1. Let $f(z)$ be analytic on and inside $C$, a simple closed contour and let $z_0$ lie inside the contour. Show that
\[ \int_C \frac{f'(z)}{z-z_0} \, dz = \int_C \frac{f(z)}{(z-z_0)^2} \, dz. \]

2. Let $f(z)$ be an entire function and let $|f(z)| \leq |z|$, for all complex $z$. Show that then $f(z) = az$ for some constant $a$.

3. Let $f(z) = u(x, y) + iv(x, y)$, which is a continuous function on the closure $\overline{\Omega}$ of an open domain $\Omega$ and is analytic in $\Omega$. Show that unless $f(z)$ is a constant, $u(x, y)$ must attain its minimum on the boundary of $\Omega$.

4. Consider the Maclaurin expansion of $tanhyp(z)$. Find the first three terms. What is the radius of convergence of the resulting power series?

5. Consider
\[ f(z) = \frac{1}{z-2} + \frac{1}{z-3}. \]

Find the Laurent series for $2 < |z| < 3$ and for $|z| > 3$. 

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**Homework set 6: Due Friday October 24 at 12 noon.**

Homework should be given to me (or my possible replacement) in class or put under my office door. **Do not put it in my lobby mail box.** No credit will be given for homework turned in late.