Complex Variables

Instructions Please write your name in the upper right-hand corner of the page. Circle the correct answer. No explanation is required.

1. If z_1, z_2, and z_3 are three distinct complex numbers, then there is precisely one linear fractional transformation T such that $T(z_1) = 1$, $T(z_2) = i$, and $T(z_3) = 0$. `True` `False`

2. If f is an analytic function in a disc centered at z_0, and the derivative $f'(z_0) \neq 0$, then f is conformal at z_0. `True` `False`

3. There exists a one-to-one conformal mapping from the open first quadrant onto the open unit disc. (The open first quadrant is the set $\{ z : \mathrm{Re}(z) > 0 \text{ and } \mathrm{Im}(z) > 0 \}$, and the open unit disc is $\{ z : |z| < 1 \}$.) `True` `False`

4. The two curves in the x–y plane defined by the equations $x^2 - y^2 = 1$ and $2xy = 3$ intersect orthogonally. `True` `False`

5. The linear fractional transformation $\dfrac{z+2}{3z+1}$ maps the imaginary axis (together with the point at ∞) onto a circle whose radius equals $5/6$. `True` `False`