

## 2: Derivative Geometry

# Using Existing Geometry

## 1. Snap to it

- Trace edges (object snaps)
- Use it in Boolean Operations

## 2. Use it as profile or path for other operations

- Extrude door/window trim
- Sweep picture frames



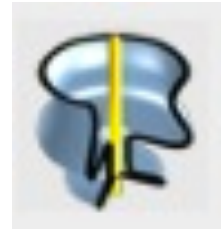
# 3D shapes, 2D “sections”

- Extrusion



- Section & displacement

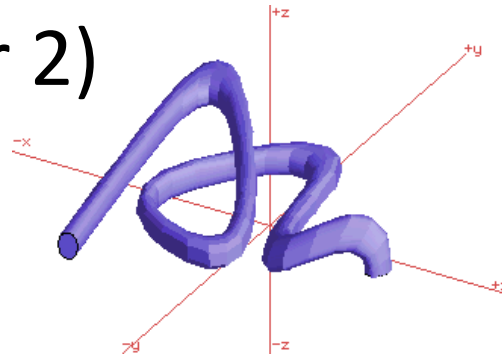
- Revolution



- Section, Axis & angle

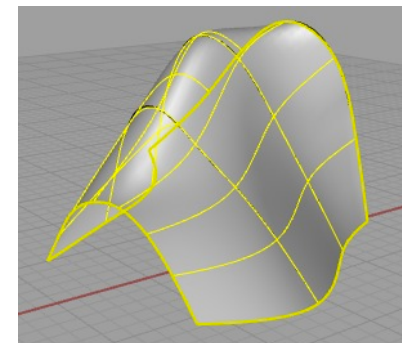
- Sweep (1 rail or 2)

- Section & path



- Lofting

- Multiple sections (aka contours!)





# Boolean Operations

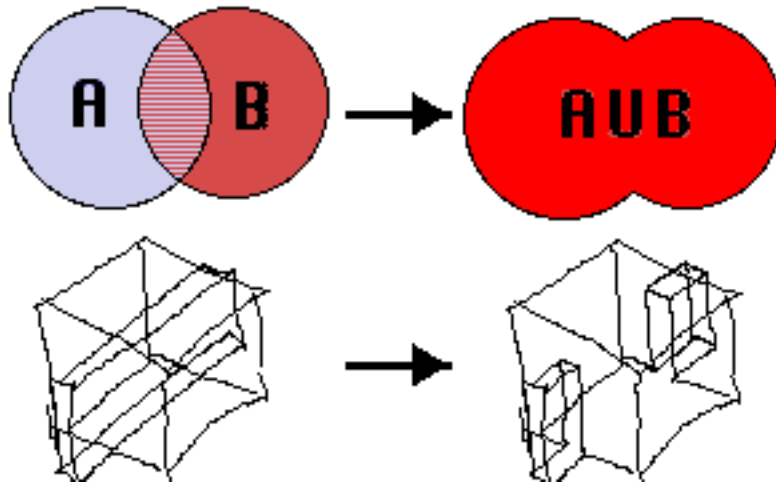
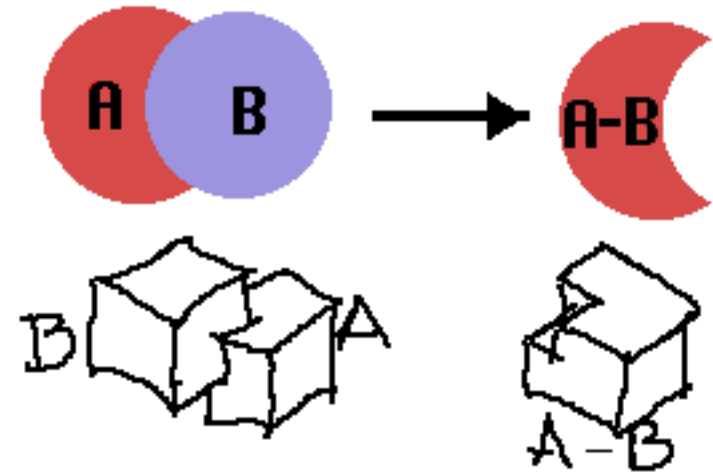
- **Requires “solids” (Rhino “polysurfaces”)**
  - “Closed” or “water-tight”
  - Consistently oriented (surface normals)
  - Passes “Euler” tests
    - No dangling edges
    - No shared points (touching corners)
    - No shared edges (touching edges)



# Boolean Operations

- **Difference**

- Subtract one volume from another



- **Union**

- Combine one volume with another

# Building Details: openings

## Cut an Opening using Booleans

- “subtract” punched window openings
- “remove” front & back door-ways
- “add” decks and flooring where needed

## Trim the Opening sweeps and extrusions

If repeated, use blocks.

# Building Details: trim

## Building door & window trim #1

- Trace edges, snapping to opening vertexes
- Offset inward.
- Extrude (&cap) inner and outer edges.

## Building door & window trim #2

- Trace edges to provide “rail” for sweep
- Draw cross-section at rail-head
- Sweep cross-section on rail

# Building Details: glazing

## Fixed glazing #1

- Define 1 plane of glass within wall for all windows in that wall.

