Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Coordinating Seminar – Technology Presentation

**Volumes of Solids of Revolution**

**Worksheet**

The purpose of Volumes of Solids of Revolution is to find the volume of a given shape. This can be done by graphing the original function then rotating the graph around the x or y-axis. For our purposes we will be rotating our function around the x-axis while using the disk method to find the volume. It is important to keep in mind that the volume will always be positive and normally has the measurements units3.

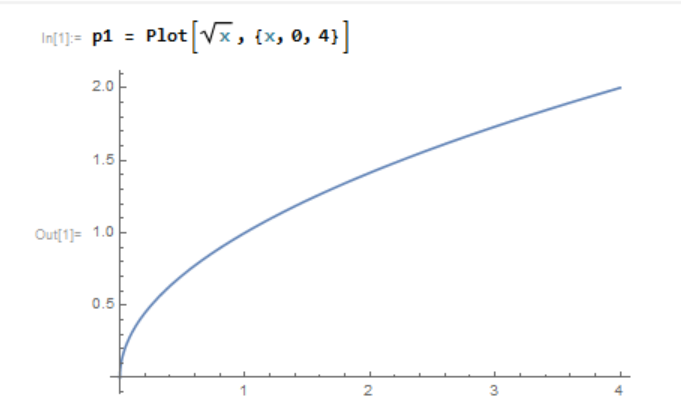
The cool part about is, the 3D shape created can be exported to an stl file which then can be 3D printed.

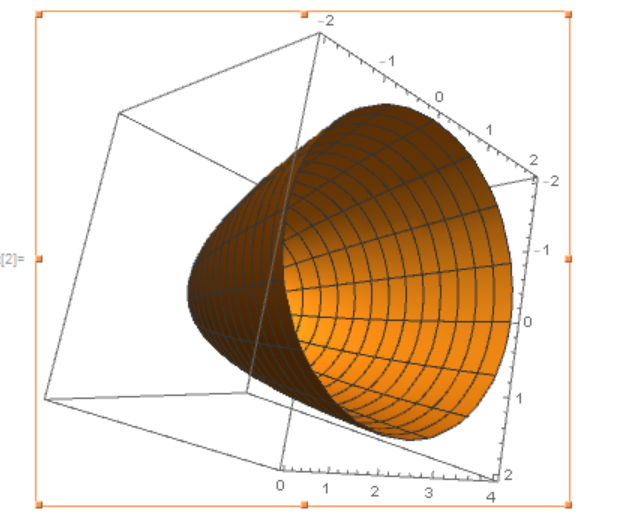
**Important Formulas:**

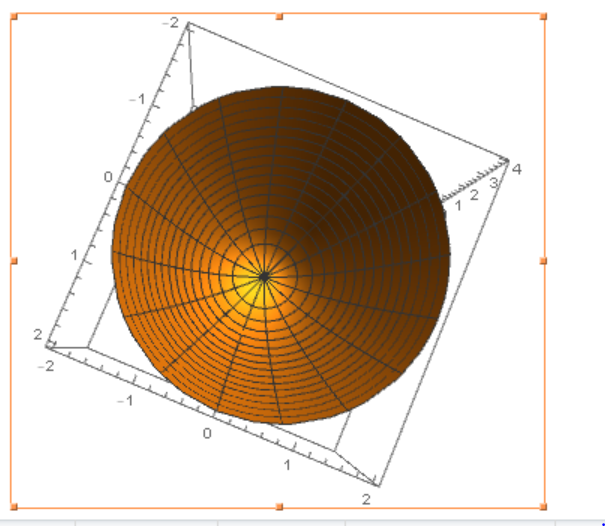
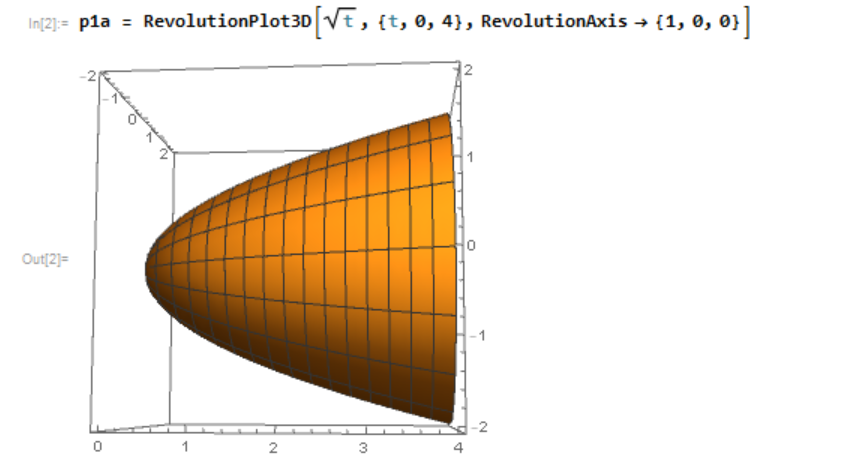
\*Note – We are using the volume of a circle formula because our method is disks and the radius is the function of the graph.

Example:

Find the volume of the solid obtained by rotating about the x axis the region under the curve y = from 0 to 4.







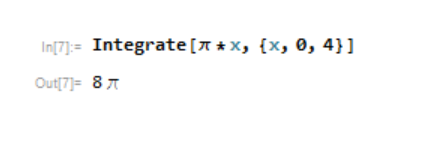
4

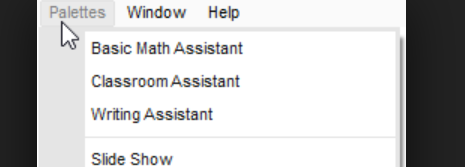
0

F(a) – F(b)

= 8π units3

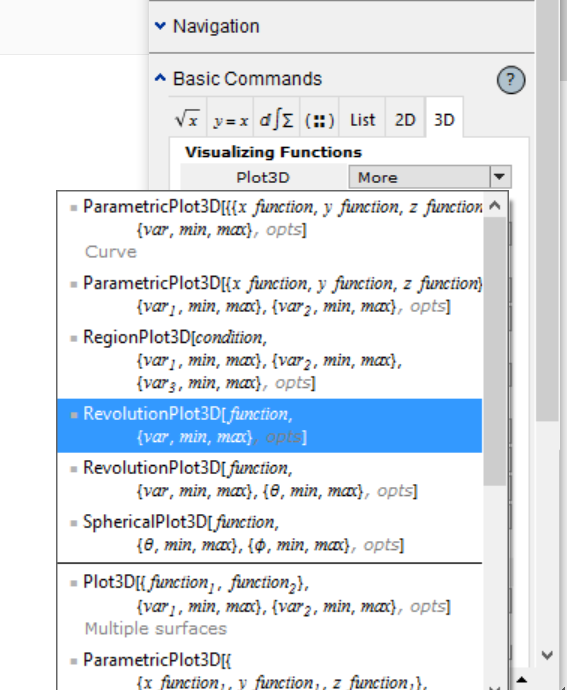
**Check with Mathematica:**



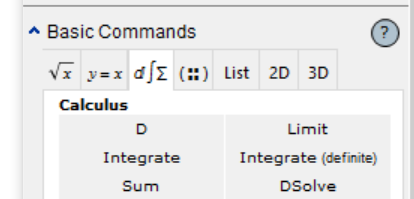
Where to find commands in Classroom assistance:

1. Open classroom assistance:



2. Plot Command: 3. 3D Plot Command

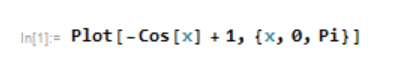


4. Integrate Command:

Exercise 1:

Find the volume of the solid obtained by rotating about the x axis the region under the curve y = -Cos(x) + 1 from 0 to π.

**Step 1:** Graph the function

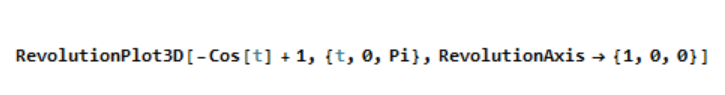


Tells Mathematica Range of function

to graph the function

Function

**Step 2:** Rotate the function



Tells Mathematica to Function Axis to rotate function

rotate function Range of {x, y, z}

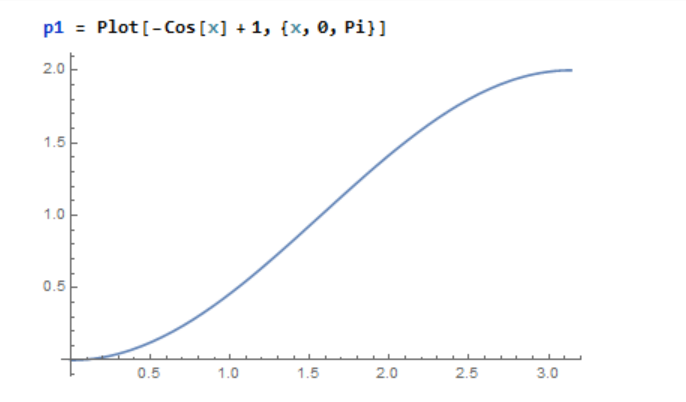
function

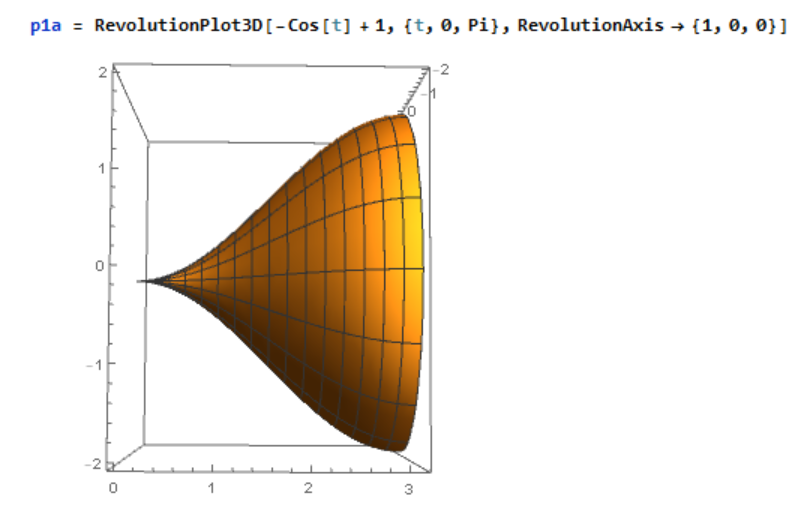
**Step 3:** Determine Volume

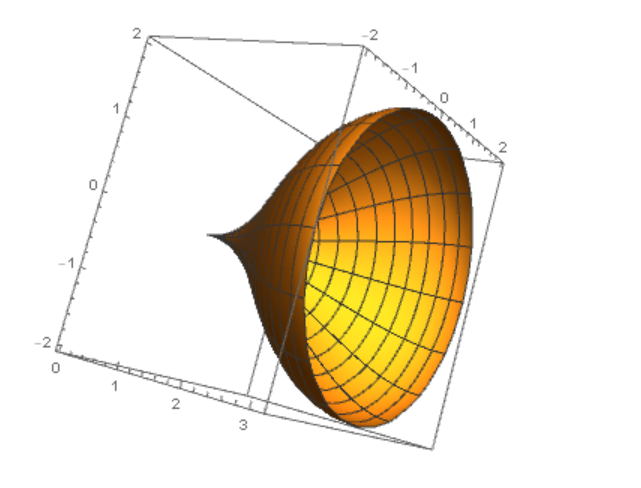
Tells Mathematica to Function Range of

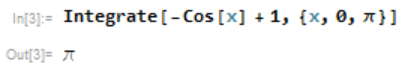
integrate the function function

Solutions to Exercise 1:







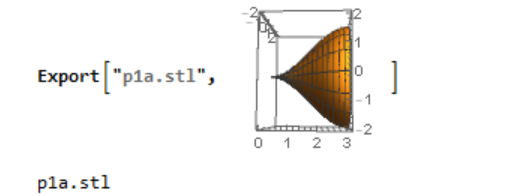


Practice Exercises:

1. Find the volume of the solid obtained by rotating about the x axis the region under the curve y= from 0 to 2.

2. Find the volume of the solid obtained by rotating about the x axis the region under the curve y =from 2. to -2.

How to save 3D graph to stl file for 3D printing:



**3D Software:**

Blender

TinkerCad

Meshmixer

Maya

3D Tin