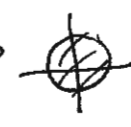


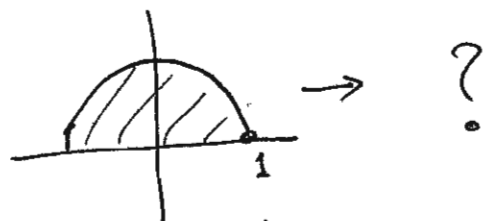
Homework 4

1 a) Find a bilinear map that maps

$D = \{z = x+iy : y < x\}$  $\rightarrow$ 
into a unit circle.

b) Find the image of the upper half of the unit circle under the map

$$w = f(z) = \frac{z-1}{z+1}$$



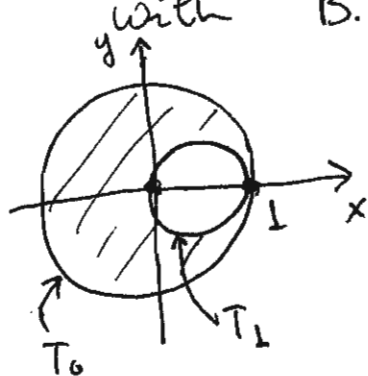
c) Find the image of



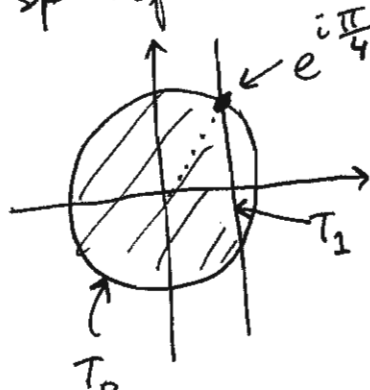
under the map in (b).

2) Solve $\Delta T = 0$ on the following regions with B.C. as specified:

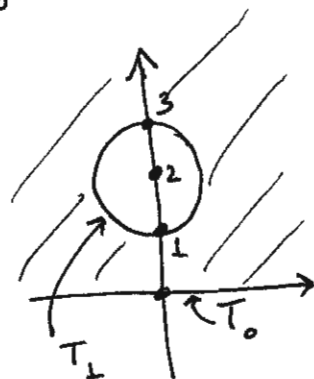
(a)



(b)



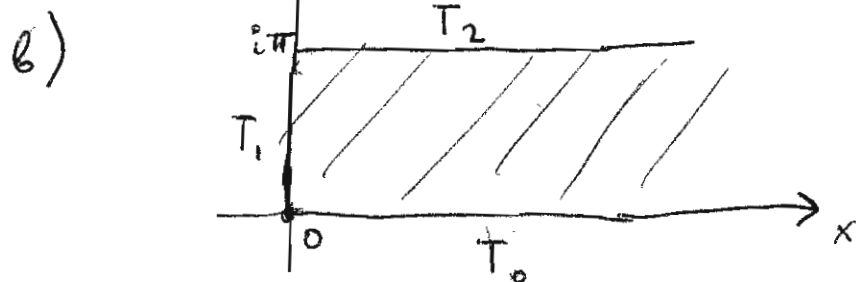
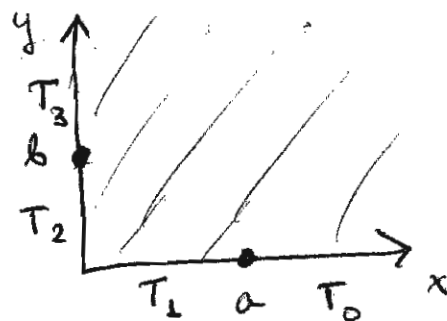
(c)



For each case, sketch the contour lines of T in the case $T_0 \neq T_1$.

3) Solve $\Delta T = 0$ on the following domains with boundary conditions as indicated:

a) Hint: consider $w = z^2$.



Hint: consider $w = e^z$, combined with Q. 1.c and Q. 3.

c) Using a computer, sketch the contour lines of T for the case (b); $T_0 = 0$, $T_1 = 1$, $T_2 = 2$.