Set 4, Due: March 10, 2020

1. p.185: 6-3

2. Determine the geodesics in the Poincaré disk: $\mathbb{D} = \{z \in \mathbb{C} : |z| < 1\}$ with the metric

$$ds^2 = 4\frac{dx^2 + dy^2}{(1 - x^2 - y^2)^2}.$$

Let $f : \mathbb{D} \to \mathbb{D}$ be a Möbius transformation. Is f an isometry between the Poincaré disks? Compute the Riemann curvature of $(\mathbb{D}, ds^2)$.

3. p.149: 5-15

4. p.223: 7-7

5. p.223: 7-8