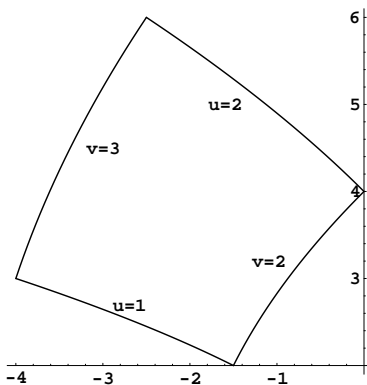1. Consider the region in the xy-plane shown below, which is bounded by

$$u = 1 \qquad u = 2 \qquad v = 2 \qquad v = 3$$

where

$$x = \frac{1}{2}(u^2 - v^2) \qquad y = uv$$

(a) List as many methods as you can think of for finding the area of the given region.

(b) For at least 3 of these methods, give explicitly the formulas you would use to find the area.

(c) Using any 2 of these methods, find the area.

2. Now consider the following integral over the same region R: $\displaystyle\iint_R \frac{1}{\sqrt{x^2 + y^2}} \, dA$

(a) Which of the above methods can you use to do this integral?

(b) Do the integral.