

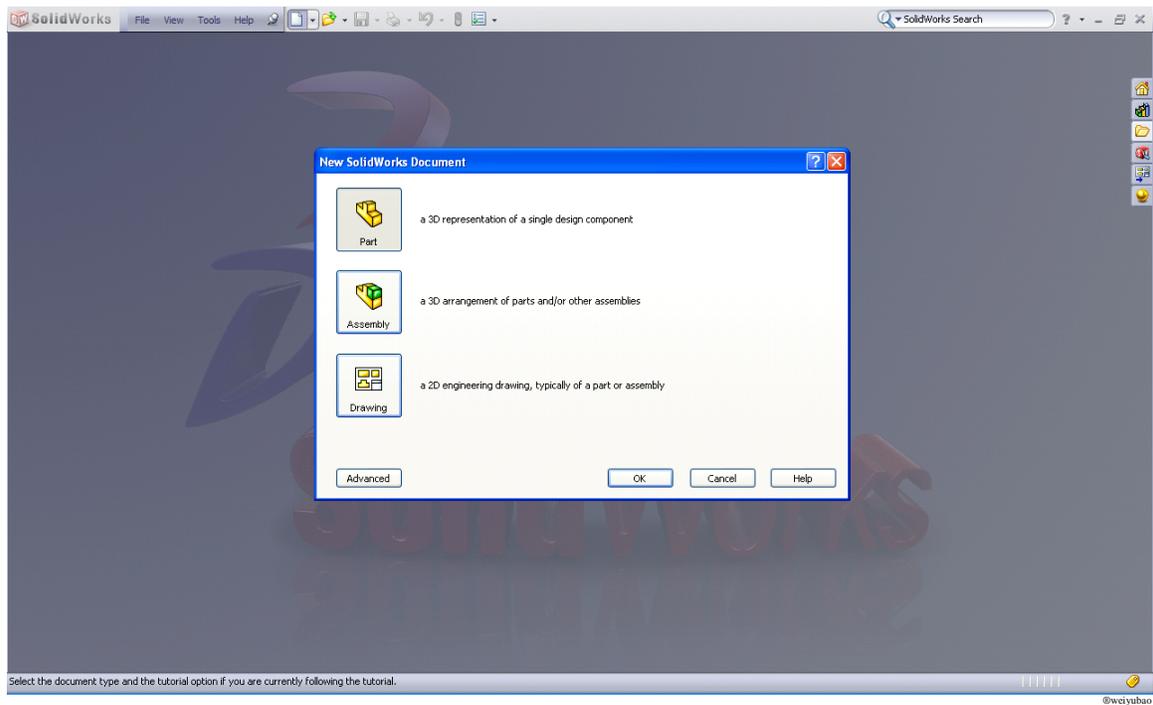
# Gear and Pinion

## Design Data

	Pinion	Gear
Pitch Diameter:	$D = 90 \text{ mm}$	$D = 180 \text{ mm}$
The numbers of teeth:	$N = 36$	$N = 72$
Diametral Pitch:	$P = N/D$	same
Addendum:	$a = 1/P = 2.5 \text{ mm}$	same
Dedendum:	$b = 1.157/P = 2.8925 \text{ mm}$	same
Outside Diameter:	$D_O = D + 2a = 95 \text{ mm}$	$D_O = D + 2a = 185 \text{ mm}$
Root Diameter:	$D_R = D - 2b = 84.215 \text{ mm}$	$D_R = D - 2b = 174.215 \text{ mm}$
Base Diameter:	$D_B = D \cos(\theta) = 84.572 \text{ mm}$	$D_B = 169.145 \text{ mm}$
Pressure Angle:	$\theta = 20^\circ$	same

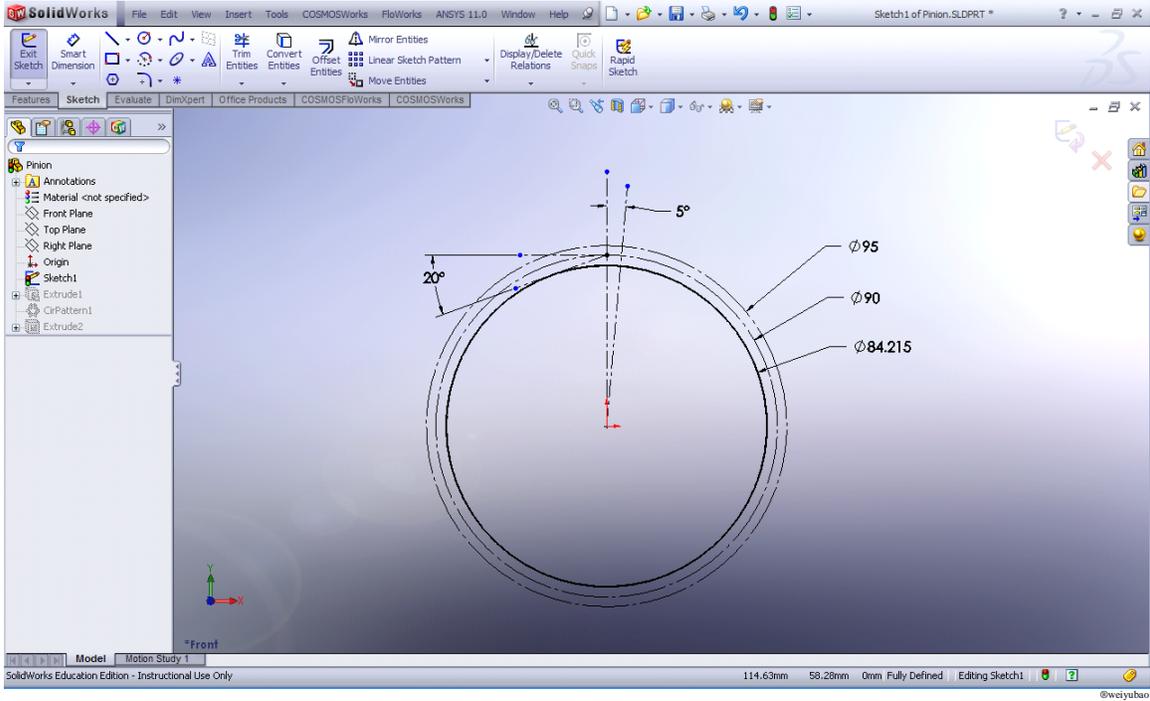
## Modeling a Pinion

Click New on the toolbar to create a new document, and select Parts then OK for modeling.

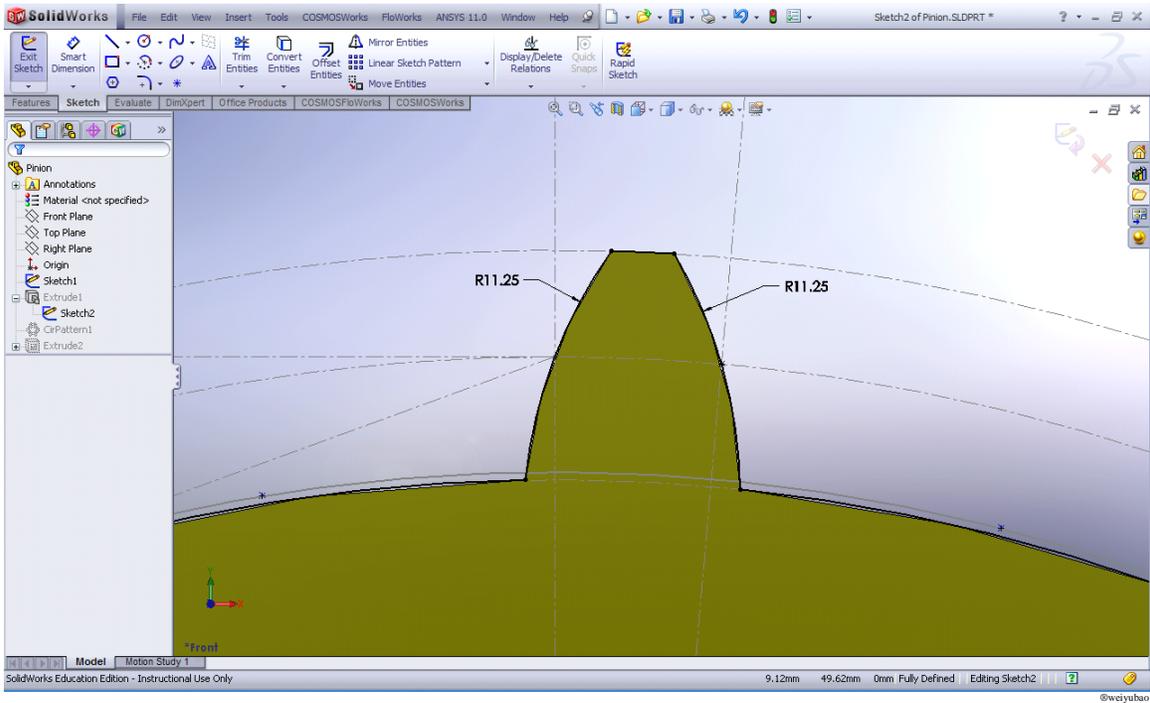


## Sketching

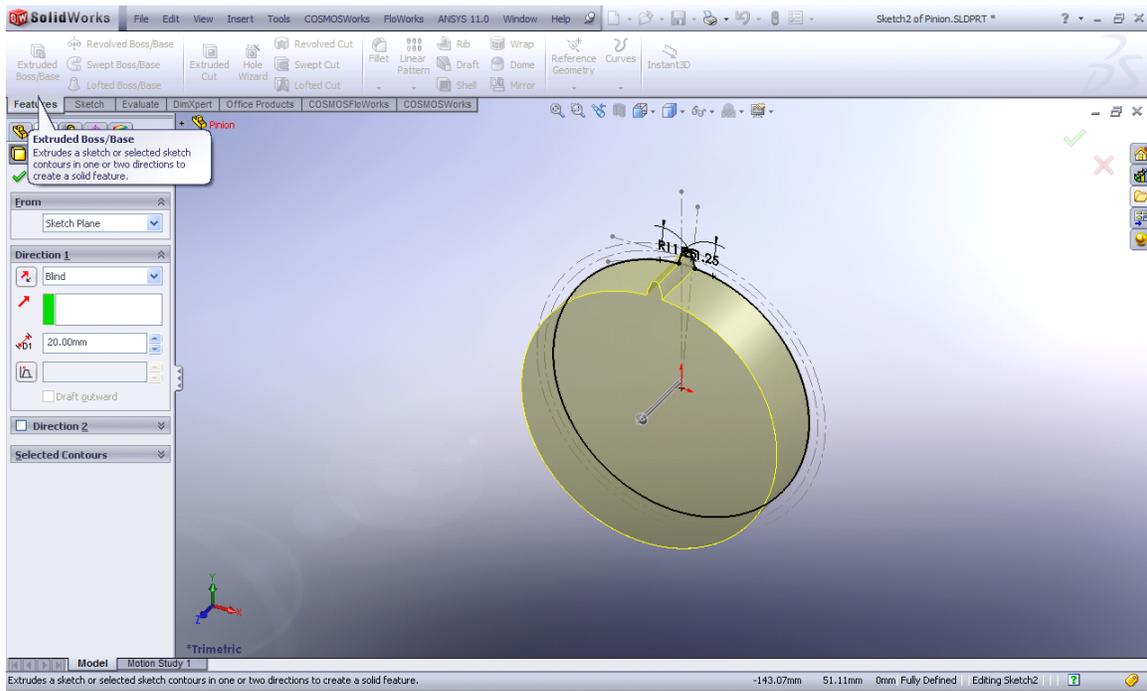
Select Sketch tab, click on Front Plane, and then click the Sketch button to start a sketch. Click Circle to sketch three concentric circles with the diameters of 95, 90, and 84.215 mm as the outside circle, pitch circle, and root circle of the pinion. Click Centerline to sketch two lines with 5 degree angle for teeth. Sketch a line tangent to the pitch circle and another line start from tangent point with 20 degree angle as a pressure angle. Sketch a base circle tangent to the line. Click Exit Sketch.



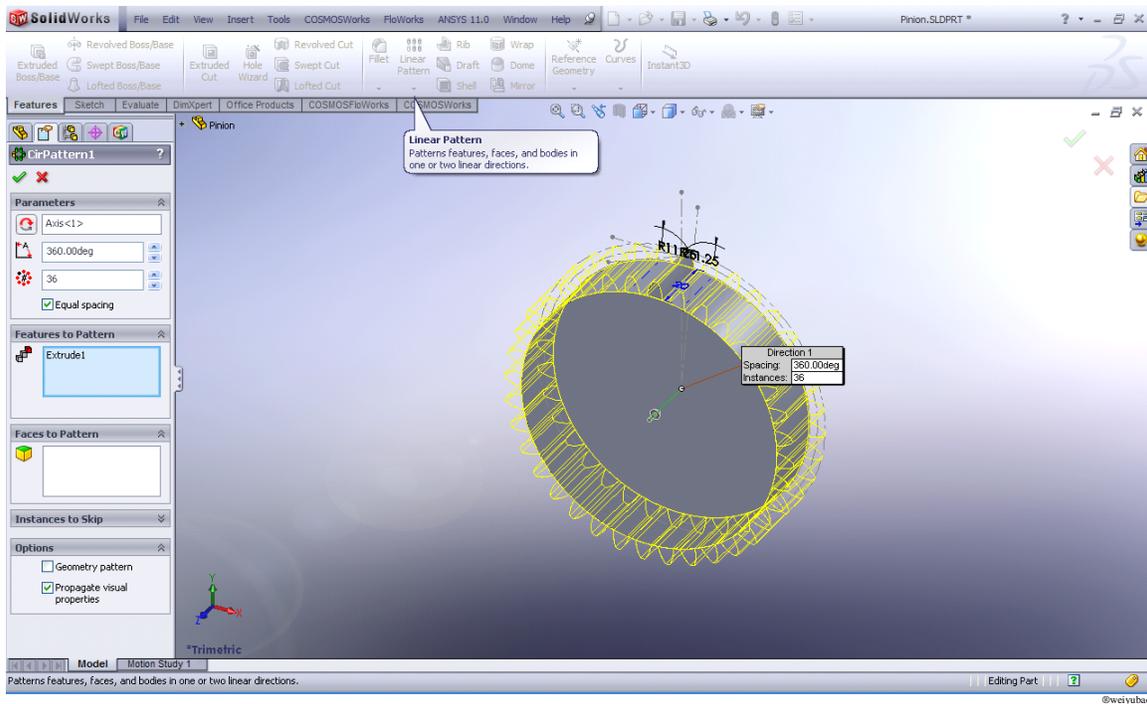
Click Front Plane to create another sketch. Use Convert Entities to sketch the outside and root circles. Click Centerpoint Arc to sketch two arcs using the base circle as center with a diameter of 11.25 mm. Use Add Relation to make both arcs coincident with the cross points between the pitch circle and two teeth edge lines respectively. Use Trim Entities to remove the parts of the circle from the outside and root circle.



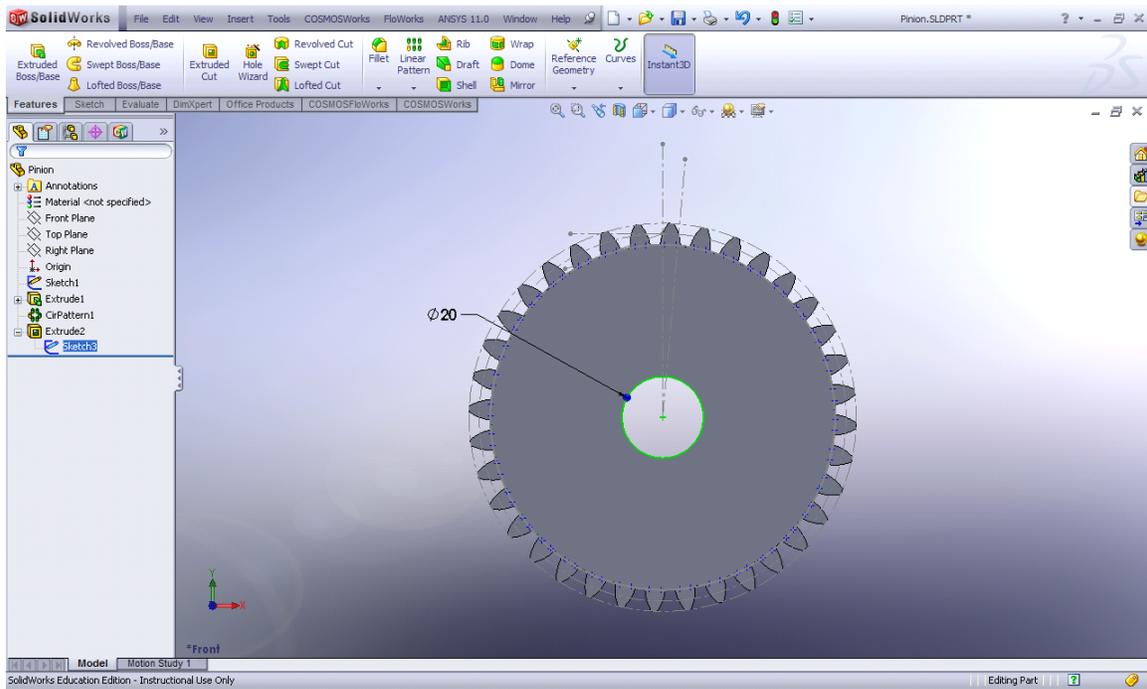
Select Features tab, click on Extruded Base to create a solid model with a depth of 20 mm.



Click Linear Pattern to create 36 teeth for the pinion.



Select the front face of the pinion as a sketch plane to sketch a circle with a diameter of 20 mm.



Select Features tab, click on Extruded Cut to create a hole in the center of the pinion.

