Maple commands: (all require the command with(plots); first)
To plot a function of the form \( z = f(x,y) \) - plot3d\((f(x,y), x=\text{range of } x, y=\text{range of } y)\);
To plot a function of the form \( f(x,y,z) = 0 \) (i.e. \( z \) is not solved for) – implicitplot3d\((f(x,y,z)=0, x=\text{range of } x, y=\text{range of } y)\);

To use Maple to help sketch a region of integration for the integral \( \int \int \int_{V} f(x,y,z) \, dz \, dx \), you can have Maple plot the function \( y = \sqrt{1-z^2} \), then plot the curves for \( z \) in 2 dimensions.

1. Use Maple to help sketch the region of integration in three dimensions for the following integrals.
   a. \( \int_{-1}^{1} \int_{0}^{1} \int_{-z^2}^{1-z^2} f(x,y,z) \, dz \, dx \)
   b. \( \int_{-1}^{1} \int_{0}^{1} \int_{0}^{x^2+y^2} xz \, dz \, dy \)
   c. \( \int_{0}^{1} \int_{0}^{1} \int_{0}^{\sqrt{1-x^2-y^2}} f(x,y,z) \, dz \, dy \)

2. Convert the integral in 1b to cylindrical coordinates.

3. Let \( T \) be the tetrahedron bounded by the coordinate planes and the plane \( 2x + 3y + 6z = 12 \). Set up an iterated triple integral to compute the volume of \( T \) using the differential
   a. \( dx \, dy \, dz \)
   b. \( dz \, dy \, dx \)

4. Use Maple to help sketch the region \( R \) which is bounded by \( z = x \), \( z = x^2 \), and the planes \( y = 0 \) and \( y = 3 \). Find the volume of the region \( R \) either with Maple or by hand.

5. Use cylindrical coordinates to compute \( \iiint_{S} y \, dV \) where \( S \) is the region in the first octant bounded by the cylinder \( x^2 + y^2 = 1 \) and the plane \( z = x \). Use Maple to help sketch the region of integration

**Homework:** Read Section 14.6. Try exercises #11-18, 21, 22, and 24 on page 823.

**Solutions:**
2. \( \int_{-1}^{1} \int_{0}^{1} \int_{-\frac{x^2}{2}}^{\frac{x^2}{2}} r^2 \cos\theta \, dz \, dr \, d\theta \)
3. \( \int_{0}^{\frac{\pi}{2}} \int_{0}^{\frac{\pi}{2}} \int_{0}^{\frac{(12-6\cos\theta)}{2}} r^2 \, dz \, dx \, dy \) and \( \int_{0}^{\frac{\pi}{2}} \int_{0}^{\frac{\pi}{2}} \int_{0}^{\frac{(12-2r^2)}{6}} \sin\theta \, dz \, dy \, d\theta \)
4. \( \int_{0}^{1} \int_{0}^{1} \int_{0}^{x^2} \, dz \, dy \, dx = \frac{1}{2} \)
5. \( \int_{0}^{1} \int_{0}^{1} \int_{0}^{r \cos\theta} \, r^2 \sin\theta \, dz \, dr \, d\theta = \frac{1}{8} \)