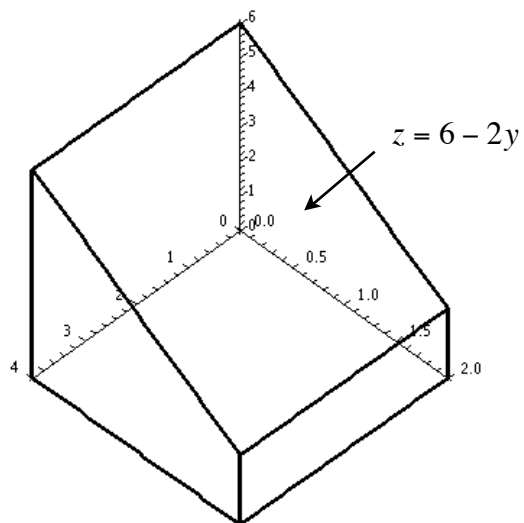
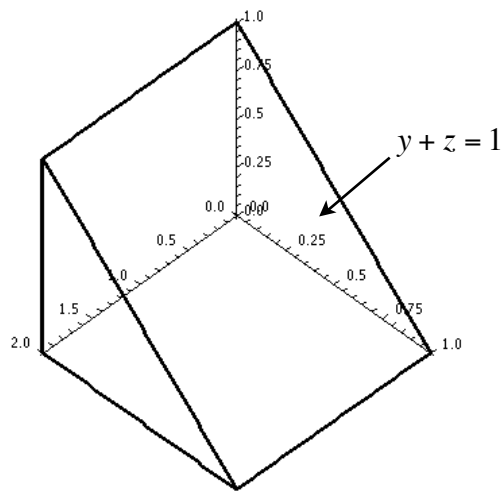


Math 213 Class 12: Volumes

1. Find the volume of the figures shown below.



2. Sketch the solid whose volume is given

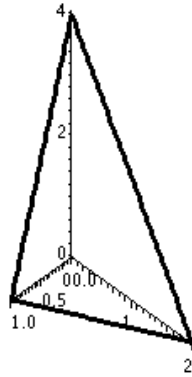
$$\int_0^4 \int_0^{\frac{4-x}{2}} \int_0^{\frac{12-3x-6y}{4}} dz dy dx$$

Then rewrite the integral in the order

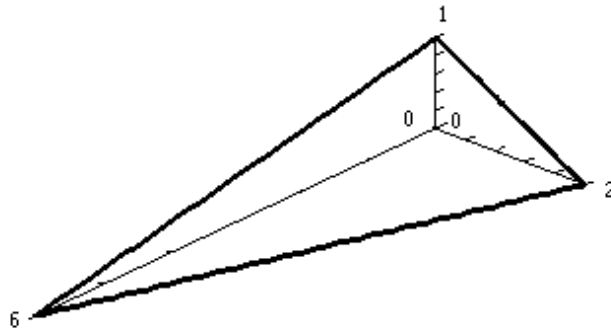
$$\int \int \int dy dx dz$$

with the appropriate limits of integration.

3. Find the volume of the tetrahedron bounded by the coordinate planes and the plane $z = 4 - 4x - 2y$.



4. Find the volume of the tetrahedron shown below.



5. **Extra Credit -**

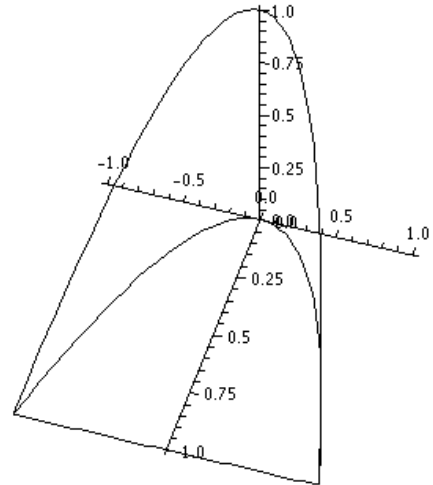
You must show ALL your work!

Compute the volume bounded by

$$x = y^2$$

$$z = 0$$

$$x + z = 1$$



6. **Extra Credit.**

You must show all your work.

Compute the volume of the following pyramid.

(Bounded by the following curve)

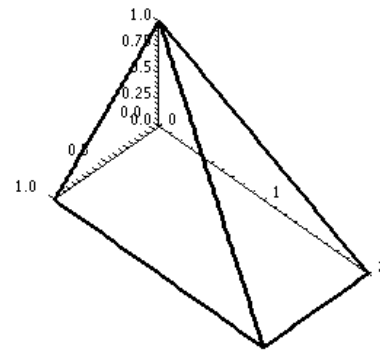
$$x = 0$$

$$y = 0$$

$$z = 0$$

$$x + z = 1$$

$$y + 2z = 2$$



Math 213 Class 12: Transformations

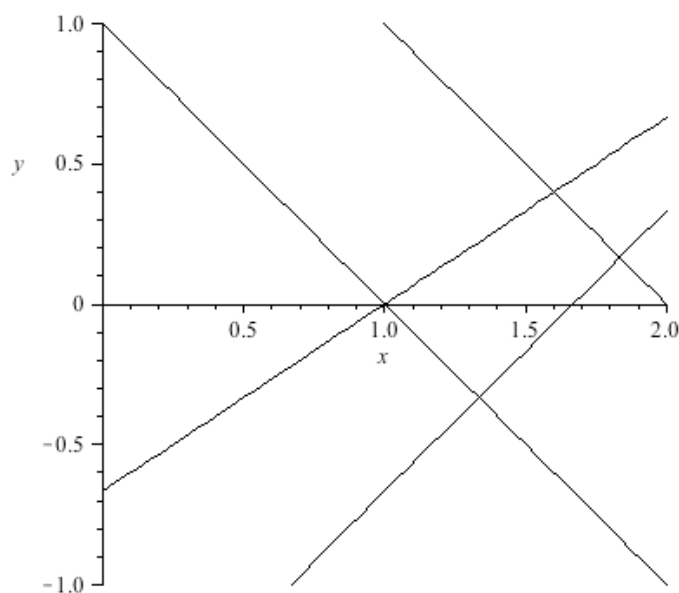
1. Let R be the region bounded by the graphs:

$$x + y = 1$$

$$x + y = 2$$

$$2x - 3y = 2$$

$$3x - 3y = 5$$



We will use the change of variables
$$x = \frac{1}{5}(3u + v)$$
 to transform the integral.
$$y = \frac{1}{5}(2u - v)$$

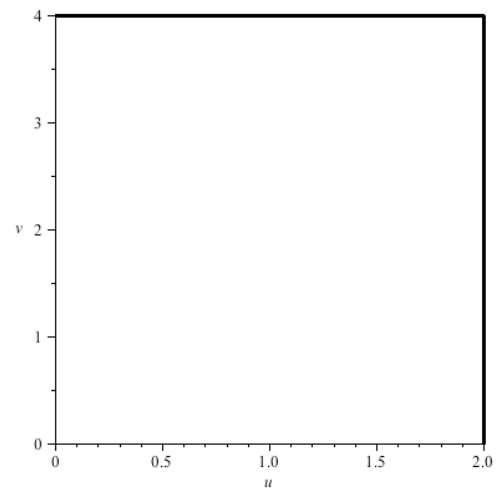
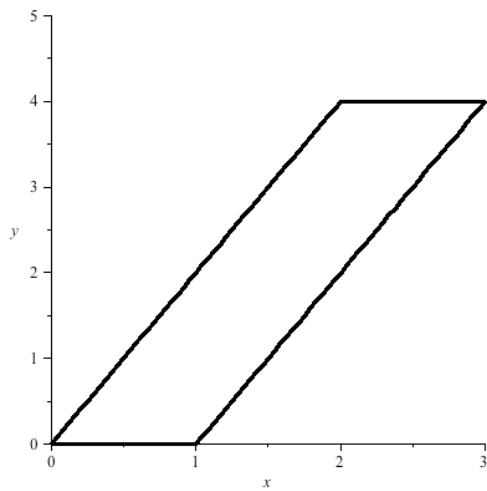
a. Find the Jacobian of the transformation.

b. Sketch the region in the uv plane.

c. Use the transformation to find the integral for $\iint_R (2x - 3y) \, dA$.

Math 213 Class 12: Transformations

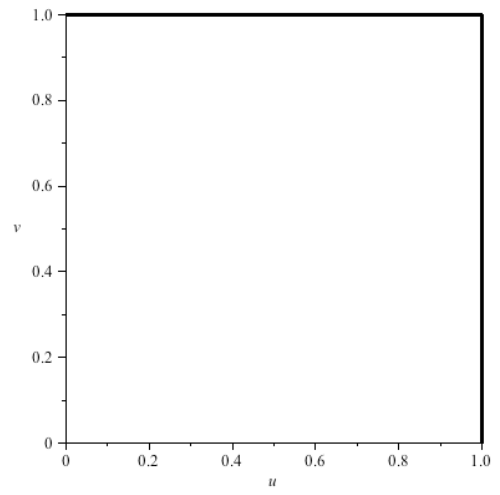
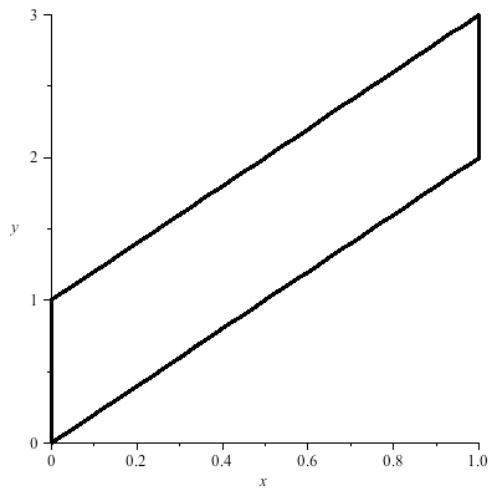
2. Transform the region in xy pictured below into the region in uv pictured below.



3. Use this transformation to compute $\int_0^4 \int_{x=y/2}^{x=y/2+1} (2x-y) dx dy$

Math 213 Class 12: Transformations

4. Transform the region in xy pictured below into the region in uv pictured below.



5. Use this transformation to compute $\int \int_R (x + y) dx dy$ where R is the xy region.

Math 213 Class 12: Transformations

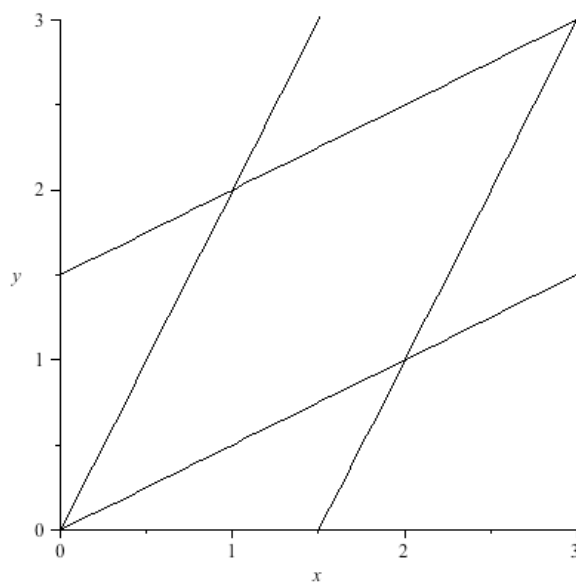
1. Consider the region pictured below bounded by the lines

$$y = \frac{1}{2}x$$

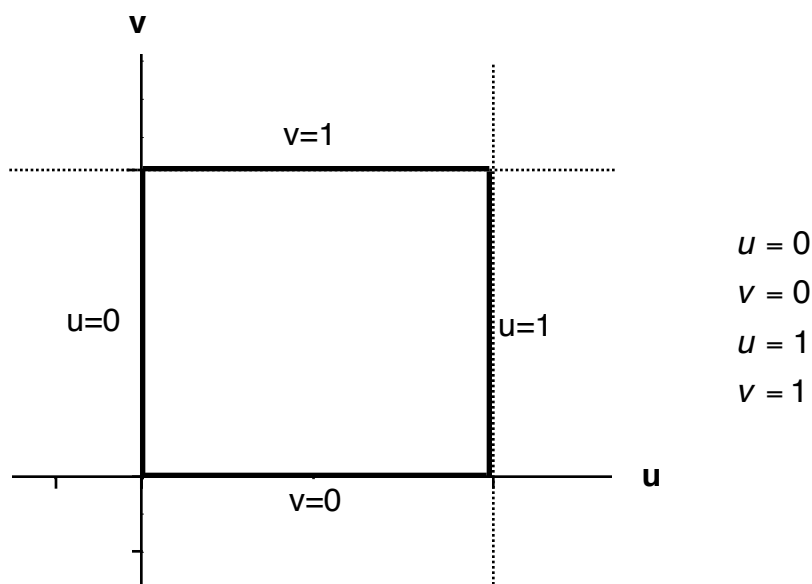
$$y = \frac{1}{2}x + \frac{3}{2}$$

$$y = 2x$$

$$y = 2x - 3$$



Find a change of variables $x = f(u, v)$ to transform this region into the square region $y = g(u, v)$ shown below.



Calculate the Jacobian for that transformation.

Math 213 Class 12: Transformations

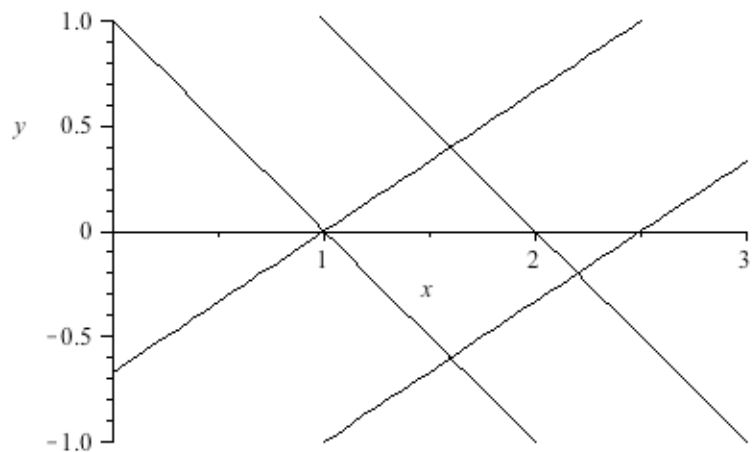
2. Consider the region pictured below bounded by the lines

$$y = \frac{2x - 2}{3}$$

$$y = \frac{2x - 5}{3}$$

$$y = 1 - x$$

$$y = 2 - x$$



Find a change of variables $\begin{matrix} x = f(u,v) \\ y = g(u,v) \end{matrix}$ to transform this region into a rectangular region in uv and calculate the Jacobian of the transformation.