Solutions to Homework Assignment 8

MATH 345-01

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1. Recall that $f(z) = z^2$ maps hyperbolas $x^2 - y^2 = c > 0$ to vertical lines $u = c$ and hyperbolas $2xy = c > 0$ to horizontal lines $v = c$. Thus, we want the region bounded by the hyperbolas $x^2 - y^2 = 1, x^2 - y^2 = 2, 2xy = 1$, and $2xy = 2$.
3. The given set is one eighth of the unit disk. Squaring maps it onto one quarter (the first quadrant), cubing maps it onto $3/8$, and z^4 maps it onto the upper half-plane along with the real axis.