

AutoDesk Inventor 2015 – Project One: Sketch Plane Cube

Purpose

Using your sketching, your visual, and your computer skills, you will create a 3D object following specified criteria and constraints.



Procedure

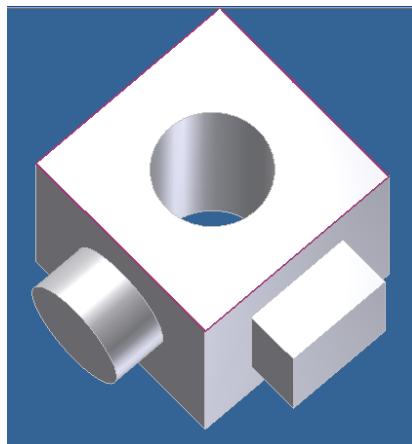
You have been hired by the Rigid Box Company. The company president, Ed Tarbush, said that he has a new idea for a box he would like for you to re-create.

Mr. Tarbush has provided sketches to give you an idea of what he would like with the criteria and constraints. “It is important that the dimensions are exact and that your final solution looks like my final sketch,” said Mr. Tarbush as you eagerly take your assignment to your desk.

Mr. Tarbush continued, “One more thing. You may want to try sketching this box by hand to understand what I want before you move to using the computer.”

“After you have completed creating my box on the computer, save the file, prepare an engineering drawing and print it for our manufacturing department.”

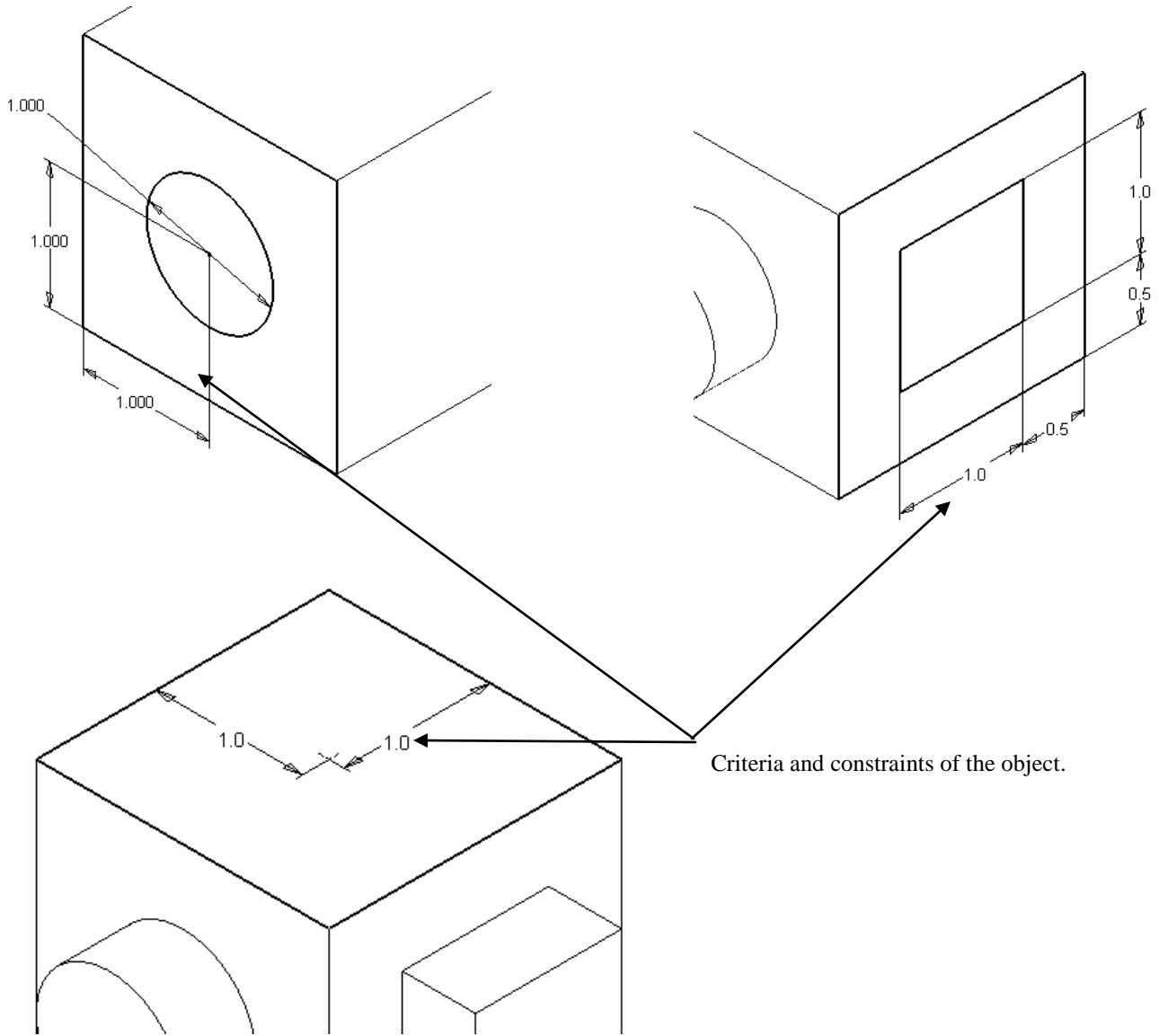
You quickly get to work creating a sketch of the shapes, then constraining and extruding them in order to replicate his box idea.



Finished Object

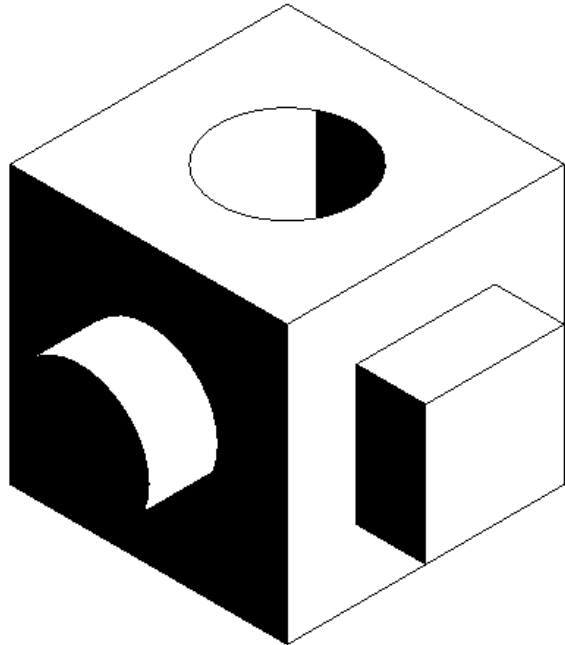
OK, so the word **constrain** means to force something to happen but at the same time limit how far and where it can go. An example of a **constraint** is a *fence* which might be built to let cows graze and roam around the pasture but at the same time preventing them from going outside the farmer’s property and escaping.

Extrude means to force or pull-out. We will use **extrude** in inventor to turn two-dimensional shapes into three-dimensions.



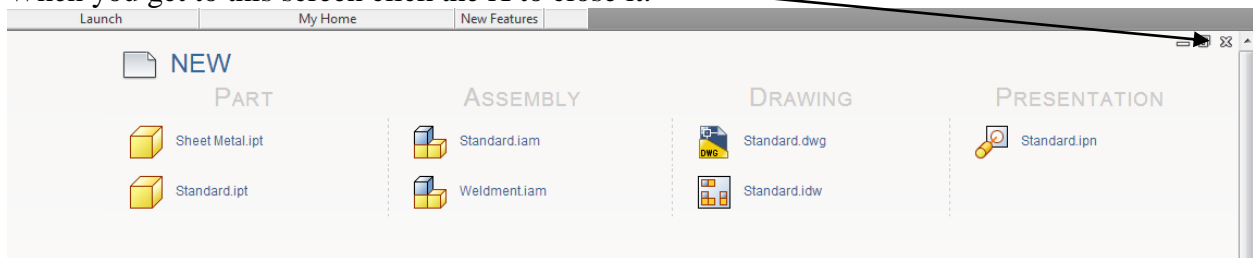
Criteria and constraints of the object.

Finished object

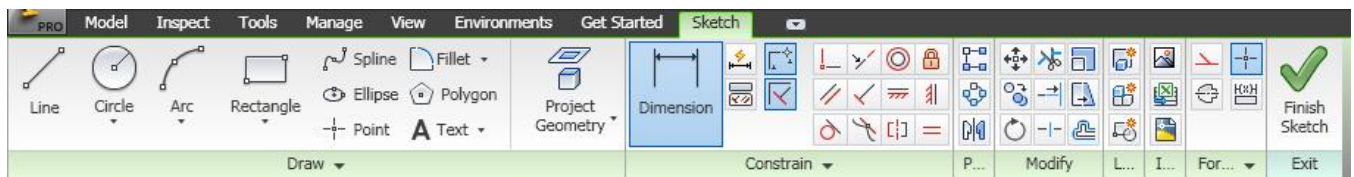


Sketch Plane Cube

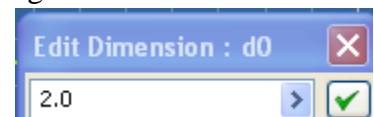
1. Open Autodesk Inventor 2015 Professional. Note: This might take quite a while, so be patient.
2. If you get the Desktop Analytics Program message just click OK.
3. If you get the Ready to Start Working screen just click the X in the upper-right corner of that panel.
4. When you get to this screen click the X to close it.

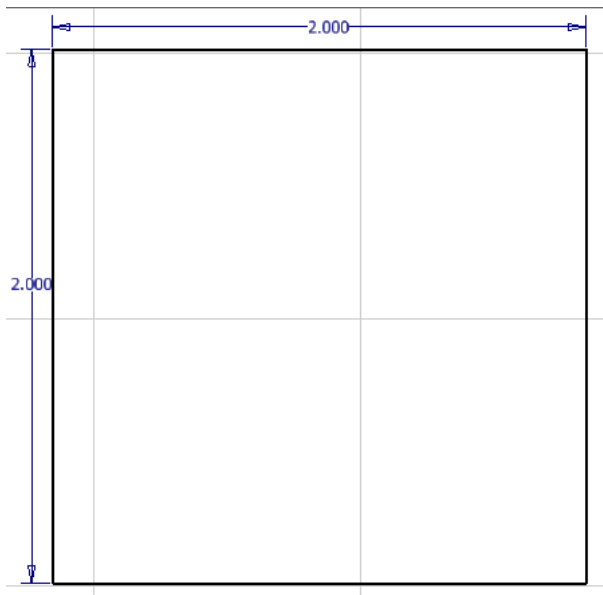


5. Click the Tools tab at the top and then the Application Options in the Options group.
6. In the General tab uncheck the box that says Show My Home on startup then click Apply (bottom).
7. Click the Sketch tab and under Display check Grid Lines and Axes. Click Apply.
8. Click the Part tab and check the Sketch on X-y Plane. Click Apply then OK.
9. Click on New and select the English tab.
10. Double click on **standard ipt**. (This allows us to create a *part* in Inventor).
11. Click Rectangle → 2 point rectangle.
12. On the graph left-click a point in the upper left, then click another point in the lower right. Don't drag the mouse anywhere.
13. Right click – Done (or hit [Esc]).

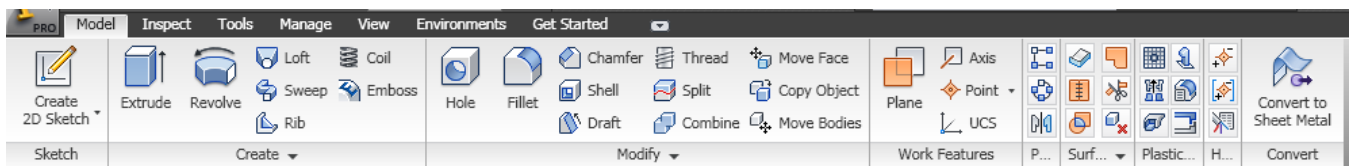


14. Click **Dimension** in the top menu then click the top the line of your rectangle.
15. Move (don't drag) the mouse up, left-click, then enter a dimension value of 2.0. Now do the same for either one of the sides. You should now have a 2"x2" square with the dimensions showing.

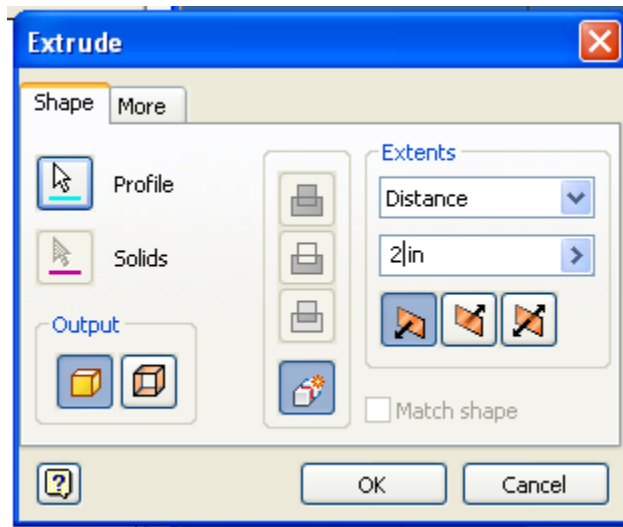




16. Click **Finish Sketch** in the upper-right. The background graph disappears. Notice that the menu at the top now goes from **Sketch** to **Model**.

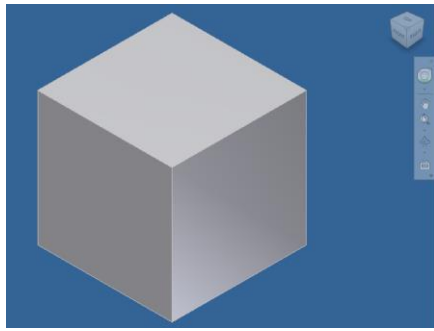


17. Click **Extrude** and make it a distance of 2 inches.



18. Click on **Home** view – upper left corner. This changes the sketch from two-dimensional (flat 2D) to three-dimensional (3D). You should now have a 2” cube.

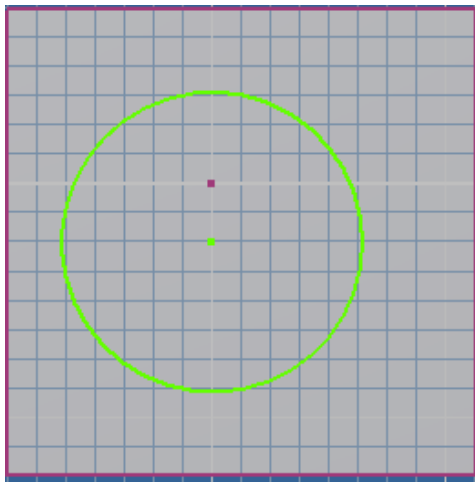
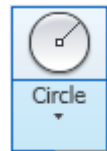




19. Click Front (view) then click on cube and click on **Create 2D Sketch** which is at the left-top of the screen. Grid lines return.

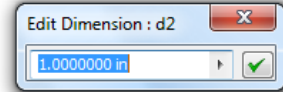
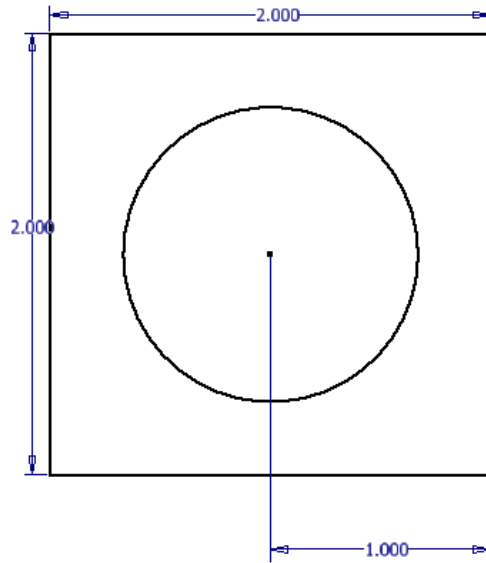


20. Click on center point circle and draw a circle in the front of the cube. It doesn't matter much where it is, as long as it's completely in the square. To draw the circle, left-click near the center of the square, move (don't drag) the mouse outward a little, then left-click again.

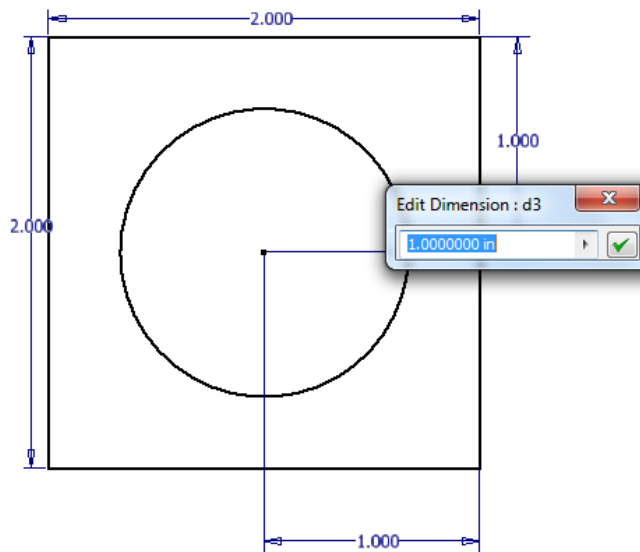


21. Right click – done

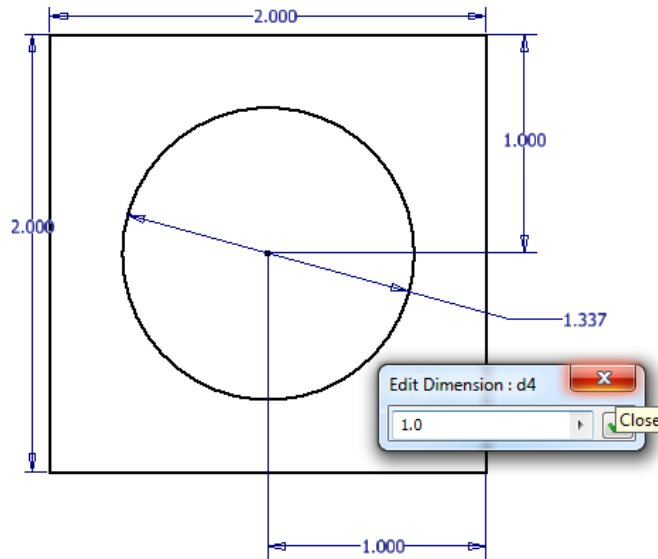
22. To center the circle from left-to-right click **Dimensions**, click the center point of the circle (it turns a red dot), then pull the mouse to the right edge of the square, click when the border turns red, then take the mouse straight down off the square and click again. Edit the distance to 1”.



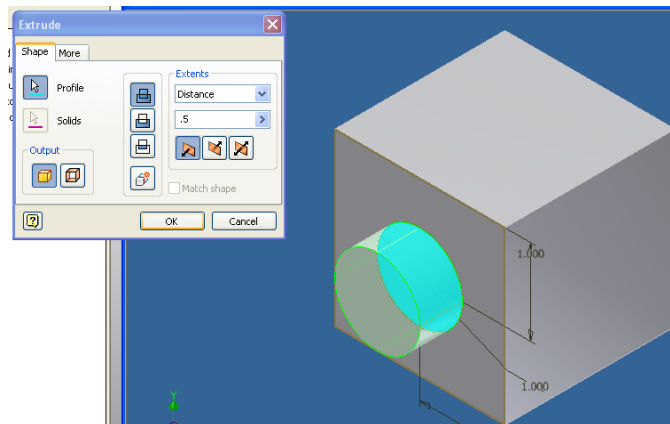
23. To center the circle from top-to-bottom click Dimensions, click the center point of the circle (it turns a red dot), then pull the mouse up to the edge of the square, click when the border turns red, then take the mouse to the right, off the square and click again. Edit the distance to 1". The circle should now be centered in the square (which is the front of the cube).



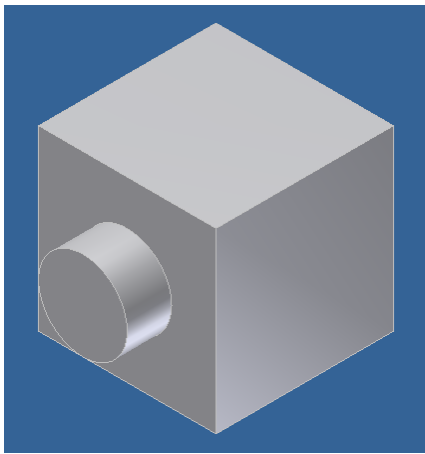
24. Make the circle's diameter (side to side) 1 inch. Here's how: Click Dimensions, click any point on the edge of the circle, then slide (don't drag) the mouse straight across the opposite side and edit the dimension to 1".



25. Right click → Done.
26. In the upper-right click Finish Sketch.
27. Click on the Home (view)
28. Click on Extrude.
29. Set the depth to .5" (that's ½ inch).
30. Run the mouse around until the circle you made is highlighted then click it select it. Now click OK.

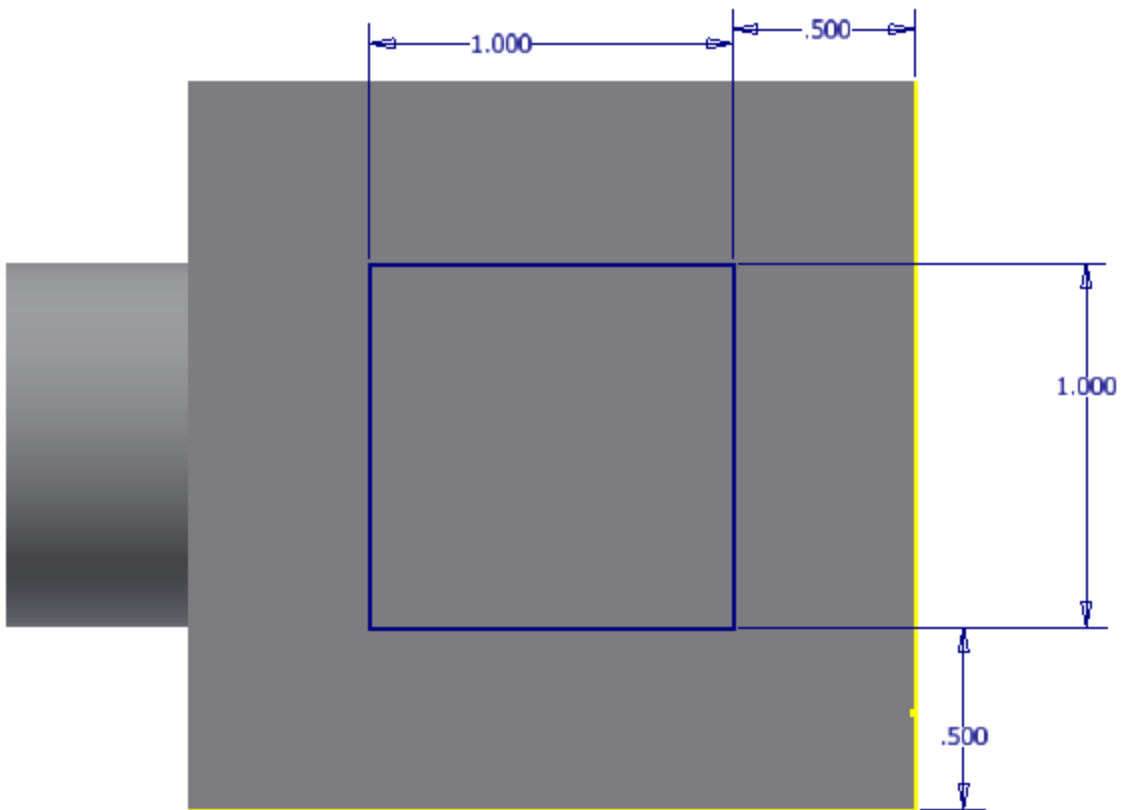


31. Your project should now look like this:



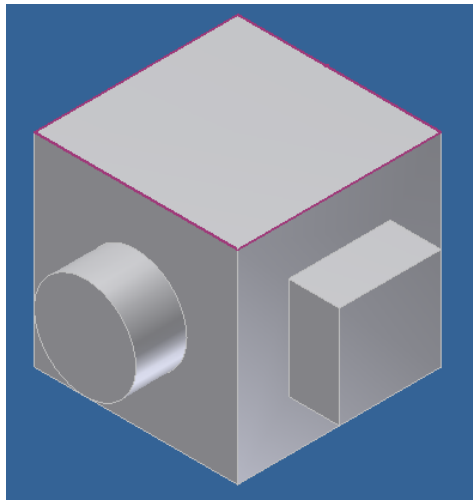
32. SAVE YOUR WORK to My Documents→Inventor→Project 1→Cube

- 33. Click the right-side view of the cube then click Create 2D Sketch at the top.
- 34. Draw a 1"x1" square on the right side (use the 1-point rectangle tool).
- 35. Make the square .5 inch from each side of cube. (Hint: Click Dimension, then click on side of square then the side of cube and pull it out to set the distance)



- 36. Right click → Done, then Finish Sketch at the top right.

37. Extrude the square .5 inch out – be sure to click on the square first-it lights up.



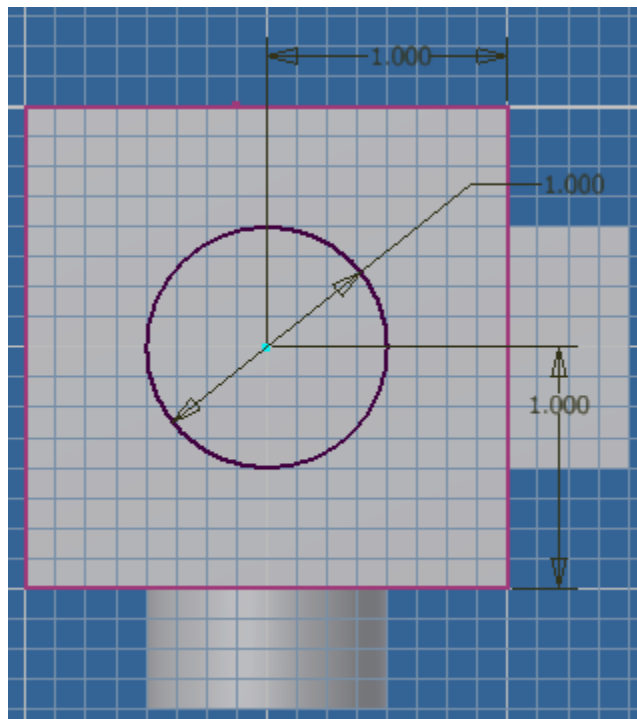
38. Select the top view of the cube then → Create 2D Sketch.

39. Draw a circle and make its diameter 1", then Done.

40. Dimensions→Click on center of circle and right edge of cube, move up (or down) and enter 1 inch.

41. Dimensions→Click on center of circle and bottom edge of cube, move to right and enter 1 inch.

42. Click Done→Finish Sketch.



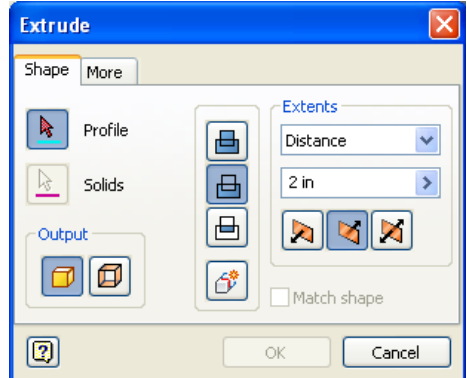
43. Now we want to turn the circle we just made into a hole that goes completely through the 2” cube.

So click on Home view then Extrude.

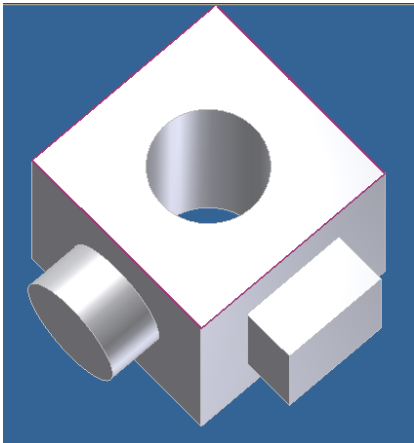
A. In the Extrude window click on **cut**, set the distance to 2” and select the middle box below that as shown:

B. Move the mouse around so just the circle on the top of the cube is highlighted, then click OK. The circle should now be a 1” hole that goes completely through the center of the cube.

C. Done.



44. Your object is complete and should look like this:



YOU DID IT!!! SAVE YOUR WORK AND HAVE MR. SHRILLA TAKE A LOOK!

PREPARE AN ENGINEERING DRAWING

45. It's a good idea to leave your Cube.ipt open in Inventor.

46. Now start a new drawing: I→New→Drawing

47. In the right column, right-click **ANSI-Large** and left-click **Delete**.

48. Right-click **Sheet 1** then left-click **Edit**. Change the size to **A** and click **OK**.

49. Click the + next to Drawing Resources and + next to Title Blocks and then double-click **AMSI A**.

50. I→Save and in the Cube folder File name type **Sketch Plane Cube**.

51. Watch my instructional video to learn how to place the different views of the cube into the drawing, set dimensions label the figures, fill-in the Title blocks and print. WOW!!!