## Math 431 Complex Analysis Spring 2020 HW 1

- (1) Chapter 1 Q 2,4,6,11,15,18,20
- (2) Determine the geometrical effect on the complex plane of the following transformations.
  - (a) f(z) = z + a, where  $a \in \mathbb{C}$ .
  - (b)  $f(z) = e^{i\theta}z$ , where  $\theta \in [0, 2\pi)$ .
  - (c)  $f(z) = \overline{z}$ .
  - (d)  $f(z) = \overline{z} + a$ , where  $a \in \mathbb{R}$ .
- (3) For each of the following pairs of transformations, calculate  $f^{-1}$ ,  $f \circ g$  and  $f \circ g \circ f^{-1}$ , and describe their geometrical effects.
  - (a)  $f(z) = e^{i\theta}z$ , g(z) = z + a, where  $\theta \in [0, 2\pi)$  and  $a \in \mathbb{C}$ . (b) f(z) = z + a,  $g(z) = e^{i\theta}z$ , where  $\theta \in [0, 2\pi)$  and  $a \in \mathbb{C}$ . (c)  $f(z) = e^{i\theta}z$ ,  $g(z) = \overline{z}$ , where  $\theta \in [0, 2\pi)$ . (d)  $f(z) = \overline{z}$ ,  $g(z) = e^{i\theta}z$ , where  $\theta \in [0, 2\pi)$ .