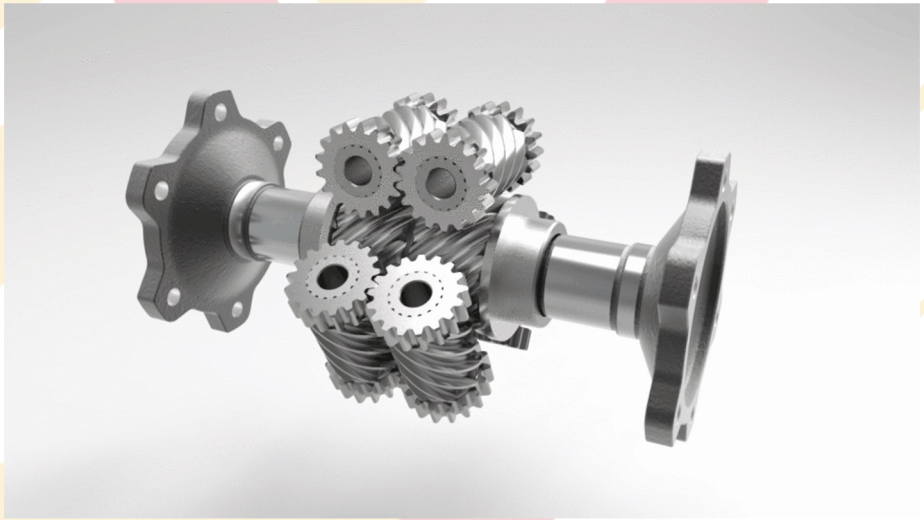
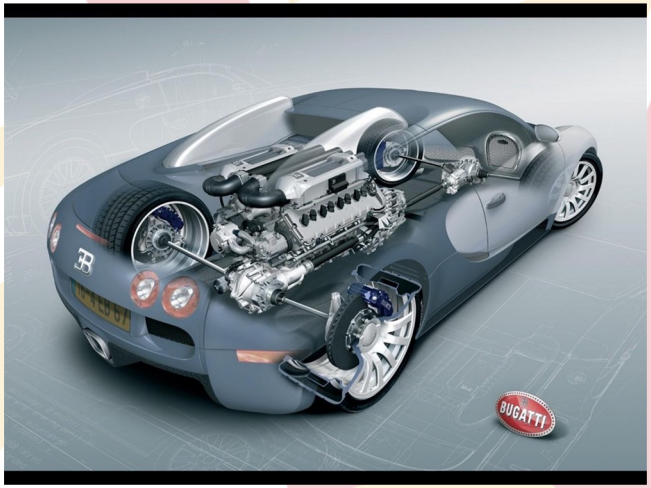
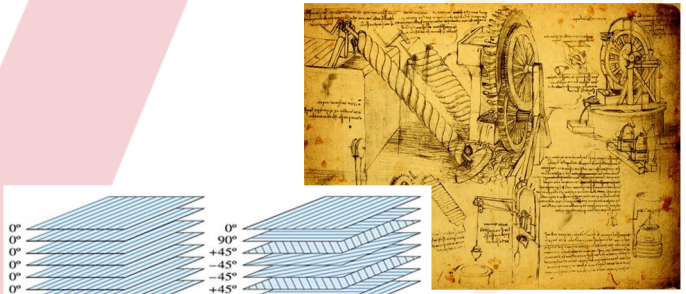
Welcome to SolidWorks

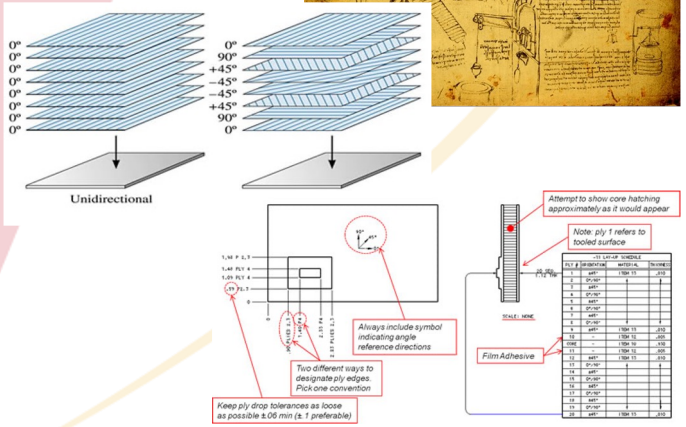


SolidWorks

Computer Aided Design (CAD)





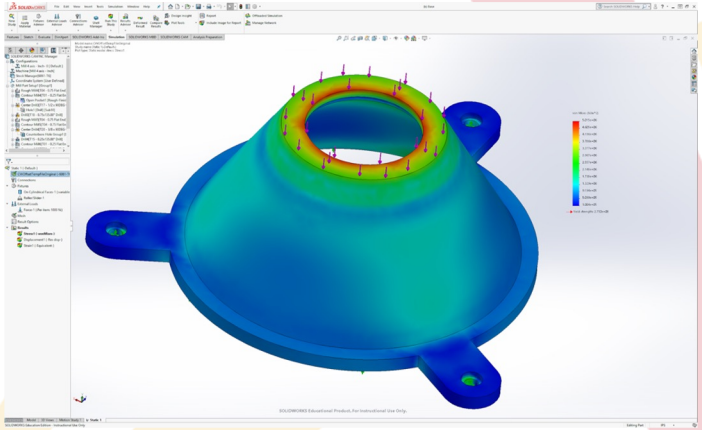


Part

Assemblies

Drawings

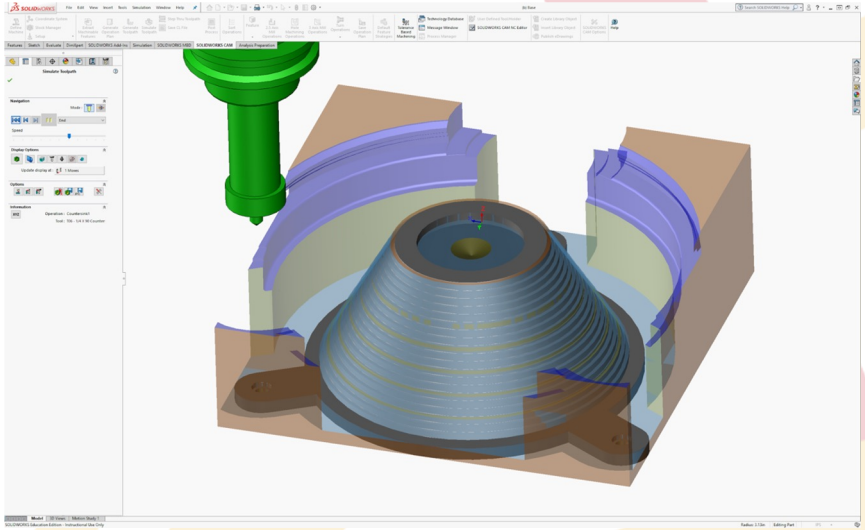
Design Analyses



Finite Element Analysis (FEA)

Topology Optimization

Production Preparation

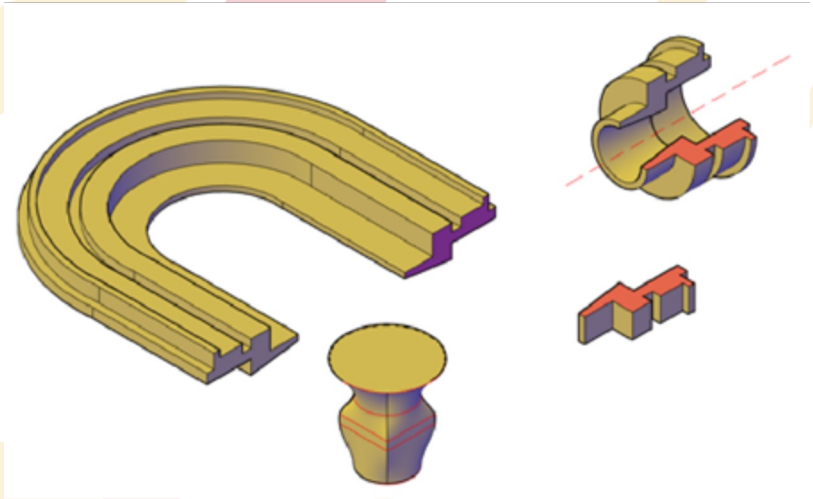


Computer Aided Manufacturing (CAM) Simulation

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

Solid Modeling

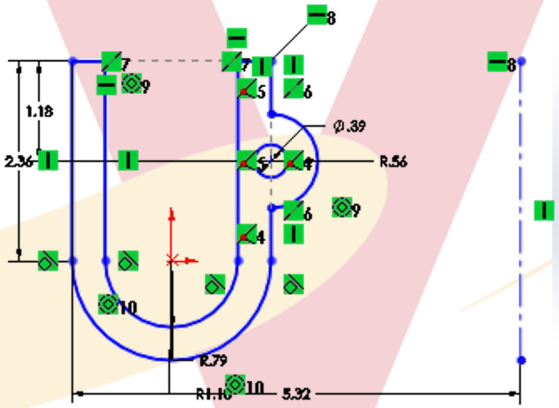
- Defined by:
  - Boundary representation (B-rep)
    - connected surfaces create an inside and outside of the part
- Have these properties:
  - Mass
  - Volume
  - Moment of inertia

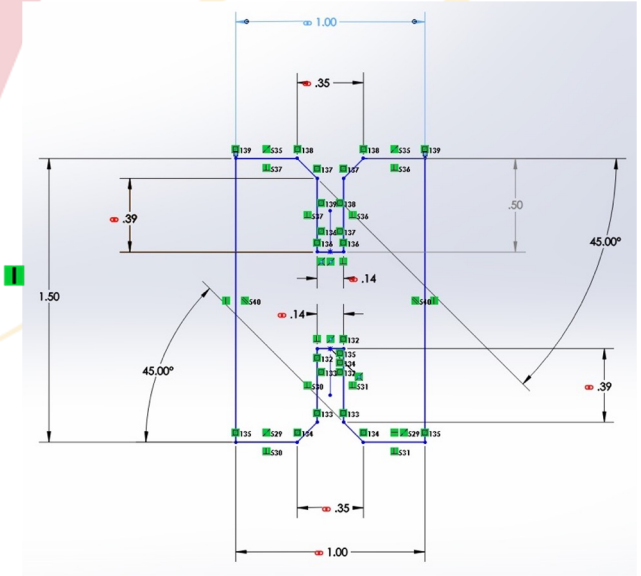


Constraints

- 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.

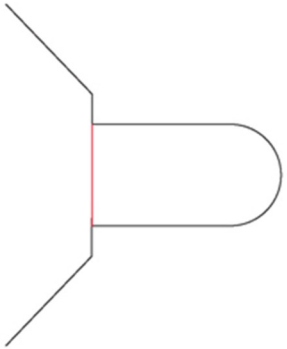




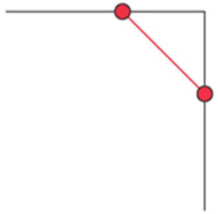
Implicit Constraints

- 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.

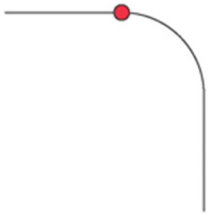
Closure



Segment Overlap

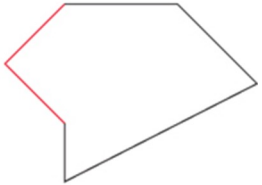


Endpoint / Line Overlap



Tangency

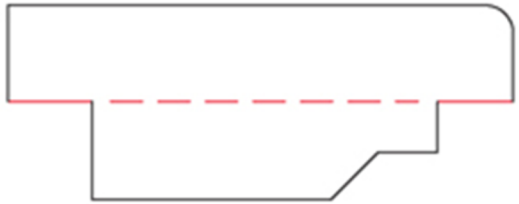
Parallelism



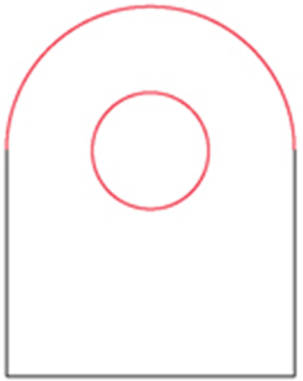
Perpendicularity

More Implicit Constraints

Same Size



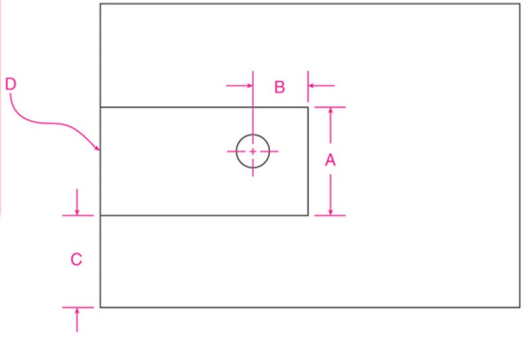
Coincident

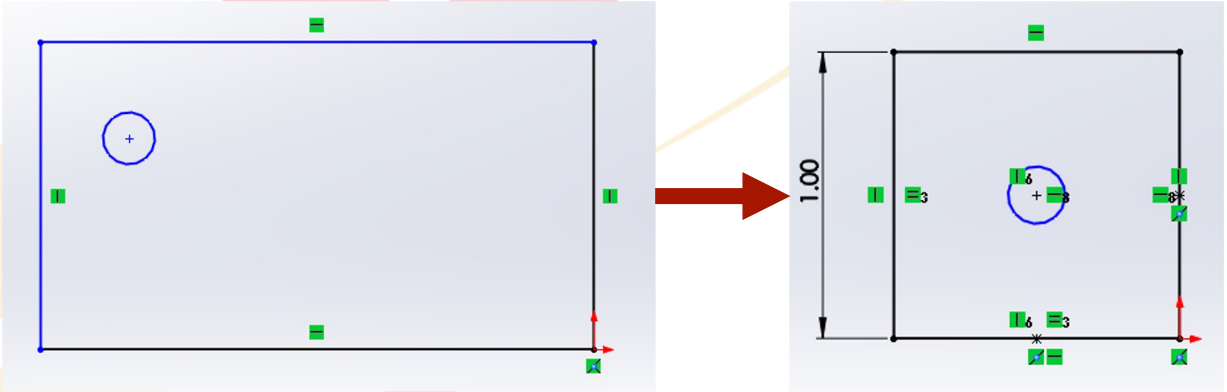


Concentric

Explicit Constraints

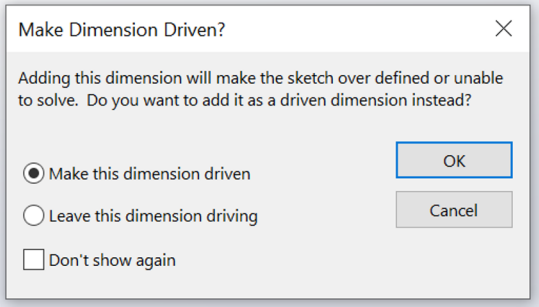
- Defined by the operator
  - Dimensional constraints: assigning a specific length to a line, radius to a circle, etc.
  - Geometric constraints: specifying the ways in which lines/shapes/features relate to one another

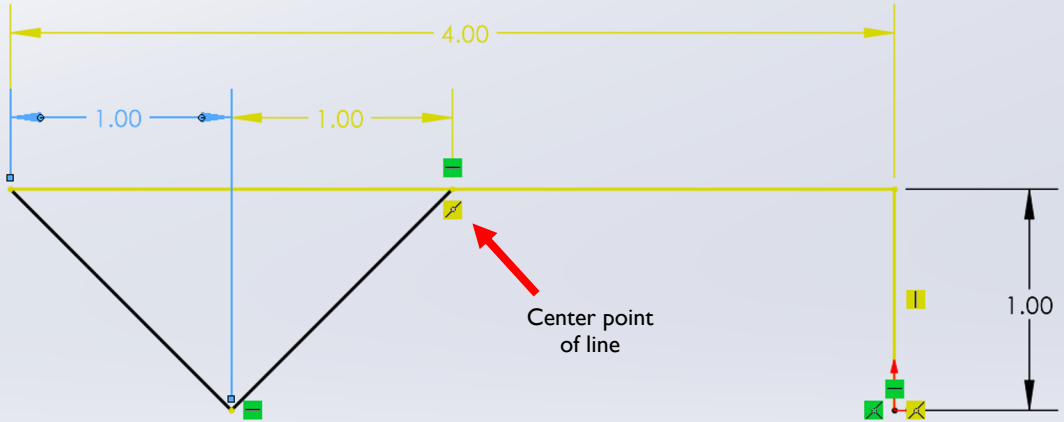




Levels of Constraint

- 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)





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


Take a Break Buddy!
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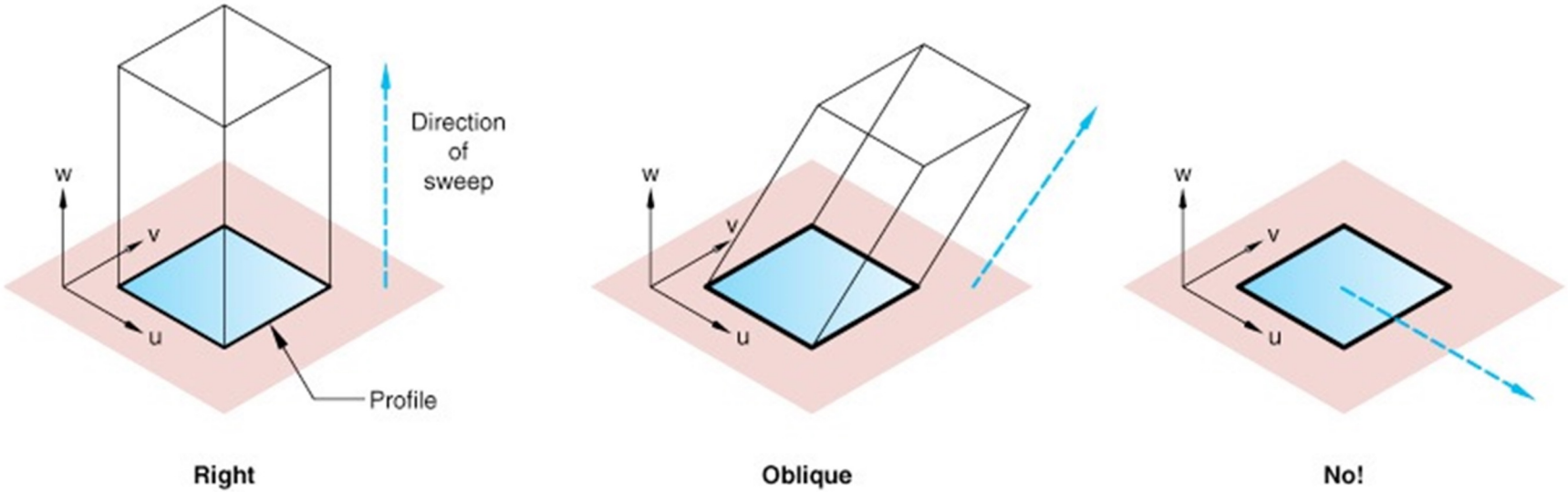
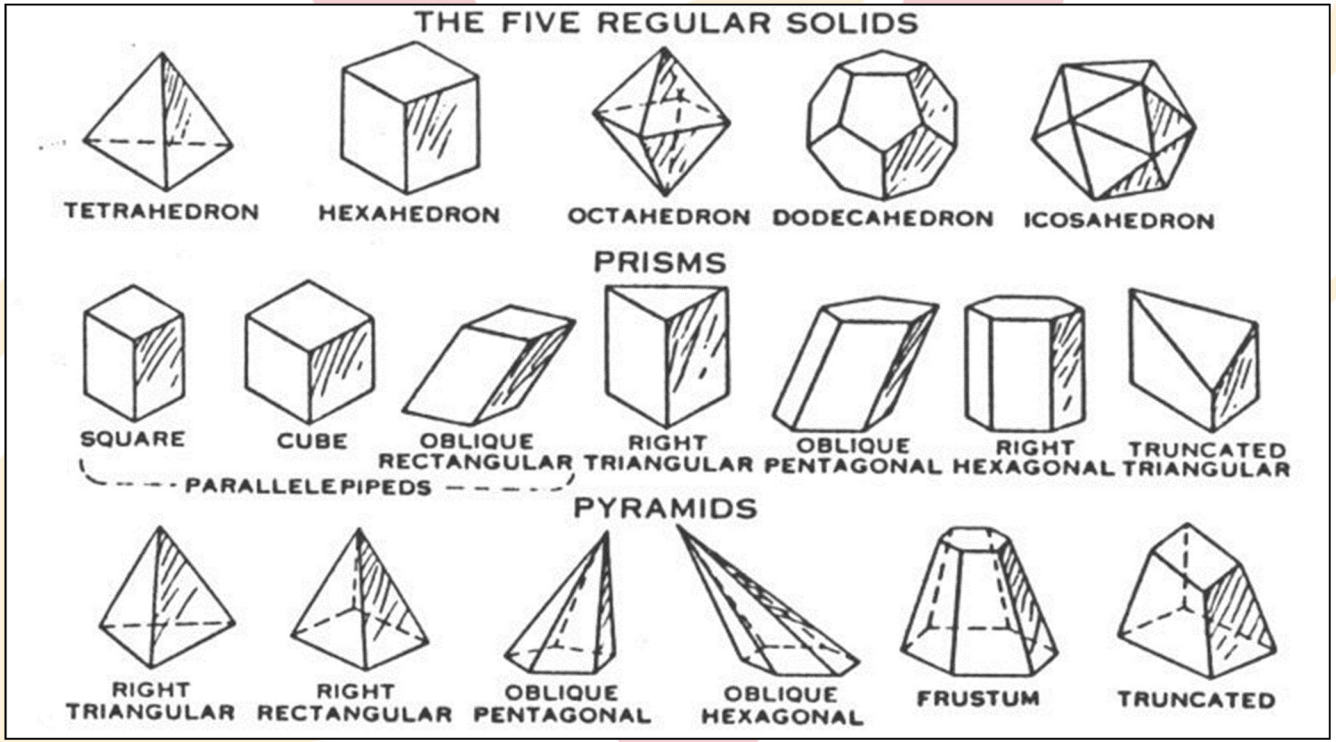
One of the basic steps…Extrusion

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

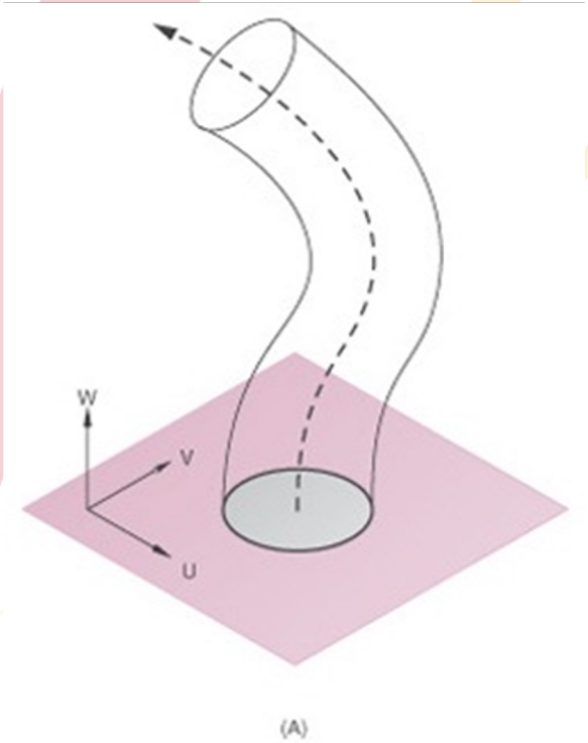


Extruding a primitive shape allows you to make some of these 3D objects…



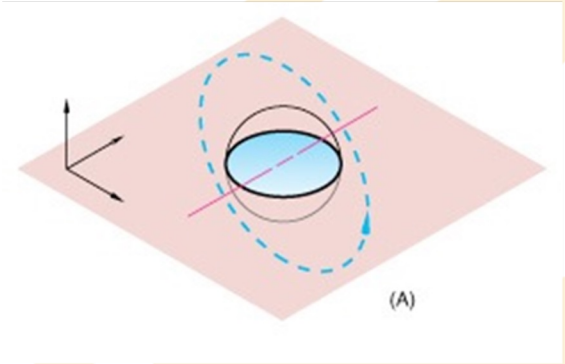
Path-based Extrusion

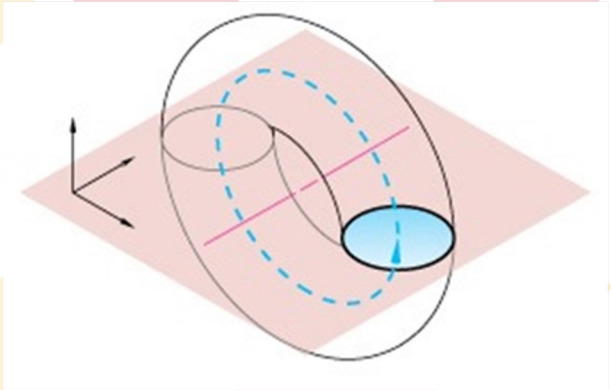
- Sweep: create a profile and define its path to be extruded along

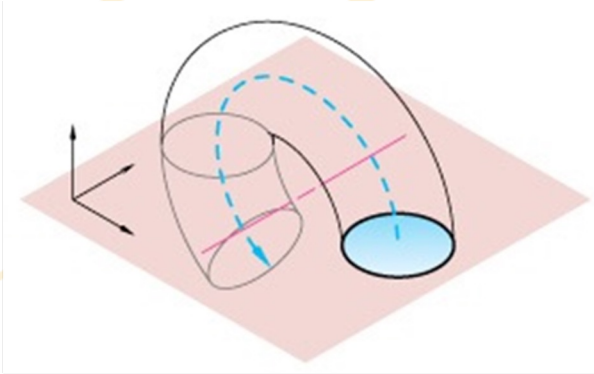


Revolute Extrusions

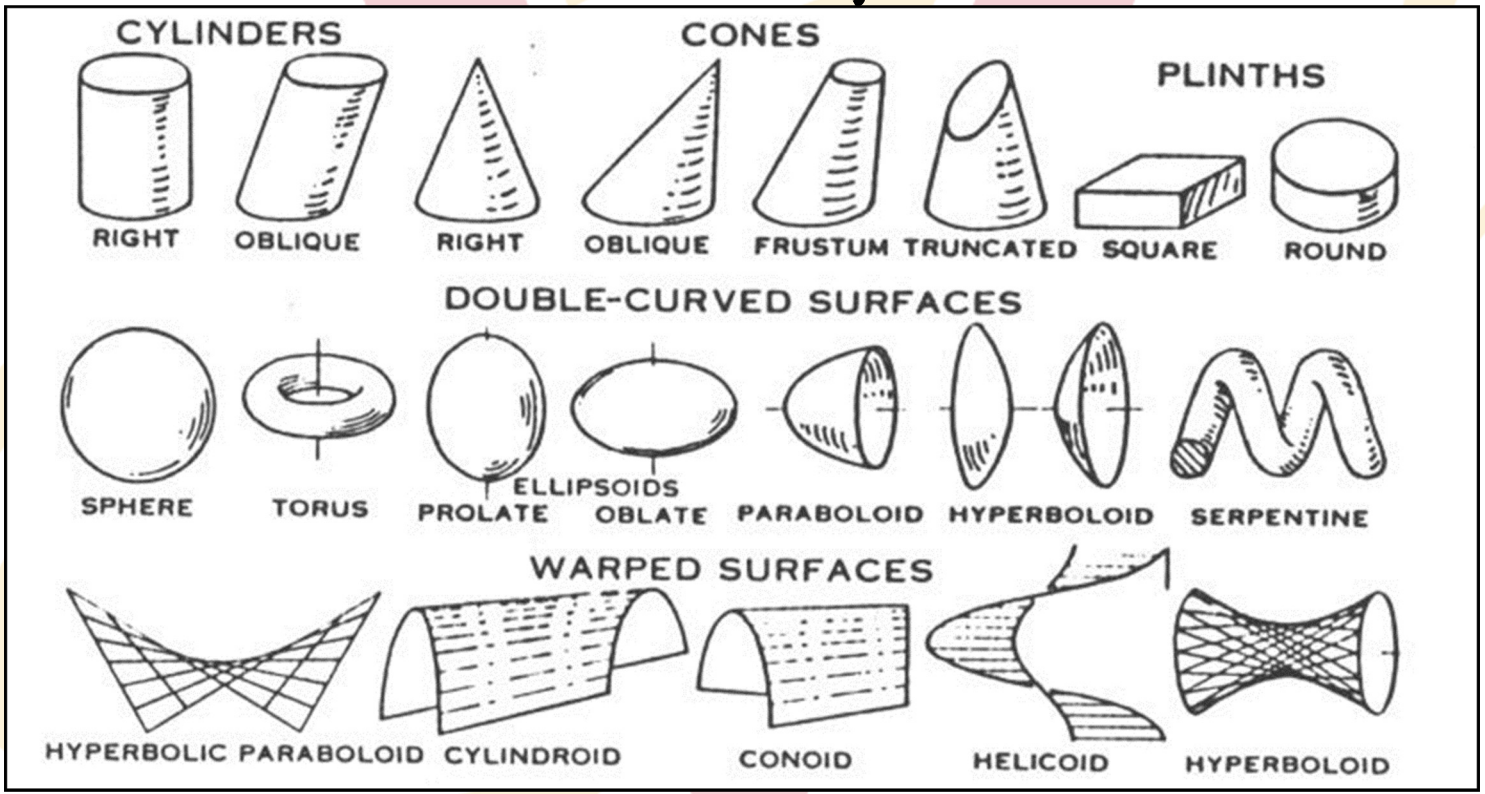
- Start with a drawn profile and define an axis of rotation about which the profile is rotated for a defined angle.







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!