

1. Let C denote the positive oriented boundary of a square whose sides lie along the lines $x = \pm 4$ and $y = \pm 4$. Evaluate each of these integrals:

(a)
$$\int_C \frac{\cos z}{z^2 + \pi^2} dz$$

(b)
$$\int_C \frac{2z + 1}{(z^2 + 1)^2} dz$$

2. Do problem # 7 on page 163.

3. Evaluate $\int_C \frac{e^z}{(4z^2 + \pi^2)^2} dz$, where C is the circle $|z| = 2$.

4. Find the limit of the following sequences.

(a)
$$z_n = \frac{n + i}{1 - ni}$$

(b)
$$z_n = n \sin\left(\frac{1}{n}\right) + i \frac{2n}{\sqrt{1 + n^2}}$$