





A. Sketch Construction Lines.

Step 1. Click File Menu > New, click **Part Metric** and OK.

Step 2. Click **Front**  (plane) in the Feature Manager and click **Sketch**  from the Content toolbar, **Fig. 1**.

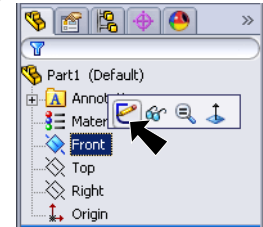





Fig. 1

Step 3. Click **Centerline**  (S) in the **Line flyout**  on the Sketch toolbar.

Step 4. Starting at the Origin , draw a vertical centerline up from the Origin and a construction line out to the left from the top endpoint of centerline, **Fig. 2**. Use the inferencing line, the dotted line that appears when you draw.

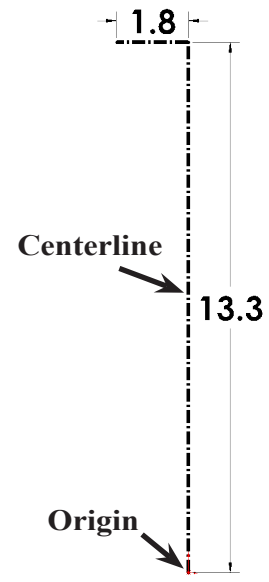


Fig. 2

Step 5. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 6. Dimension the centerline **13.3** and the horizontal construction line **1.8** as shown in **Fig. 2**.

Step 7. Click **Zoom to Fit**  (F) on the View toolbar.

B. Save as "FRONT RIM LX".

Step 1. Click File Menu > Save As.

Step 2. Key-in **FRONT RIM LX** for the filename and press ENTER.

C. Sketch Lines.

Step 1. Click **Line**  (L) on the Sketch toolbar.

Step 2. Draw the **three lines** as shown in **Fig. 3**.

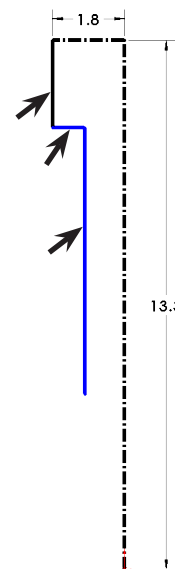


Fig. 3

Step 3. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 4. Add dimensions as shown in **Fig. 4**.

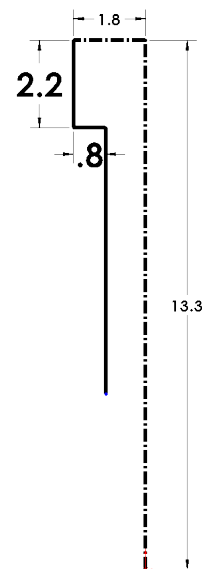


Fig. 4

D. Mirror Sketch.

Step 1. **Right click drawing and click Select** from menu to unselect Smart Dimension.

Step 2. **Drag selection around the sketch** to select all entities (lines and dimensions), **Fig. 5**. To drag selection, click above and to left of sketch and drag down and to right to drag around all.

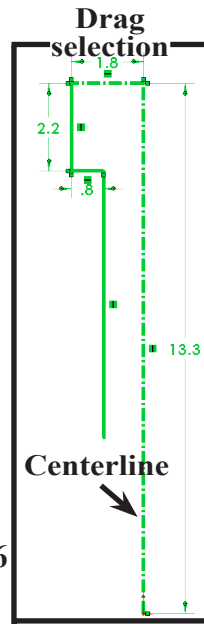
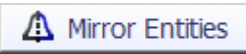


Fig. 5

Step 3. Click **Mirror Entities**  on the Sketch toolbar.

Step 4. In the Mirror Entities Property Manager: click in **Mirror about box**, **Fig. 6** and click **the vertical centerline** in sketch, **Fig. 6**.

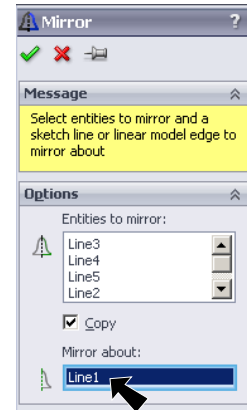


Fig. 6

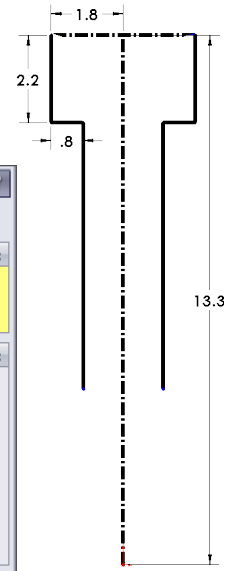


Fig. 7

click OK , **Fig. 7**.

E. 3 Point Arc.

Step 1. Click **3 Point Arc**  (S) in the Arc flyout  on the Sketch toolbar.

Step 2. Draw an arc between the Position 1, Position 2 and Position 3 in **Fig. 8**. To draw the arc, first click Position 1, then Position 2. Swing the arc down to Position 3 and click.

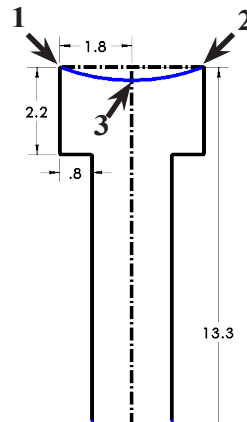


Fig. 8

Step 3. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 4. Dimension arc **5** as shown in **Fig. 9**.

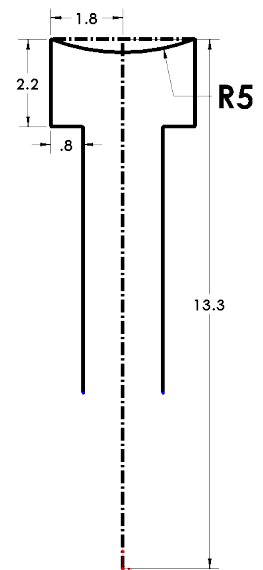


Fig. 9

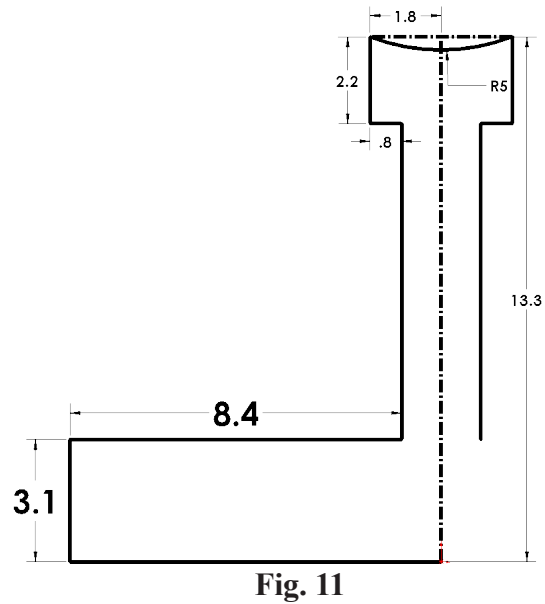
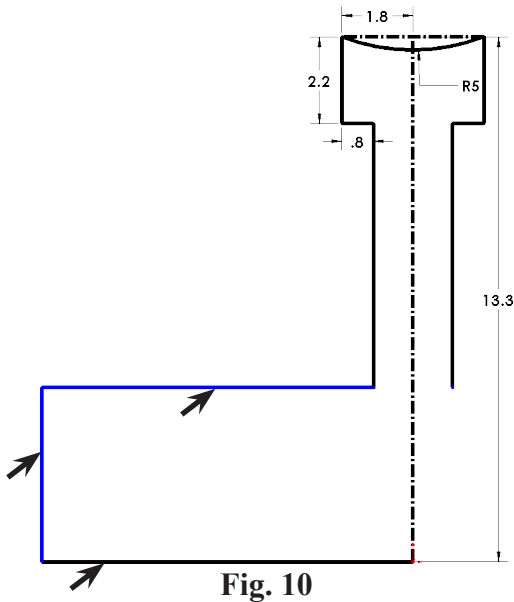
F. Lines Inside Rim.

Step 1. Click **Line**  (L) on the Sketch toolbar.

Step 2. Draw the **three lines** as shown in **Fig. 10**.

Step 3. Click **Smart Dimension**  (S) on the Sketch toolbar.


Step 4. Add dimensions as shown in **Fig. 11**.



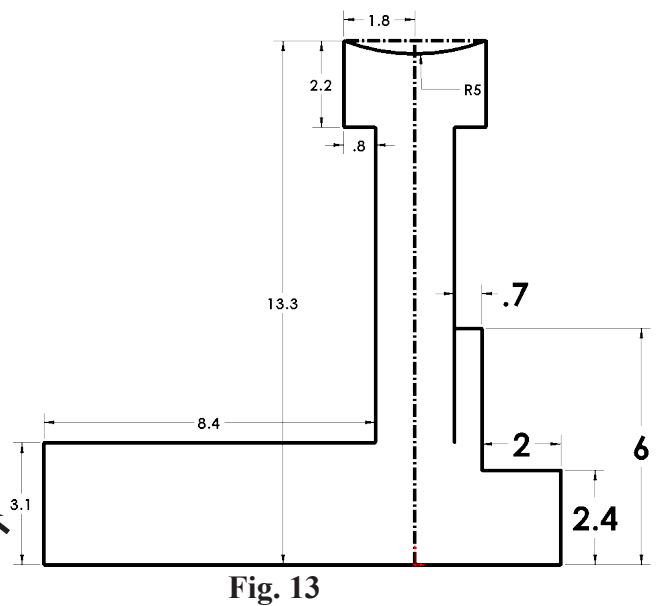
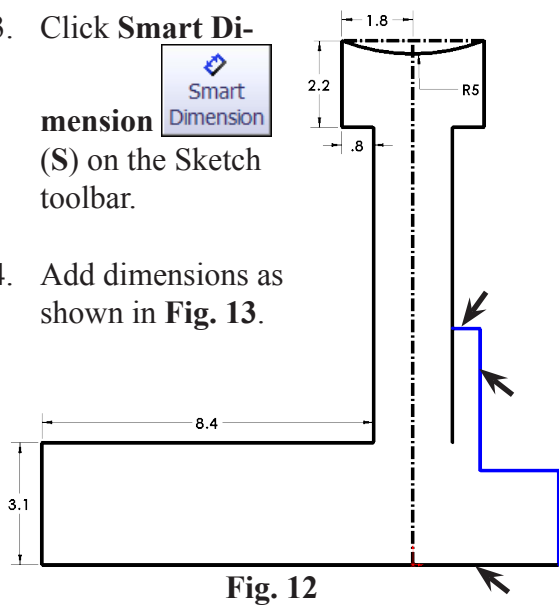
G. Lines Outside Rim.

Step 1. Click **Line**  (L) on the Sketch toolbar.

Step 2. Draw the **5 lines** as shown in **Fig. 12**.

Step 3. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 4. Add dimensions as shown in **Fig. 13**.



H. Trim Corner.


Step 1. Click **Trim Entities**  (S) on the Sketch toolbar.

Step 2. In the Property Manager select: **Trim to closest**



Fig. 14

Click bottom end of mirror vertical line to trim, **Fig. 15**. Results shown in **Fig. 16**.

Click OK  in the Property Manager.

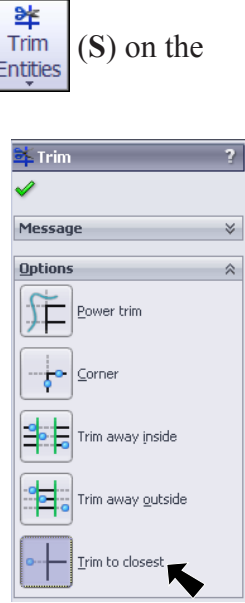


Fig. 14

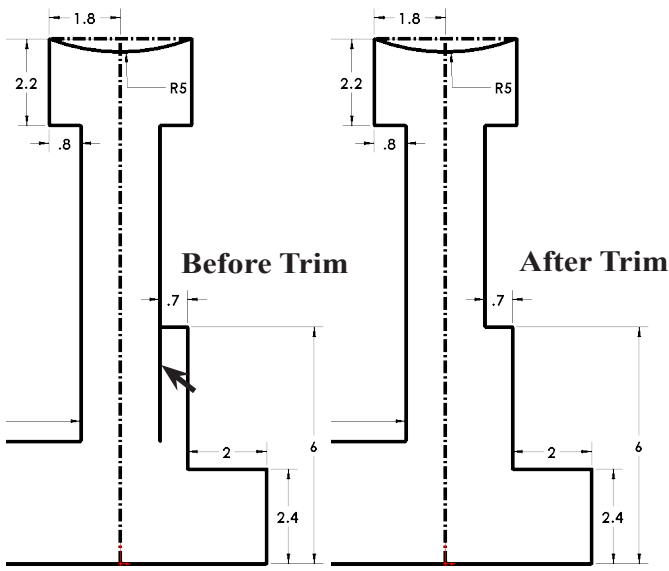
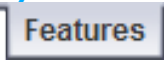


Fig. 15

Fig. 16

I. Revolved Boss/Base.

Step 1. Click **Features**  on the Command Manager toolbar.


Step 2. Click **Revolved Boss/Base**  on the Features toolbar.

Step 3. In the Revolve Property Manager:

for Axis of Revolution , click **bottom line of sketch**, **Fig. 18**.

Your bottom line of sketch does not have to show in Property Manager as Line12.

Click OK .

Step 4. Click **Zoom to Fit**  (F) on the View toolbar.

Step 5. Save. Use **Ctrl-S**.



Fig. 17

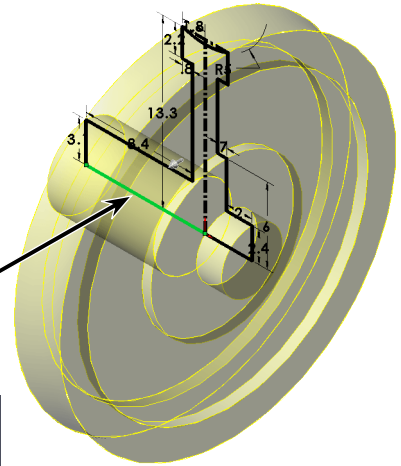


Fig. 18

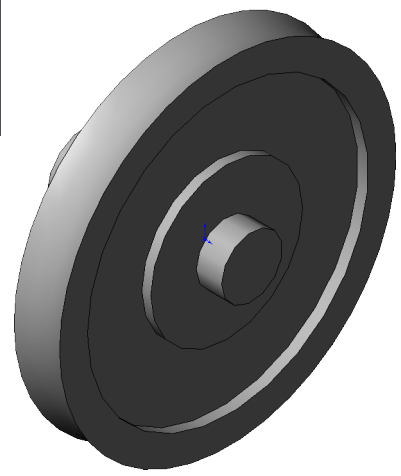



Fig. 19

J. Hole for Axle.

Step 1. Rotate view slightly to view **inside of rim**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 20**.

Step 2. Click **inside face of hub** and click **Sketch**  on the Content menu, **Fig. 20**.

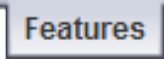
Step 3. Click **Normal To**  on the Standard Views toolbar.

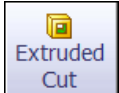
Step 4. Click **Circle**  (S) on the Sketch toolbar.

Step 5. Draw a circle for hole starting at the Origin , **Fig. 21**.

Step 6. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 7. Dimension **diameter 3.5** as shown in **Fig. 21**.

Step 8. Click **Features**  on the Command Manager toolbar.

Step 9. Click **Extruded Cut**  on the Features toolbar.

Step 10. In the Property Manager, under **Direction 1** set:

Depth  D1 to 9

click OK , **Fig. 22**
and **Fig. 23**.

Step 11. Save. Use **Ctrl-S**.

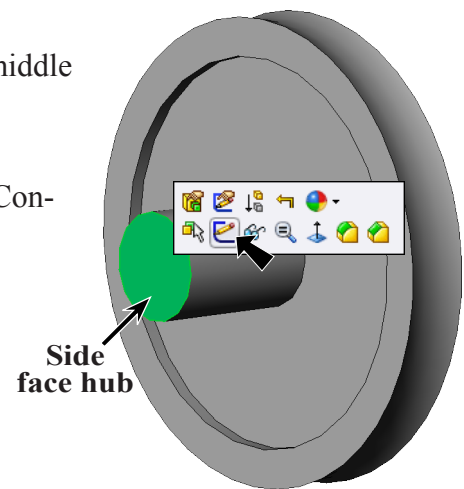


Fig. 20

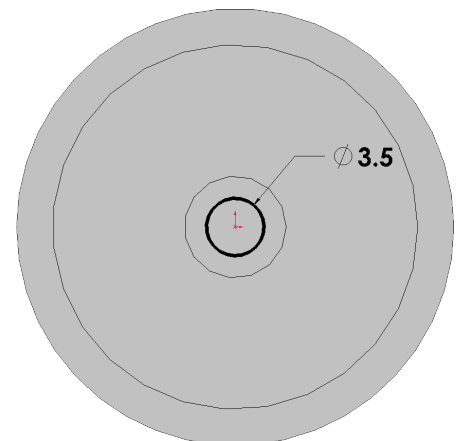


Fig. 21

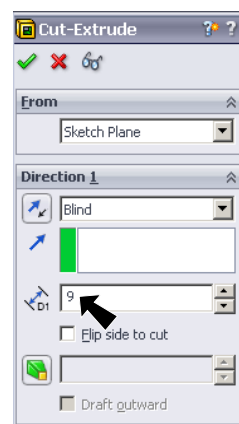


Fig. 22

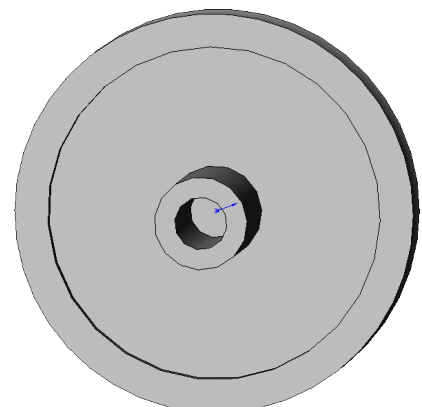




Fig. 23


K. Hole in Rim.

Step 1. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click **side face of rim** and click **Sketch**  on the Content menu, **Fig. 24**.

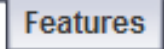
Step 3. Click **Normal To**  on the Standard Views toolbar.

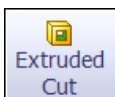
Step 4. Click **Circle**  (S) on the Sketch toolbar.

Step 5. Draw a circle for the hole directly **above** the Origin , **Fig. 25**.

Step 6. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 7. Dimension as shown in **Fig. 25**.

Step 8. Click **Features**  on the Command Manager toolbar.

Step 9. Click **Extruded Cut**  on the Features toolbar.

Step 10. In the Cut-Extrude Property Manager set **End Condition to Through All** and click OK .

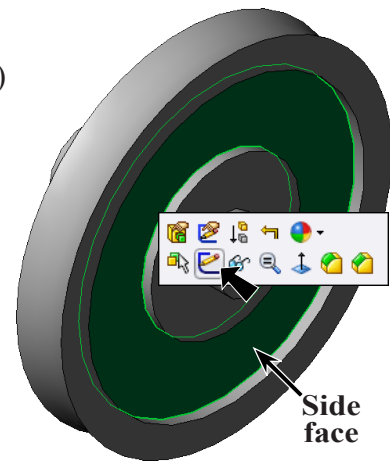


Fig. 24

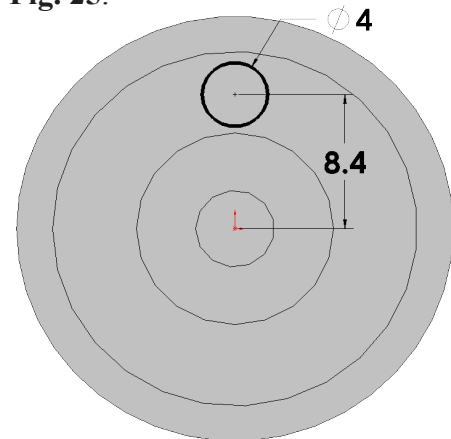


Fig. 25

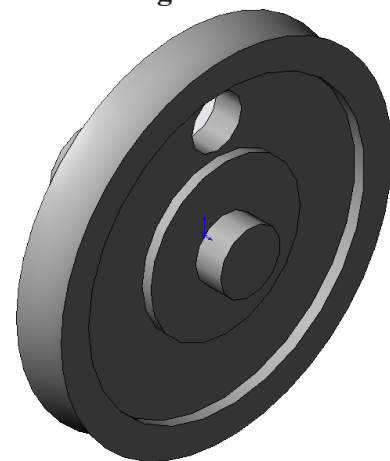



Fig. 27

L. Circular Pattern for Hole.

Step 1. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 2. Click View Menu > Temporary Axes. (**Alt V X**)

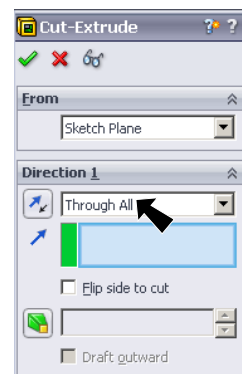





Fig. 26

Step 3. Click **Circular Pattern**  **Circular Pattern** in the **Linear Pattern** flyout  on the Features toolbar. Be sure to click the **flyout arrow**  to select Circular Pattern.

Step 4. In the Circular Pattern Property Manager set:
under Parameters,

Pattern Axis 

click Temp axis in drawing, **Fig. 29**

Number of Instances  to 8

Check Equal spacing, **Fig. 28**

under **Features to Pattern**

click hole in rim, **Fig. 29**

click OK  in the Property Manager, **Fig. 30**.

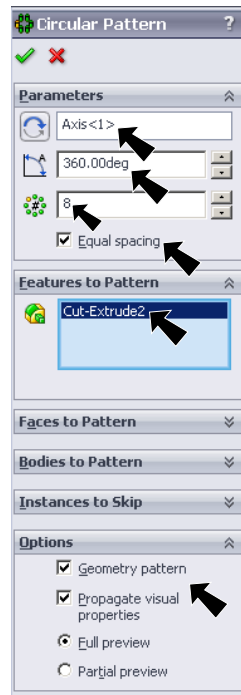


Fig. 28

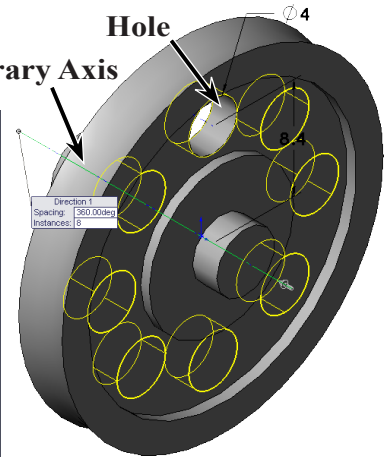



Fig. 29

Step 5. Save. Use **Ctrl-S**.

M. Bolt.

Step 1. Click **side face of wheel cap** and click **Sketch**  on the Content menu, **Fig. 30**.

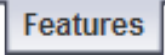
Step 2. Click **Normal To**  on the Standard Views toolbar.

Step 3. Click **Circle**  (S) on the Sketch toolbar.

Step 4. Draw a circle **directly above the Origin** , **Fig. 31**.

Step 5. Click **Smart Dimension**  (S) on the Sketch toolbar.

Step 6. Dimension as shown in **Fig. 31**.

Step 7. Click **Features**  on the Command Manager toolbar.

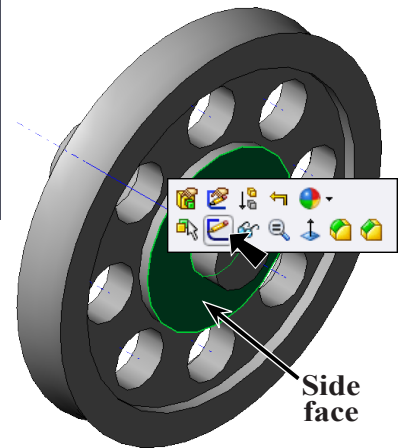


Fig. 30

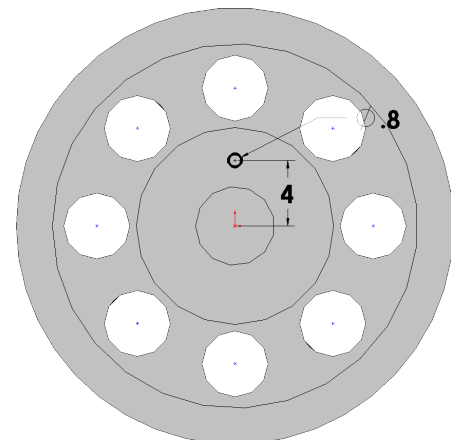





Fig. 31

Step 8. Click **Extruded Boss/Base**  on the Features toolbar.

Step 9. Click **Isometric**  on the Standard Views toolbar. (**Ctrl-7**)

Step 10. Press Q key on keyboard to **Zoom to Selection**  (Q) to zoom to extrude.

Step 11. In the Property Manager, under **Direction 1** set:

Depth  to **.2**
click OK , **Fig. 32** and **Fig. 33**.

Step 12. Save. Use **Ctrl-S**.

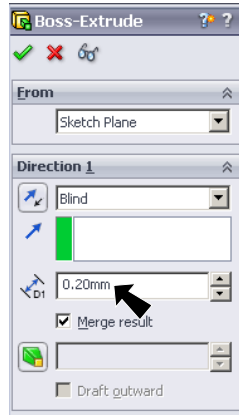


Fig. 32

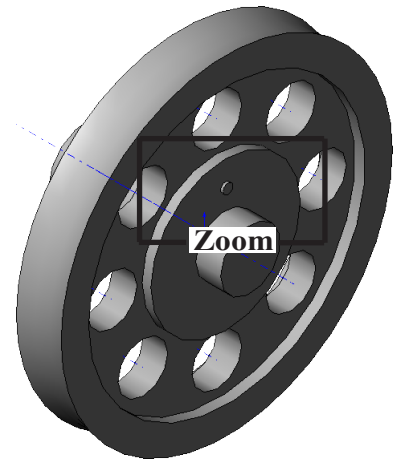




Fig. 33

N. Dome Top Face of Bolt.

Step 1. Click **Dome**  on the Features toolbar.

Step 2. In the Dome Property Manager:
click **top face of the extruded bolt**, **Fig. 35**.
set **Distance** to **.2**
click OK  when done.

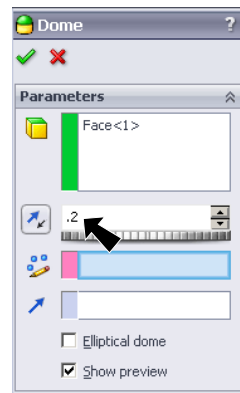


Fig. 34

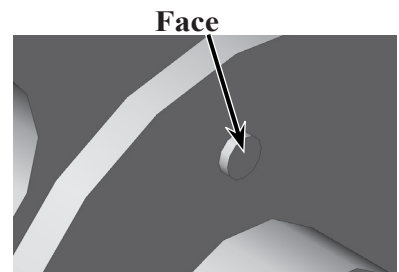


Fig. 35

Step 3. Save. Use **Ctrl-S**.

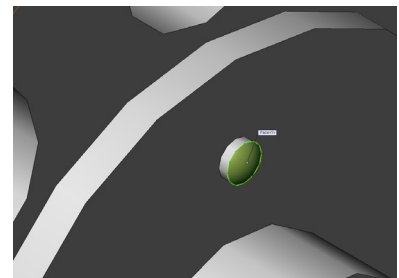


Fig. 36

O. Circular Pattern for Bolt.

Step 1. Click **Circular Pattern**  **Circular Pattern** in the **Linear Pattern** flyout  on the Features toolbar. Be sure to click the **flyout arrow**  to select Circular Pattern.

Step 2. In the Circular Pattern Property Manager set:
under Parameters,

Pattern Axis 
click **Temp axis** in
drawing, **Fig. 38**

Number of Instances 
to **10**

Check Equal spacing,
Fig. 37

under **Features to Pattern**
click **Dome1** and
Extrude2, **Fig. 38**

click **OK**  in the
Property Manager, **Fig. 39**.

Step 3. Save. Use **Ctrl-S**.

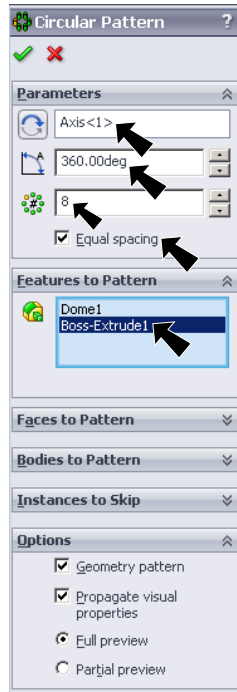


Fig. 37

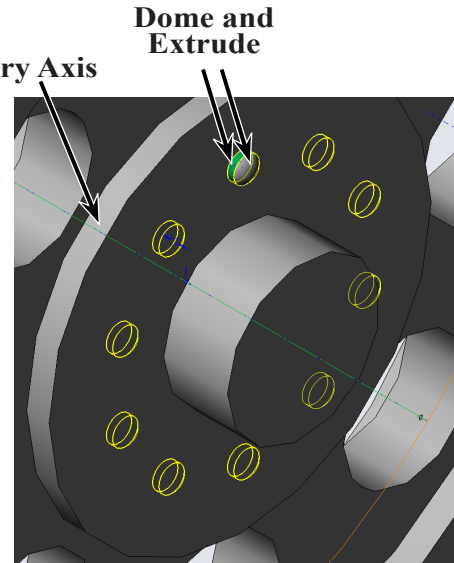


Fig. 38

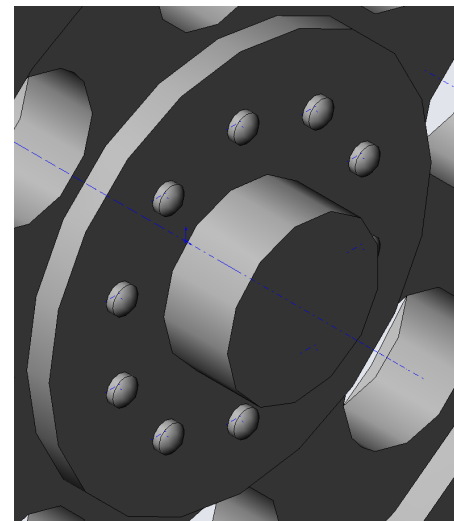


Fig. 39

P. Fillet Edges of Rim.

Step 1. Turn off Temporary Axes. Click View Menu > Temporary Axes. (Alt V X)

Step 2. Click **Fillet**  on the Features toolbar.

Step 3. In the Fillet Property Manager:

Set the **Radius**  to .5

Click three edges of rim, **Fig. 41**

Click OK  when done.

Step 4. Save. Use **Ctrl-S**.

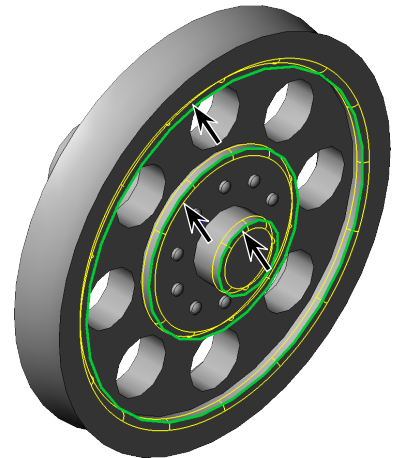



Fig. 41

Q. Material Chrome Stainless Steel.

Step 1. **Right click Material**  in the Feature Manager and click **Edit Material**, **Fig. 43**.

Step 2. **Expand Steel** in the material tree and select **Chrome Stainless Steel**. Click **Apply** and **Close**.

Step 3. Save. Use **Ctrl-S**.

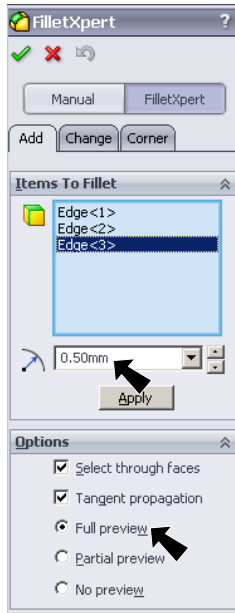


Fig. 40



Fig. 42

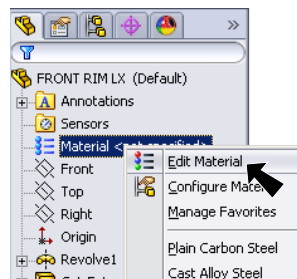


Fig. 43