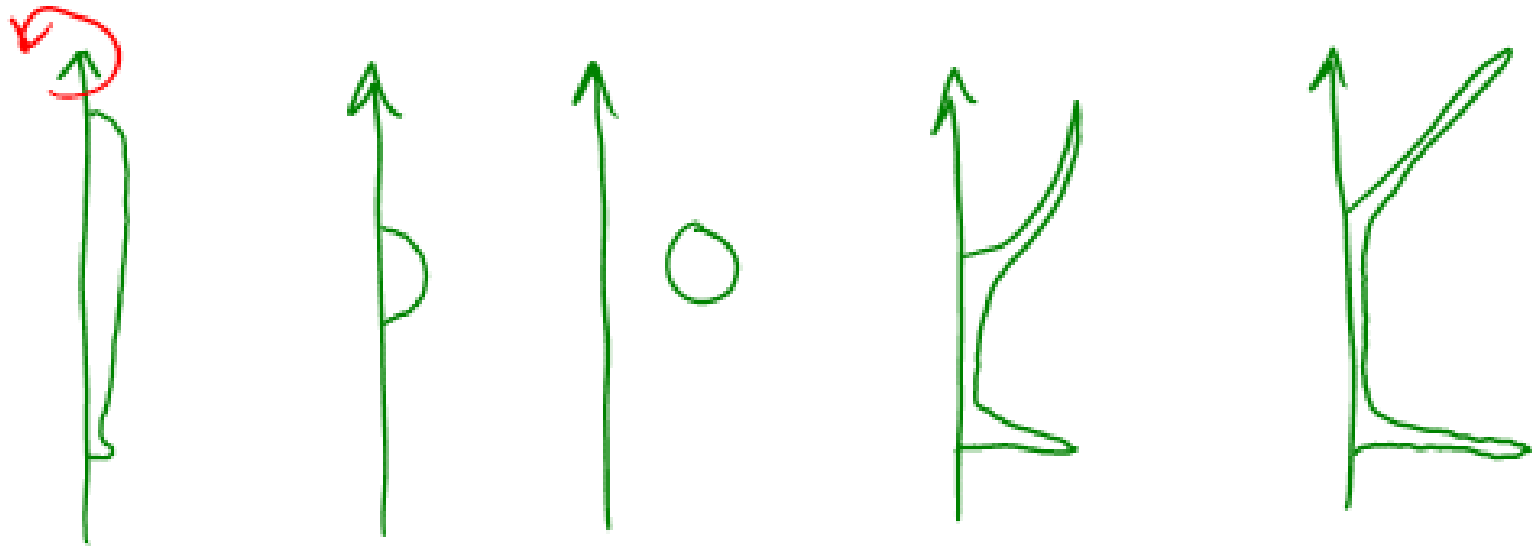


Surfaces of Revolution

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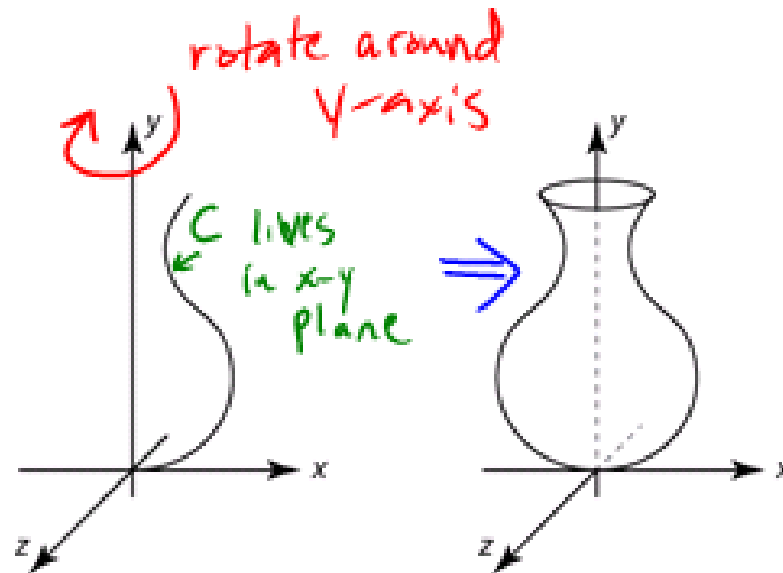
Surfaces of revolution



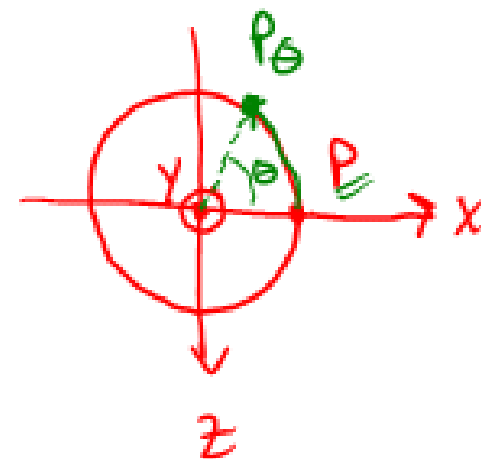
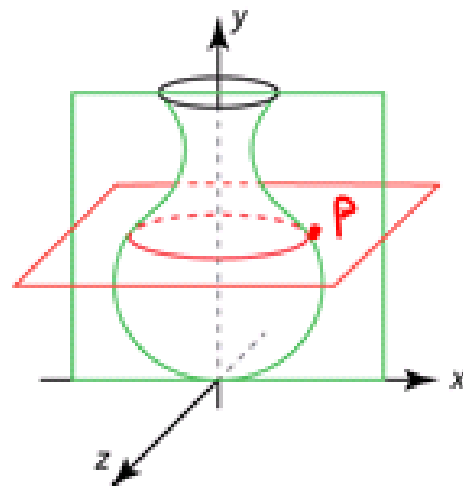
Idea: rotate a 2D **profile curve** around an axis.

What kinds of shapes can you model this way?

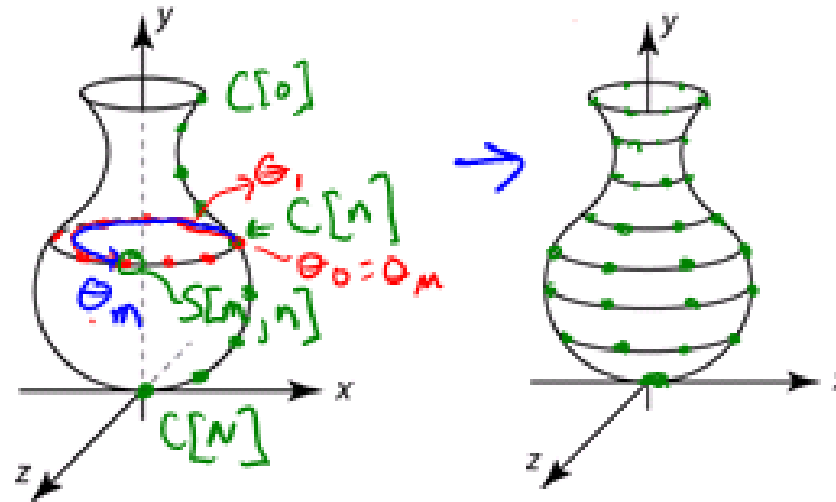
Constructing surfaces of revolution



$$P_0 = R_y(\theta) P$$



Constructing surfaces of revolution



Given: A set of points $C[n]$ on a curve in the xy -plane:

$$C[n] = \begin{bmatrix} C_x[n] \\ C_y[n] \\ 0 \\ 1 \end{bmatrix} \quad \text{where } n \in [0, M]$$

$$\Delta\theta \downarrow \\ \theta_m = \frac{2\pi}{M} \cdot m$$

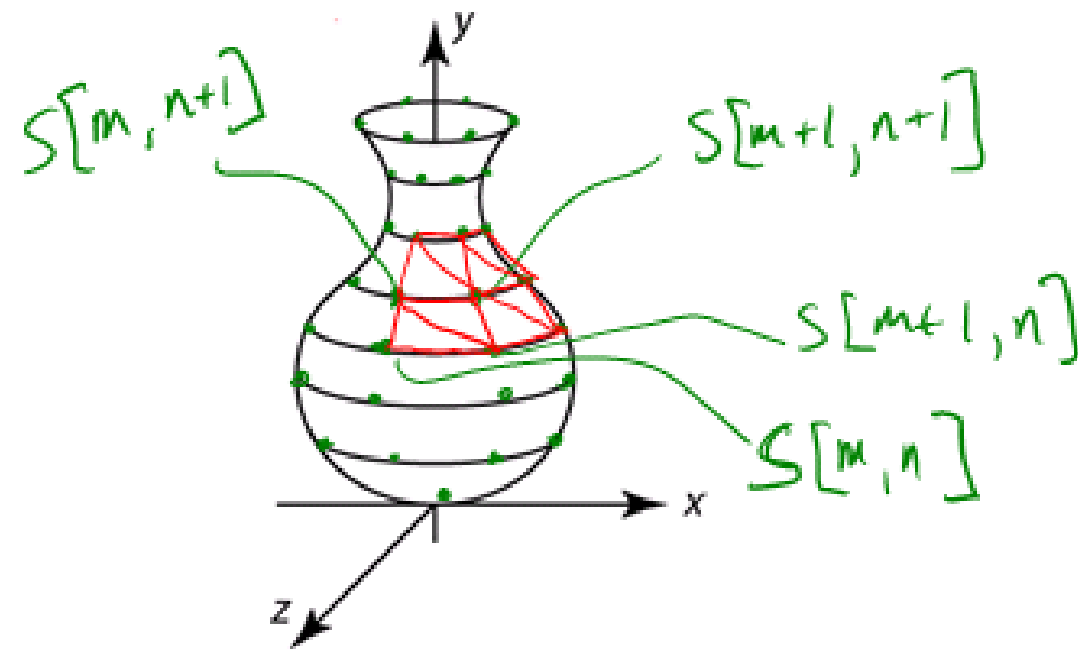
Let $R_y(\theta_m)$ be a rotation about the y -axis by angle θ_m .

Find: A set of points $S[m, n]$ on the surface formed by rotating $C[n]$ rotated about the y -axis. Assume $m \in [0, M]$.

Solution:
$$S[m, n] = R_y\left(\frac{2\pi}{M}m\right)C[n]$$

Constructing surfaces of revolution

We now have an array of points, $S[n, m]$ on the surface.



How would we turn this into a mesh of triangles?

How many triangles are generated?

$$\sim 2N \cdot n$$