

## MATH 4100 HOMEWORK 2, SPRING 2023

Part 1. From Ash–Novinger, *Complex Variables*

- Ch. 1, p. 10, #17
- Ch. 2, p. 9, #2
- Ch. 2, p. 17, #6

Part 2.

(1) Compute

$$\int_{|z|=2} \frac{dz}{z^2 - 1}$$

where the circle is oriented counterclockwise (or, “in the positive sense”).

(2) Compute

$$\int_{|z|=1} \frac{e^z dz}{z}.$$

(3) (extra credit) Let  $P(z)$  be a polynomial, let  $a \in \mathbb{C}$  be a complex number, let  $R$  be a positive real number, and let  $C$  be the circle  $\{z \in \mathbb{C} : |z - a| = R\}$ . What is the value of

$$\int_C P(z) d\bar{z} ?$$