Math 301 Homework 6

filename: `hmk6.problems.tex`

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Section 7.2 (p. 382) 11, 13

1. Find the image of the triangle with vertices at 1, i and $1 + i$ under the map $f(z) = z^2$.

2. Let D be the first quadrant $\{x + iy : x > 0, y > 0\}$ with the unit (quarter) circle removed. The boundary of D is $C_1 \cup C_2 \cup C_3$ where $C_1 = \{iy : 1 \le y < \infty\}$, $C_2 = \{e^{i\theta} : 0 \le \theta \le \pi/2\}$ and $C_3 = \{x : 1 \le x < \infty\}$. Solve $\Delta\varphi = 0$ in D with $\varphi = 0$ on C_1, $\varphi = 1$ on C_2 and $\varphi = 0$ on C_3. (Hint: use the Joukowski map $f(z) = (1/2)(z + 1/z)$ composed with another map.)