M417

Fall 1996

hw7.tex due October 21, 1996

Using anything that you know, including known Taylor series expansions, find the indicated Taylor series and the radius of convergence.

1. $e^z = \displaystyle\sum_{n=0}^{\infty} a_n (z-a)^n$, $|z-a| < ?$.

2. $\sin(z) = \displaystyle\sum_{n=0}^{\infty} a_n \left(z - \frac{\pi}{2}\right)^n$, $\left|z - \frac{\pi}{2}\right| < ?$

3. $z^3 + 4z^2 + 10z - 8 = \displaystyle\sum_{n=0}^{\infty} a_n z^n$, $|z| < ?$

4. $z^3 + 4z^2 + 10z - 8 = \displaystyle\sum_{n=0}^{\infty} a_n (z-3)^n$, $|z-3| < ?$

5. $\dfrac{1}{1+z^2} = \displaystyle\sum_{n=0}^{\infty} a_n (z-3)^n$, $|z-3| < ?$

    Hint: $\dfrac{1}{1+z^2} = \dfrac{1}{2i}\left\{\dfrac{1}{z-i} - \dfrac{1}{z+i}\right\}$