

1. (\mathcal{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. (\mathcal{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 $f^{(m)}(0) \neq 0$.)