1. (15) (i) Find all values of z such that $e^{iz} = 1 + i\sqrt{3}$. Write your answer in $a + ib$ form.

Answer :

(15) (ii) Find all values of z such that $z^3 = -8i$. Write your answer in $a + ib$ form.

Answer :

2. (15) (i) Evaluate $\displaystyle\int_C \frac{e^{\sin z} + e^{\bar{z}}}{z^2}\,\mathrm{d}z$ where C is the circle $|z| = 1$ traversed once counterclockwise.

Answer :

(10) (ii) Let L be the line segment from $1 + i$ to $3 + 3i$. Evaluate $\displaystyle\int_L |z|^2\,\mathrm{d}z$. Write your answer in $a + ib$ form.

Answer :

3. (15) (i) Find the radius of convergence R of the power series $\sum_{n=0}^{\infty} \frac{1}{(1+3i)^n} z^{2n}$.

$Answer:$

(15) (ii) Find the analytic function to which the power series in (i) converges for $|z| < R$.

$Answer:$

4. (15) For which values of $R > 0$ the integral $\displaystyle\int_C \frac{\mathrm{d}z}{(z^2 - 5z + 6)}$, where C is the circle $|z| = R$ traversed once counterclockwise, is equal to zero?

Answer :