1. (E) Evaluate the following integrals:

\[
\frac{1}{2\pi i} \int_{|z|=2} \left( z + \frac{1}{z} \right)^3 \, dz; \quad \frac{1}{2\pi i} \int_{|z|=2} \frac{dz}{z^2 - 3z}
\]

2. Your name (worth one point)

3. §3.6 – 2.

4. (E) Find the Taylor series for \( f(z) = \frac{1 + 2z}{(1-z)^2} \) at \( z = 0 \). (Hint: first expand \( f \) in partial fractions, and then use the last problem.)

5. §3.6 – 6.

6. §3.5 – 8. (Hint: take the definition of the derivative – look at \( F(z+h) - F(z) \).)

7. §3.7 – 6.

8. §3.8 – 1 (first five).

9. §3.7 – 8.

10. §3.7 – 9.

11. p. 174 – 6.4

12. p. 175 – 7.4 (Hint. First show that \( f(0) = 0 \). Then derive a contradiction from the assumption that there exists \( m \) so that \( f^{(k)}(0) = 0 \) for \( 1 \leq k \leq m - 1 \) and \( f^{(m)}(0) \neq 0 \).