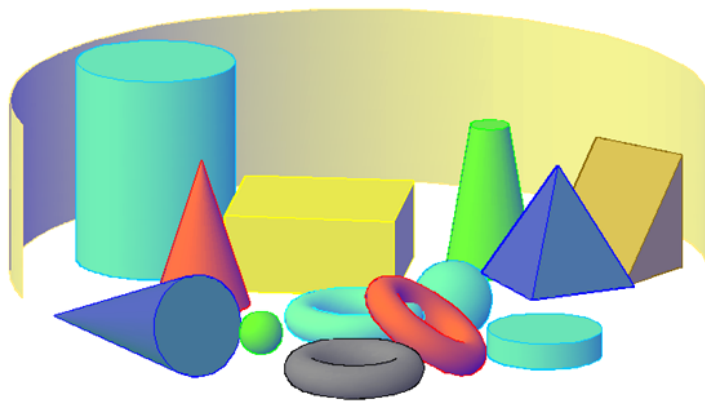# Create Basic 3D Objects

This tutorial outlines the procedures for creating three-dimensional objects by creating basic 3D shapes known as solid primitives. You can also create 3D models by extruding 2D shapes.

Audience: Users new to 3D modeling with AutoCAD 2011

Prerequisites: Working knowledge of 2D drafting

Time to complete: 15 minutes

Objectives

- Create 3D solid primitives
- Create 3D objects from 2D objects

Tutorial Files

All necessary files for this tutorial are located at
http://www.autodesk.com/autocad-tutorials.

Recommended: Before starting the tutorials

1 Download the *create_basic_3Dobjects.zip* from
   http://www.autodesk.com/autocad-tutorials.

2 Unzip *create_basic_3Dobjects.zip* to *C:\My Documents\Tutorials*.

Lesson 1: Create 3D Solid Primitives

In this lesson, you learn how to create 3D solid primitives in the 3D Modeling
workspace.

You can use standard 3D solid objects known as solid primitives to create a
box, cone, cylinder, sphere, torus, wedge, and pyramid. To create these 3D
solid primitives, switch the workspace to 3D Modeling, where the palettes
and ribbon panel are customized to create and modify 3D solid models.

Switch to the 3D Modeling Workspace

1 On the status bar, at the bottom of the drawing area, click the Workspace
   Switching button.

2 On the Workspace menu, click 3D Modeling.
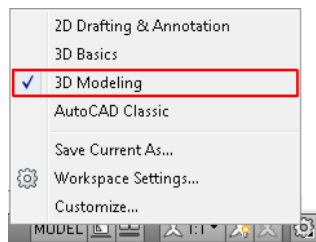
The 3D Modeling workspace is displayed. In this workspace, you can access
the various commands and tools needed for creating 3D drawings.

NOTE For more information about switching workspaces, see the *AutoCAD User's Guide* or refer to the AutoCAD 2009 tutorial: *Switching Workspaces in AutoCAD 2009*.
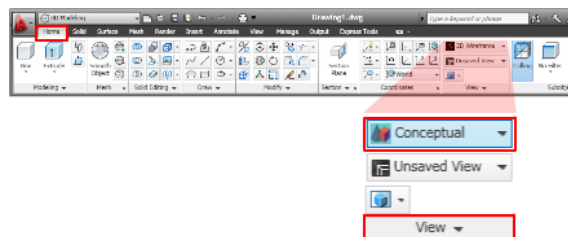
Create a box

You can create a rectangular or cubical solid box. Box objects can form a basic structure that you can resize or combine with other objects.
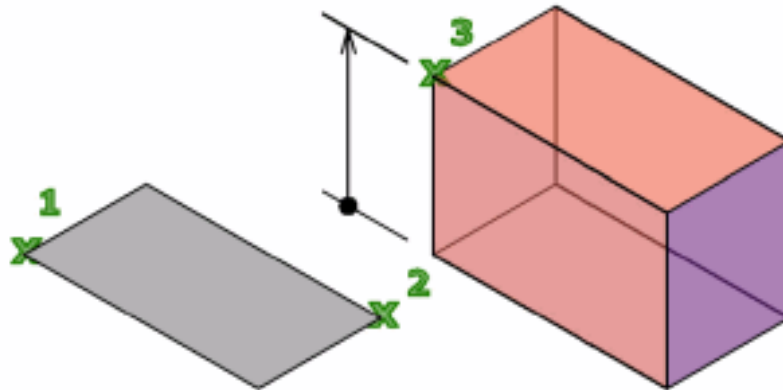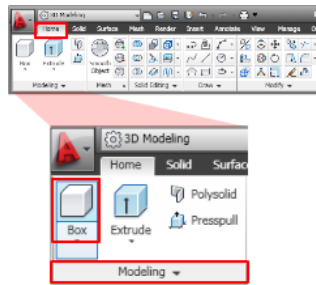

The following steps explain how to create a box.

1 On the ribbon, click Home tab ➤ View panel ➤ Visual Styles drop-down ➤ Conceptual.

2 On the ribbon, click Home tab ➤ Modeling panel ➤ Solid Primitives drop-down ➤ Box.
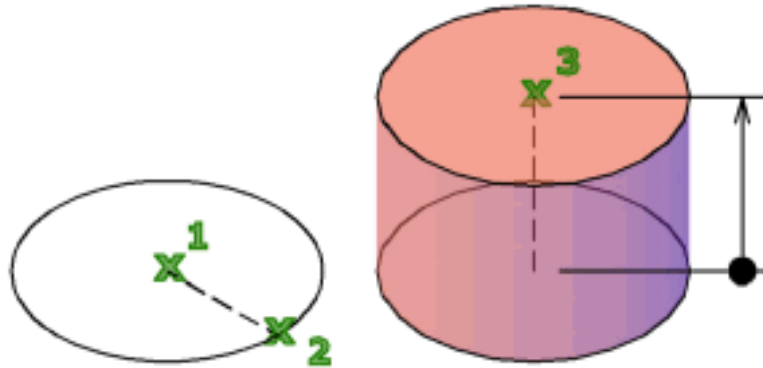
3 At the prompt, click any point in the drawing to specify a base point.

4 At the prompt, enter **@ 8,8** for the opposite corner and press Enter.

5 At the prompt, enter **5** for height and press Enter.

The base of the box is always drawn parallel to the XY plane of the current UCS (workplane). The height of the box is specified in the Z axis direction. You can enter both positive and negative values for the height.

6 On the ViewCube, located at the upper-right corner of the drawing window, click Top, Front, Left, and Right to navigate around the sheet.

NOTE For more information on ViewCube, see the *AutoCAD User's Guide* or refer to the AutoCAD 2009 tutorial: *Navigating a Model with ViewCube.*

Create a cylinder

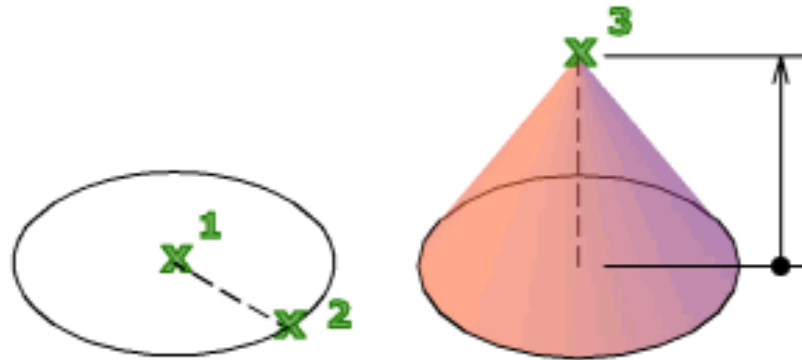You can create a cylinder with a circular or elliptical base.

The following steps explain how to create a cylinder.

1   On the ribbon, click Home tab ➤ Modeling panel ➤ Solid Primitives

drop-down ➤ Cylinder.

2   At the prompt, click any point in the drawing to specify a base point.

3   At the prompt, enter **5** for radius and press Enter.

4   At the prompt, enter **8** for height and press Enter.

Create a cone

You can create a pointed or frustum of a cone with a circular or elliptical base.
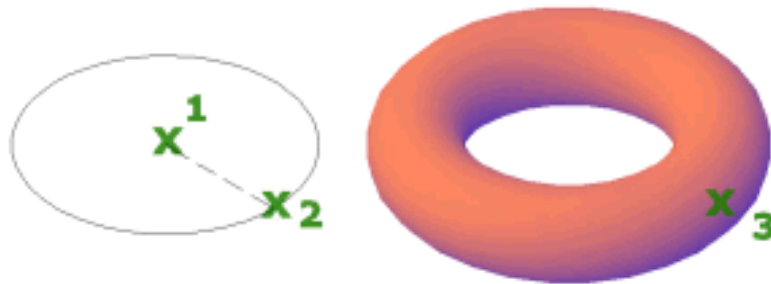
The following steps explain how to create a cone.

1 On the ribbon, click Home tab ➤ Modeling panel ➤ Solid Primitives

   drop-down ➤ Cone.

2 At the prompt, click any point in the drawing to specify a base point.

3 At the prompt, enter **7** for radius and press Enter.

4 At the prompt, enter **5** for height and press Enter.

Create a torus

You can create a ring-shaped basic 3D solid primitive that resembles the inner
tube of a tire. A torus has two radius values. One value defines the tube. The
other value defines the distance from the center of the torus to the center of
the tube.

The following steps explain how to create a torus.

1   On the ribbon, click Home tab ➤ Modeling panel ➤ Solid Primitives

      drop-down ➤ Torus. ◎

2   At the prompt, click any point in the drawing to specify a base point.

3   At the prompt, enter **8** for radius and press Enter.

4   At the prompt, enter **3** for tube radius and press Enter.

Summary: In this lesson, you learned how to:

■   Display the 3D Modeling workspace

■   Create simple 3D solid primitives

Lesson 2: Create Simple 3D Objects from 2D Objects

In this lesson, you create simple 3D objects from 2D objects.

You can create simple and complex objects by combining and modifying basic 3D shapes. You can also extrude 2D objects to create solids and surfaces by adding height. If you extrude a closed object such as a circle, the result is a

3D solid. If you extrude an open object such as an arc or a line, the result is a surface. A surface is a type of 3D object that has no thickness.
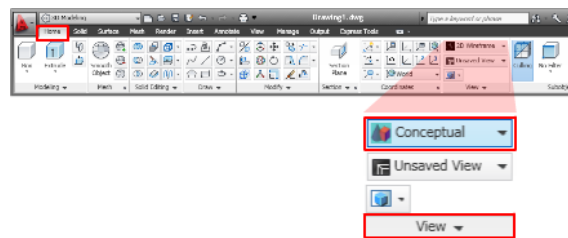
Draw a table stand with simple 3D solid primitives
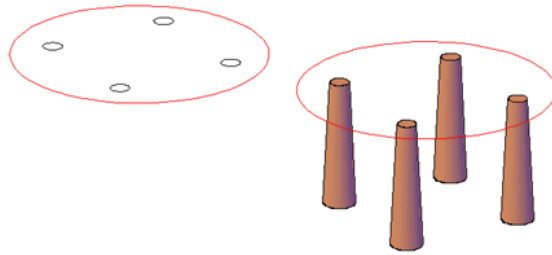
1   Click ➤ Open.

2   In the Select File dialog box, browse to *C:\My Documents\Tutorials*. Open *create_table.dwg*.

3   On the ribbon, click Home tab ➤ View panel ➤ Visual Styles drop-down list ➤ Conceptual.

TIP If you have trouble selecting objects, change the current visual style to 3D Wireframe.

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4   On the left half of the status bar, click the Object Snap button to enable object snap mode. Right-click the Object Snap button.


5   On the shortcut menu, click Center to turn it on. The Center option should now have a box around its icon which indicates the object snap is enabled.
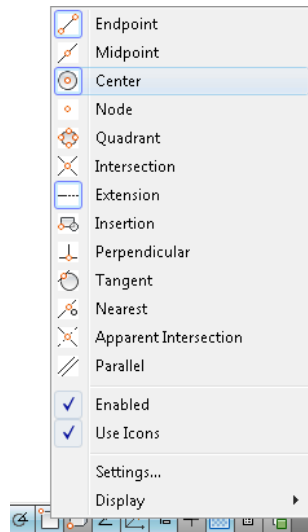
6 On the ribbon, click Home tab ➤ Modeling panel ➤ Solid Primitives

   drop-down ➤ Cone.

7 At the prompt, move the cursor over one of the smaller circles. The center
   point of the circle is displayed. Click the center of the circle in the
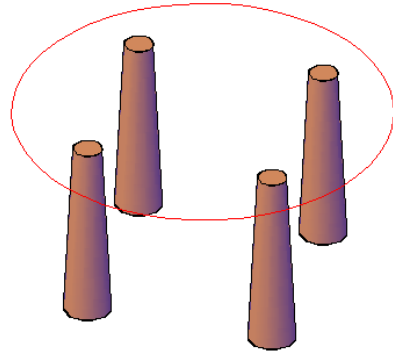   drawing.
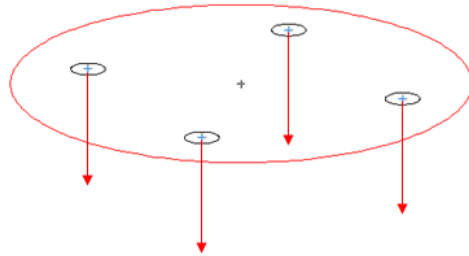
8 At the prompt, enter **T** for top radius and press Enter.

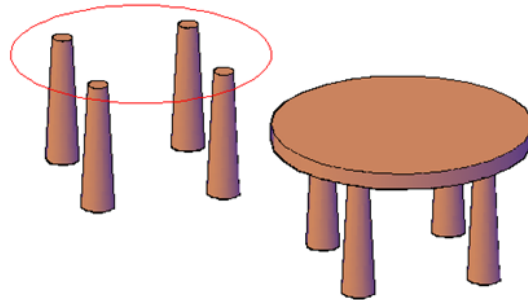**9** At the prompt, enter **0.5** for radius and press Enter.

10 At the prompt, enter **-4** for height and press Enter.

11 Repeat the process on the other smaller circles in the drawing to create
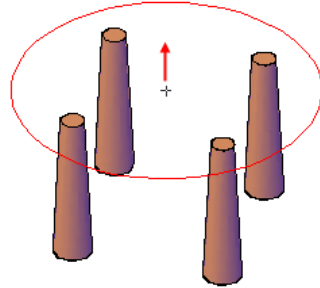   four table legs.

You have created four table legs.
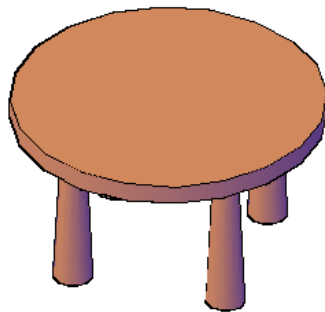
Draw a table top with simple 3D solid primitives


In the same drawing file, do the following:

1   On the ribbon, click Home tab ➤ Modeling panel ➤ Solid Primitives drop-

    down ➤ Cylinder.

2   At the prompt, select the center point of the circle that has a radius of 4.

3 At the prompt, enter **4** for radius and press Enter.

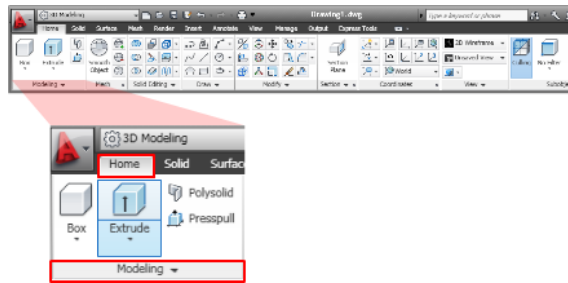**4** At the prompt, enter **0.5** for height and press Enter.

You have created a table top.

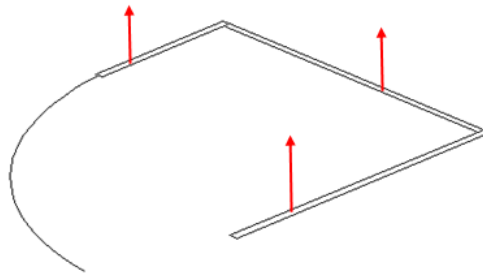**Extrude an object to create the walls of a room**
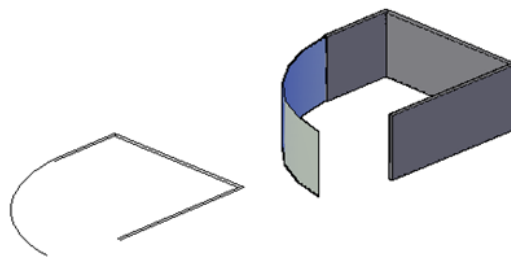
1 Click ➤ Open.

2 In the Select File dialog box, browse *to C:]Documents\Tutorials*.

3 Open *create_wall.dwg*.

**4** On the ribbon, click Home tab ➤ Modeling panel ➤ Solid Creation drop-down ➤ Extrude.

5 At the prompt, select the three closed rectangles in the drawing window, and press Enter.

6 At the prompt, enter **96** for the height of extrusion and press Enter.

> **NOTE** A 3D solid object (wall) is created because you have extruded a closed object (rectangle). When you extrude an open object, a 3D surface is created.

7 Repeat the extrude process on the arc (open object) displayed in the drawing to create a 3D surface.
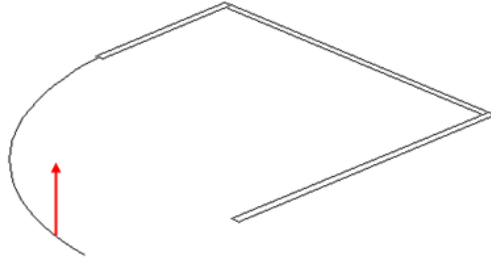
You created the walls of a room.

Summary: In this lesson, you learned how to do the following:

■ Create 3D objects from 2D objects

■ Extrude a closed 2D object to create a 3D solid and extrude an open object to create a 3D surface

Congratulations! You have created basic 3D objects.

For more information, see the *AutoCAD User's Guide.*