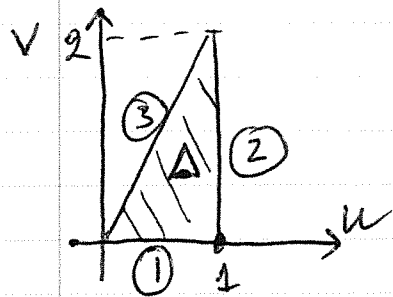


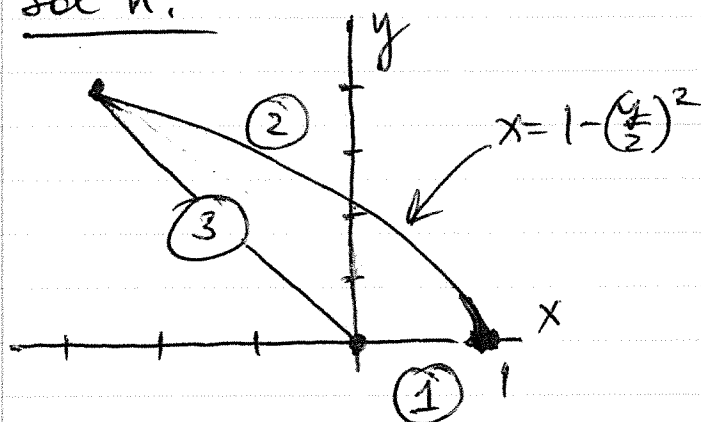
Ex. 1/book (Sec. 15.9) modified

Find the image R in the xy -plane of the triangle Δ in the uv -plane under transformation

$$x = u^2 - v^2$$

$$y = 2uv.$$

Sol'n:



On ①

$$v = 0$$

$$u \text{ in } [0, 1]$$

$$x = u^2 - v^2 \xrightarrow{v=0} = u^2$$

$$y = 2 \cdot u \cdot v \xrightarrow{v=0} = 0$$

So: $x = u^2$ in $[0^2, 1^2]$
 $y = 0$

On ②: $u = 1, v \text{ in } [0, 2].$

$$x = 1^2 - v^2 = 1 - v^2, \text{ in } [1^2 - 0^2, 1^2 - 2^2] = [1, -3].$$

$$y = 2 \cdot 1 \cdot v = 2v, \text{ in } [0, 2 \cdot 2] = [0, 4].$$

Eliminate v from these parametric eqs:

$$v = y/2, \Rightarrow x = 1 - (y/2)^2 \leftarrow \text{parabola on a side.}$$

On ③: $v = 2u, u \text{ in } [0, 1].$

$$x = u^2 - v^2 = u^2 - (2u)^2 = -3u^2$$

$$y = 2 \cdot u \cdot (2u) = 4u^2.$$

Eliminate u^2 :

$$u^2 = -x/3 \Rightarrow y = (-4/3)x.$$