

ME 1403 Engineering Practice & Graphics  
Spring 2018

# Lecture 5

Chapter-5

Instructor:

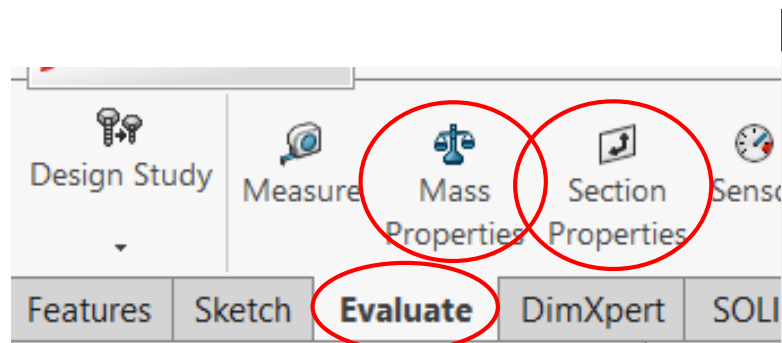
Syed Hasib Akhter Faruqui

[Email: shafnehal@gmail.com](mailto:shafnehal@gmail.com)

# Outline

- Tools / Methods
  - Section Properties / Mass Properties
  - Extrude
  - Thin Feature
  - Revolve
  - Material
- Discussion
  - Questions till Now
  - Mid-Term Exam!

# Section Properties / Mass Properties



**Section Properties**  
Face<1> Options... Recalculate

Report coordinate values relative to: -- default --

Section properties of the selected face of Part1

Area = 3605.12 millimeters<sup>2</sup>

Centroid relative to output coordinate system origin: ( millimeters )  
X = 0.00  
Y = 30.21  
Z = 0.00

Moments of inertia of the area, at the centroid: ( millimeters <sup>4</sup> )  
Lxx = 288709.87      Lxy = 0.00      Lxz = 0.00  
Lyx = 0.00      Lyy = 4351775.66      Lyz = 0.00  
Lzx = 0.00      Lzy = 0.00      Lzz = 4063065.79

Polar moment of inertia of the area, at the centroid = 4351775.66 millimeters <sup>4</sup>

Angle between principal axes and part axes = 90.00 degrees

Principal moments of inertia of the area, at the centroid: ( millimeters <sup>4</sup> )  
Ix = 288709.87  
Iy = 4063065.79

Moments of inertia of the area, at the output coordinate system: ( millimeters <sup>4</sup> )  
LXX = 3579986.25      LXY = 0.00      LXZ = 0.00  
LYX = 0.00      LYY = 4351775.66      LYZ = 0.00  
LZX = 0.00      LZY = 0.00      LZZ = 7354342.16

Help    Print...    Copy to Clipboard

**Mass Properties**  
Part1.SLDPRT Options... Recalculate

Override Mass Properties... Recalculate

Include hidden bodies/components  
 Create Center of Mass feature  
 Show weld bead mass

Report coordinate values relative to: -- default --

Mass properties of Part1  
Configuration: Default  
Coordinate system: -- default --

Density = 0.00 grams per cubic millimeter

Mass = 217.86 grams

Volume = 217857.20 cubic millimeters

Surface area = 25012.20 square millimeters

Center of mass: ( millimeters )  
X = 0.00  
Y = 0.00  
Z = 0.00

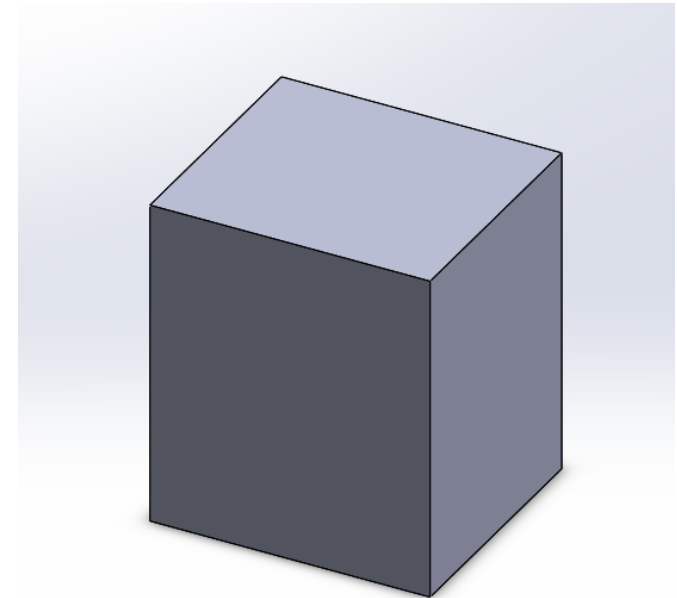
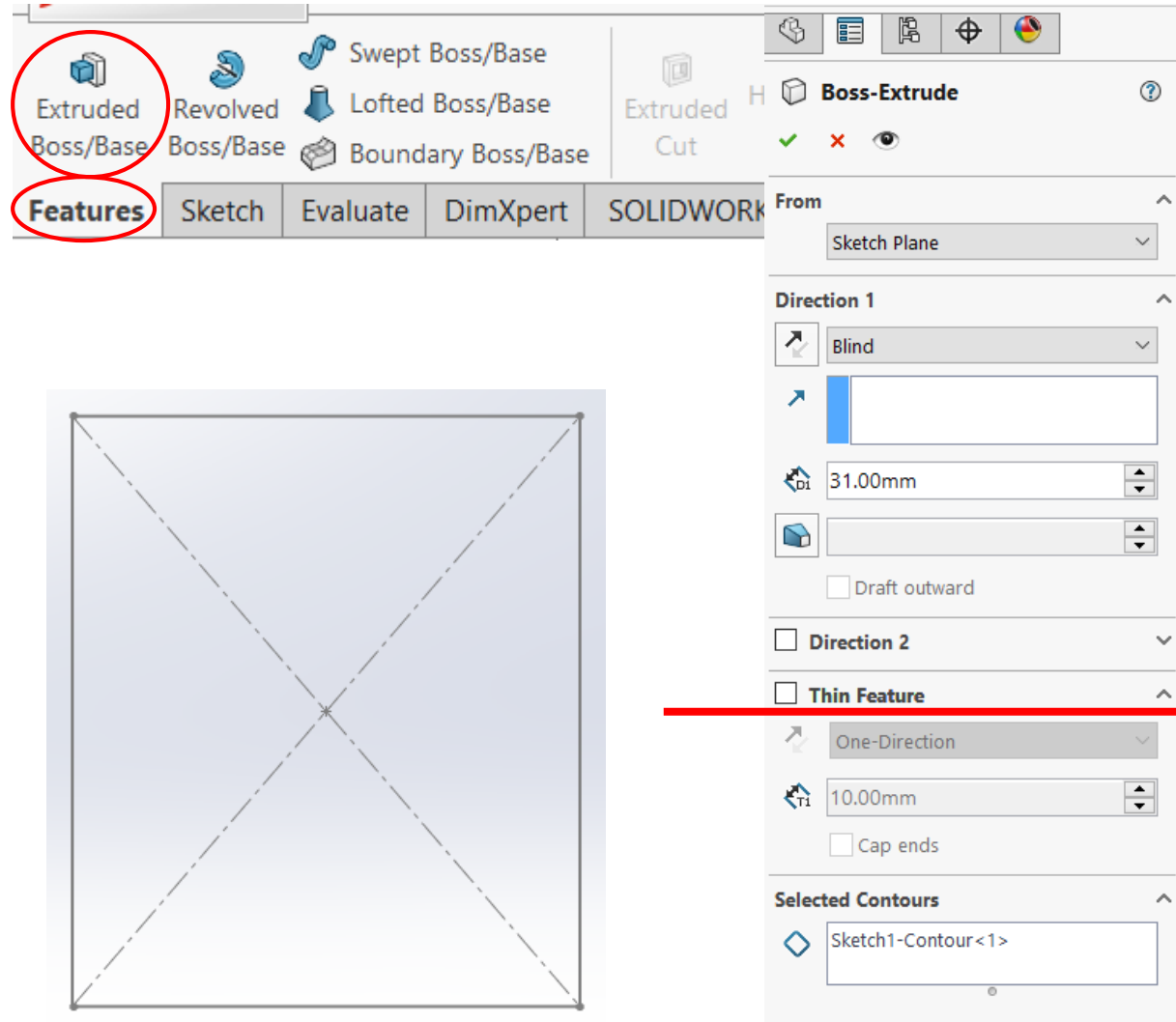
Principal axes of inertia and principal moments of inertia: ( grams \* square millimeters )  
Taken at the center of mass.  
Ix = ( 1.00, 0.00, 0.00)      Px = 83743.98  
Iy = ( 0.00, 1.00, 0.00)      Py = 262977.70  
Iz = ( 0.00, 0.00, 1.00)      Pz = 311828.22

Moments of inertia: ( grams \* square millimeters )  
Taken at the center of mass and aligned with the output coordinate system.  
Lxx = 83743.98      Lxy = 0.00      Lxz = 0.00  
Lyx = 0.00      Lyy = 262977.70      Lyz = 0.00  
Lzx = 0.00      Lzy = 0.00      Lzz = 311828.22

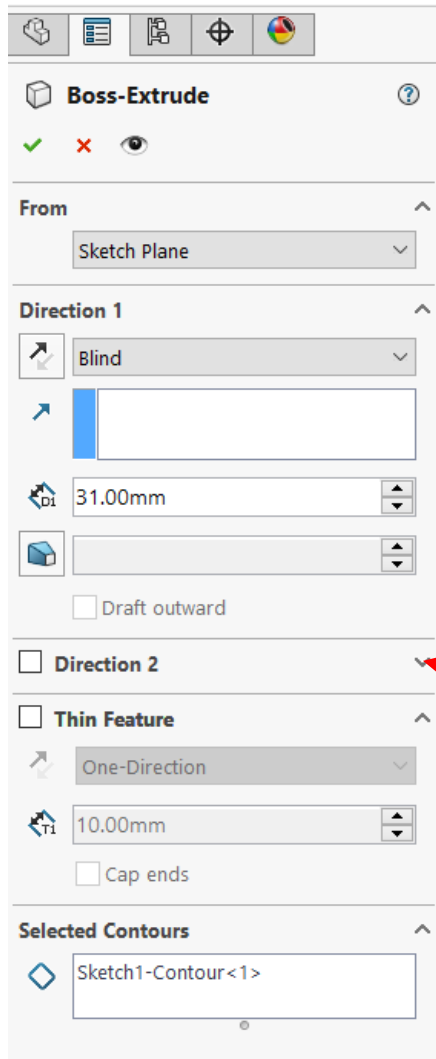
Moments of inertia: ( grams \* square millimeters )  
Taken at the output coordinate system.  
Ixx = 83743.98      Ixy = 0.00      Ixz = 0.00  
Iyx = 0.00      Iyy = 262977.70      Iyz = 0.00  
Izx = 0.00      Izy = 0.00      Izz = 311828.22

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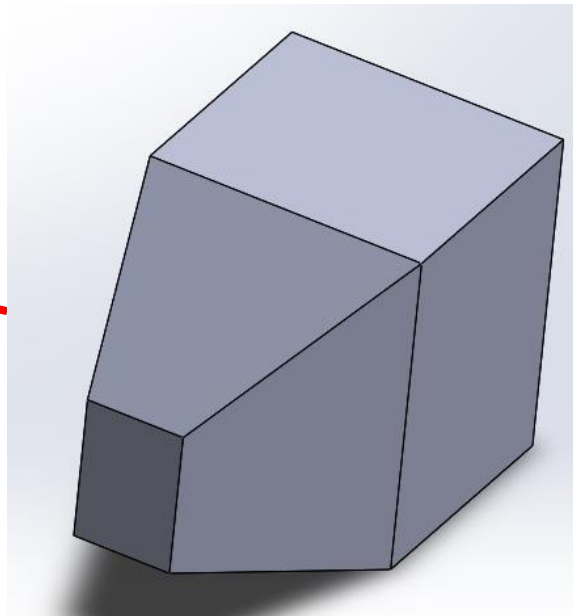
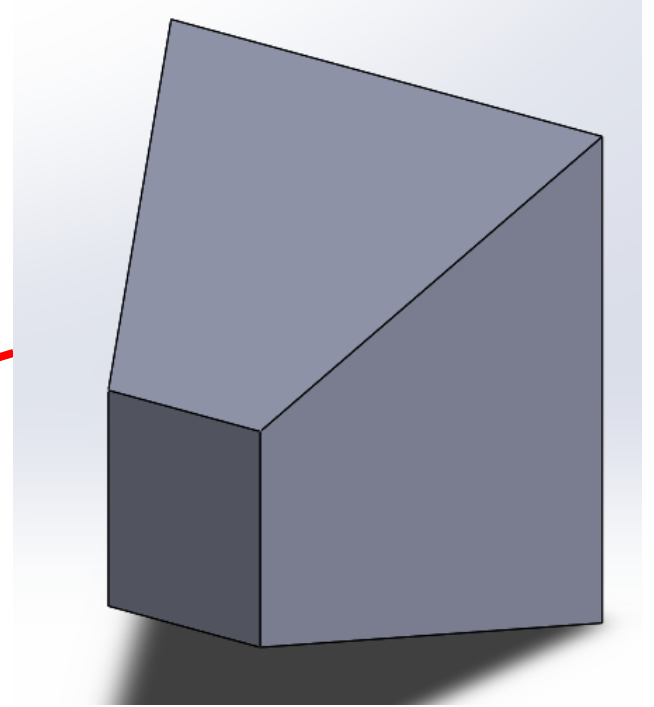
# Extrude



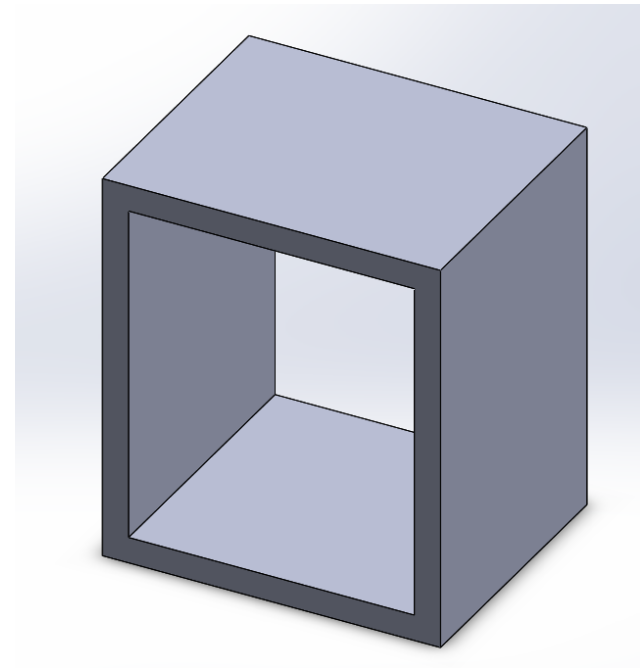
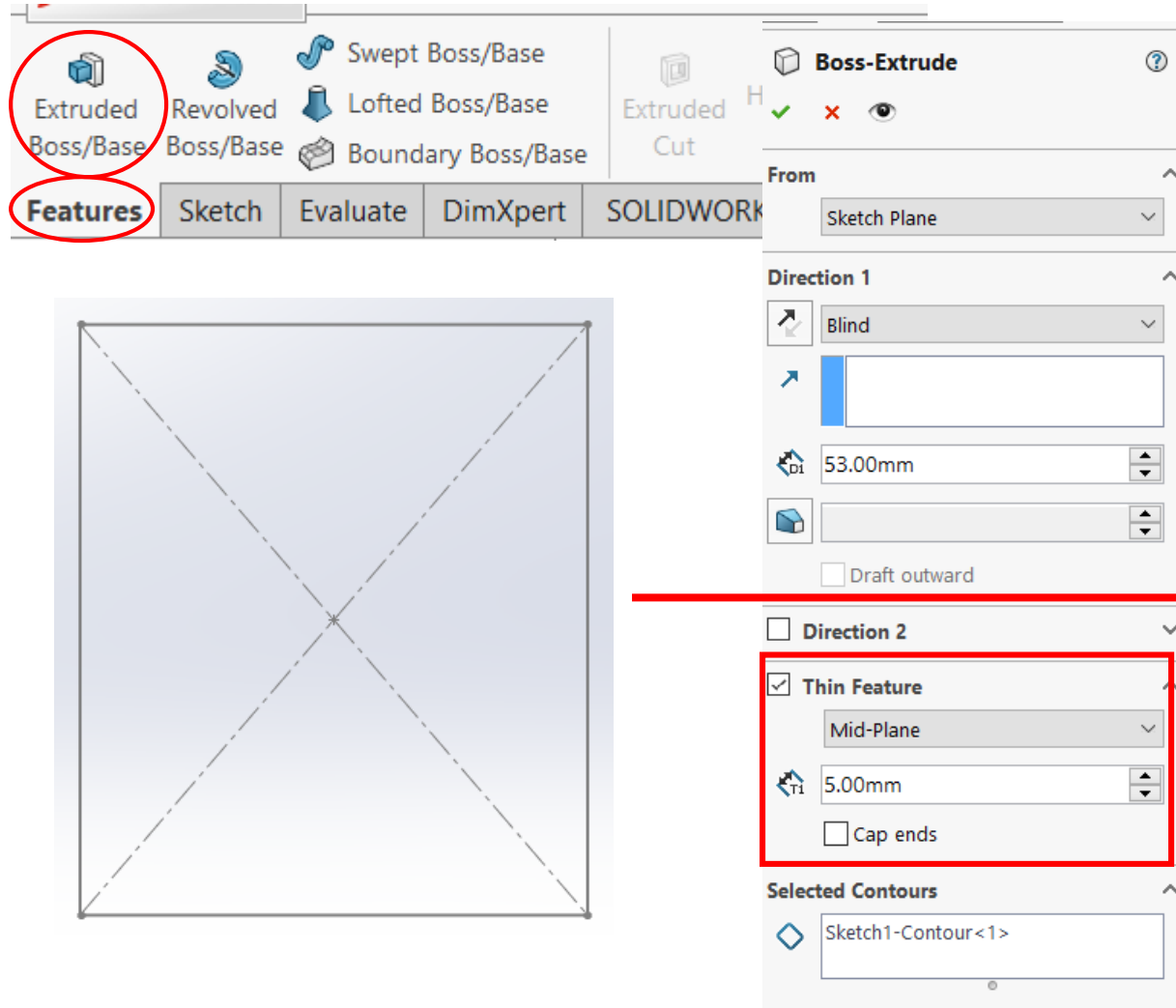
# Extrude (Draft Angle/ Direction 2)



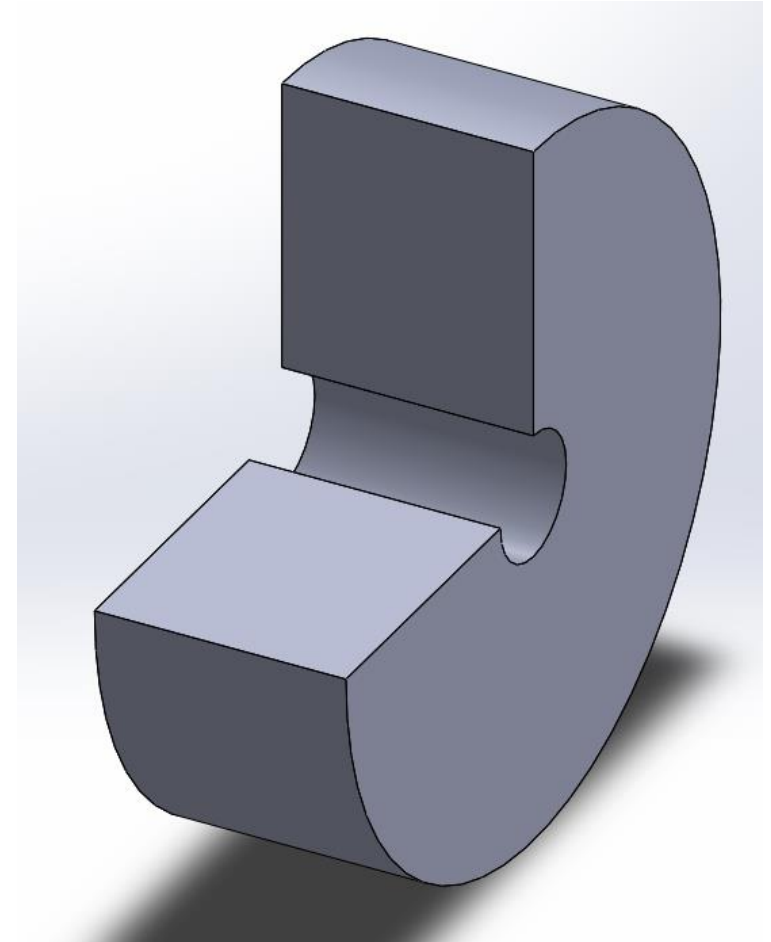
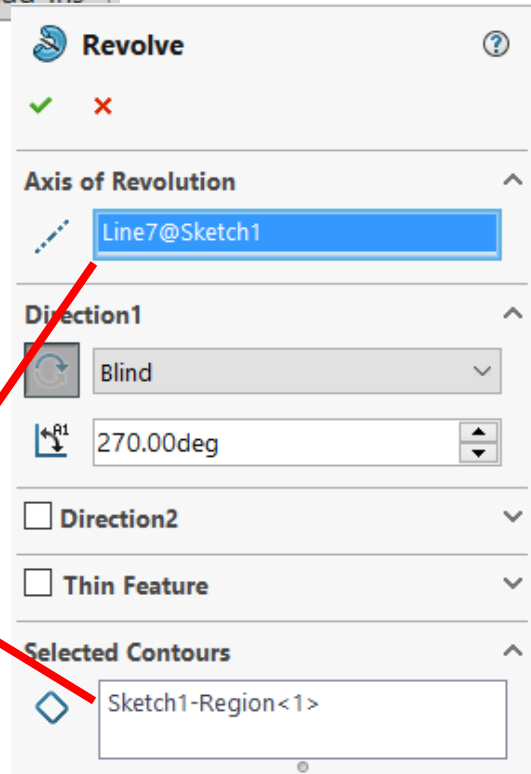
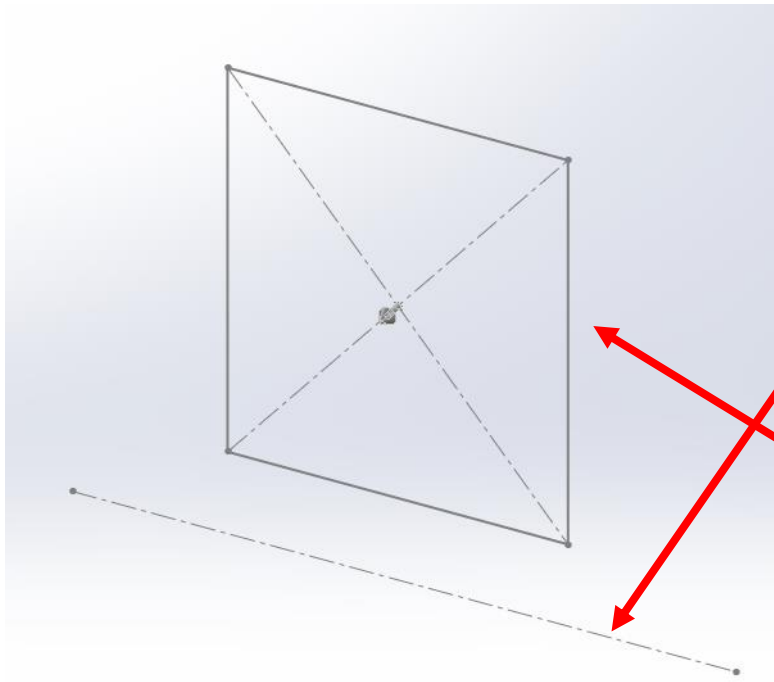
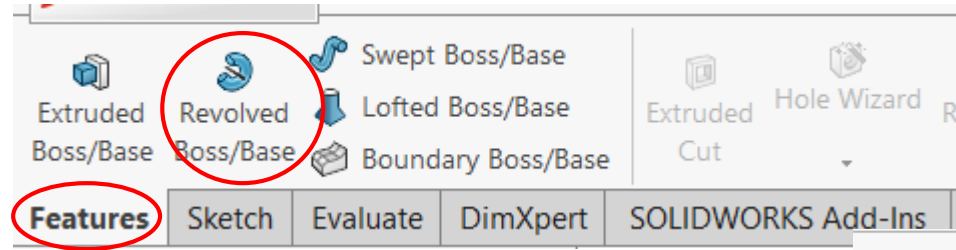
20 degree



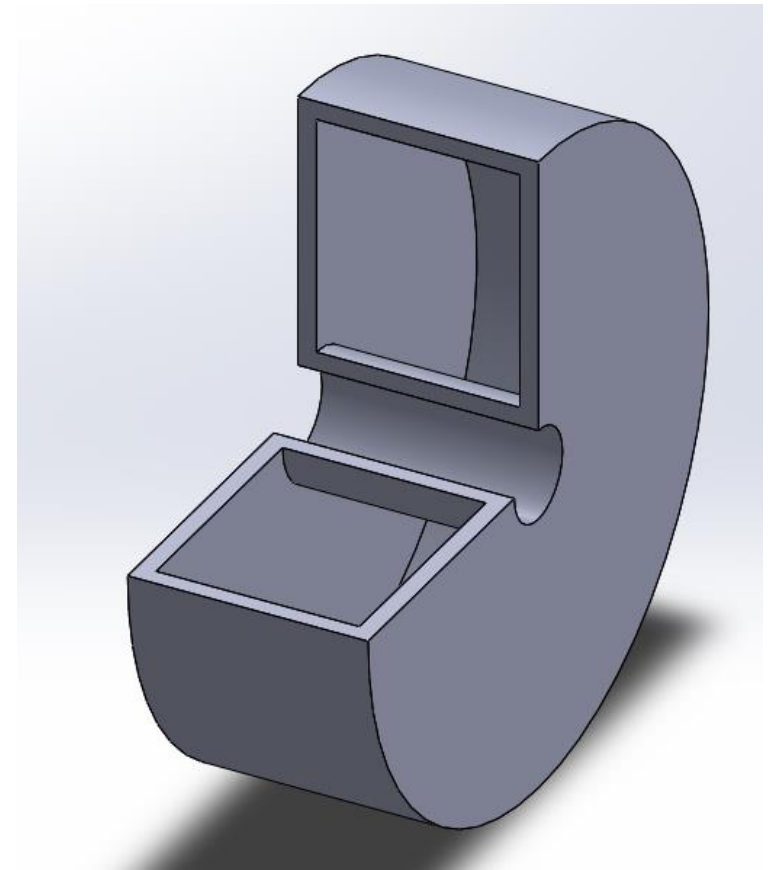
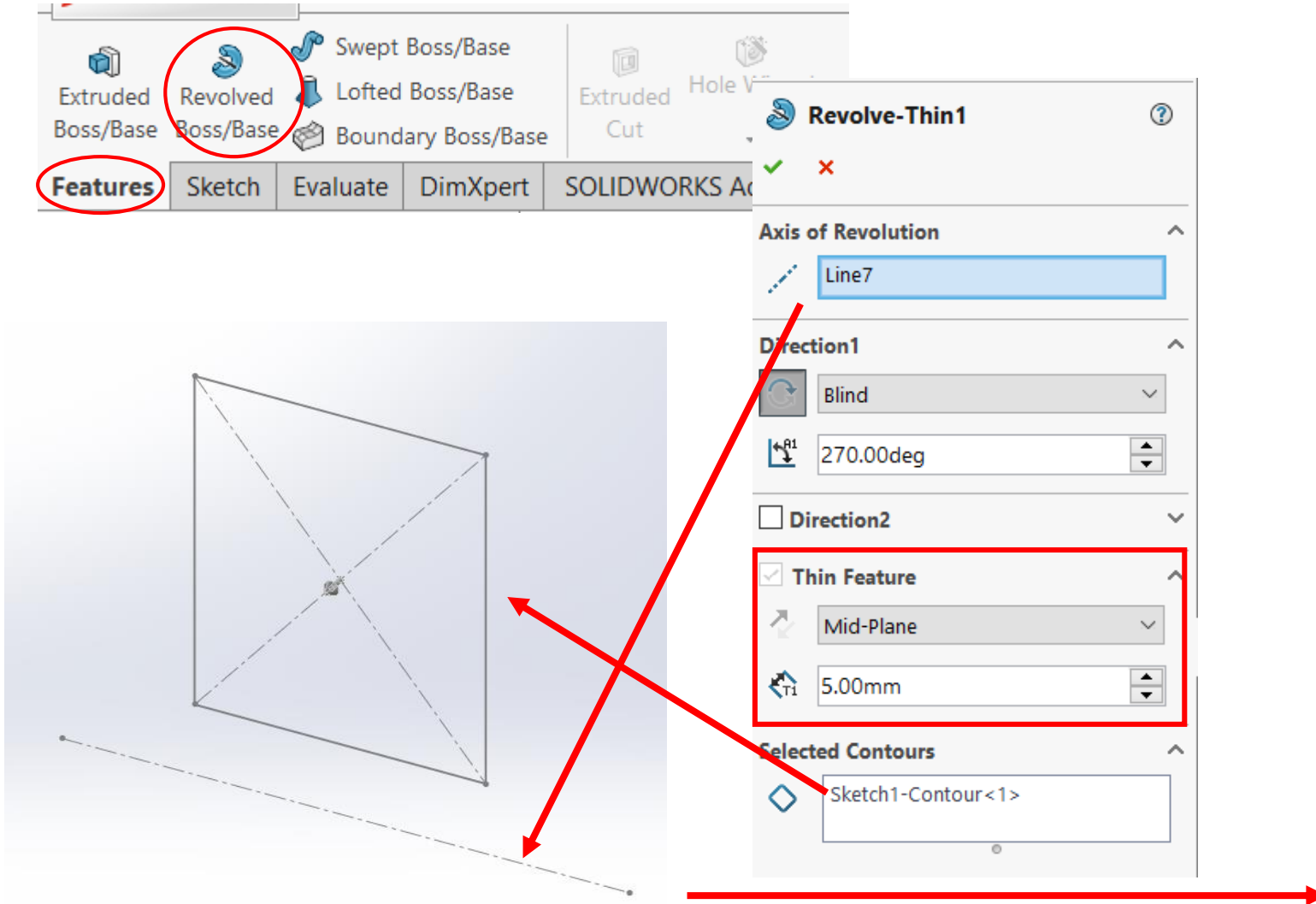
# Thin Extrude



# Revolve



# Thin Revolve





# Midterm Exam!

- Syllabus: Chapter-2,3,4
- Time: 40 minutes
- Questions:
  - 2 sketches