MATH410

Midterm #2, 05/05/16

Total 100

Solutions

<u>Show all work legibly.</u>   **Name**:_____

1. (25) Find the values of $i^{\sqrt{3}}$.

$i^{\sqrt{3}} =$

2. (25) Find the power series about the origin for $f(z) = \dfrac{z^2}{(1-z)^2}$, $|z| < 1$. (Hint: $\dfrac{1}{(1-z)^2} = \dfrac{d}{dz}\dfrac{1}{(1-z)}$)

The power series is:

3. (25) Use Cauchy's formula to evaluate $\displaystyle\int_{|z+1|=2} \frac{z^2}{4-z^2}\, dz$.

$$\int_{|z+1|=2} \frac{z^2}{4-z^2}\, dz =$$

4. (25) Suppose f is an entire function, and there is a constant c so that $\mathrm{Im} f(z) < c$ for each z. True or False? f is a constant.

Mark one and explain.

☐ True   ☐ False