

Math 4220: Homework 4

Due Thursday, October 8 in class.

4.1. Textbook exercise: 4.1.2.

Extra problem 1: Find a parametrization for the segment of the sideways parabola $x = y^2$ going from $(4, -2)$ to $(4, 2)$.

Extra problem 2: (a) Fix $z_0, z_1 \in \mathbf{C}$. Describe geometrically the curve parametrized by $z : [0, 1] \rightarrow \mathbf{C}$, $z(t) = (1 - t)z_0 + tz_1$.

(b) Fix $w_0, w_1 \in \mathbf{C}$. Find a parametrization for the straight line segment going from w_0 to $w_0 + w_1$.

4.2. Textbook exercises: 4.2.3(ab), 4.2.5, 4.2.6, 4.2.9, 4.2.14(abc), 4.2.18.

4.3. Textbook exercises: 4.3.4, 4.3.10.

Hint for 4.3.10: Since f is continuous at z , for every $\varepsilon > 0$ there exists $\delta > 0$ such that whenever $|w - z| < \delta$, $|f(w) - f(z)| < \varepsilon$. Choose Δz small enough that $|\Delta z| < \delta$ and let $w = z + t\Delta z$.

You can read in the textbook that Exercise 4.3.10 provides the missing piece of the proof that (iii) implies (i) in Theorem 7.

4.4. Textbook exercise: 4.4.10(abd).