# Homework 8, MATH 300 2021-22 Term 2

The numbered questions are from the textbook:
E.B. Saff, A.D. Snider, *Fundamentals of Complex Analysis with Applications to Engineering, Science and Mathematics*, third edition.
We will randomly choose 3-4 questions to mark each time.

1. 4.4.10 (the circular symbol on the integral indicates integration along the positive direction of the circle $|z| = 2$); 4.4.16.

2. 4.5.3; 4.5.5; 4.5.6; 4.5.7.

3. Let $\Gamma$ be any closed simple contour in $\mathbb{C}$ oriented in the positive sense, and for a complex number $w$ not on $\Gamma$, write

$$g(w) = \int_\Gamma \frac{z^3 + 2z}{(z-w)^3} dz.$$

   Show that $g(w) = 6\pi i w$ when $w$ is in the interior of $\Gamma$ and that $g(w) = 0$ when $w$ is in the exterior of $\Gamma$.