Assignment 6

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

1) Let \( \gamma_1(t) = 1, t \in [0, 2\pi] \)
   \( \gamma_2(t) = e^t, t \in [0, 2\pi] \)
   \( \gamma_3(t) = 2 + e^{it}, t \in [0, 1] \)
   Consider the curves
   
   Check the boxes corresponding to which true statement(s) b) are given.

   - \( \Omega \) is a convex set.
   - \( \gamma_1 \) is homotopic to \( \gamma_2 \) with fixed end-points in \( \Omega \).
   - \( \gamma_1 \) is homotopic as closed curves to \( \gamma_2 \) in \( \Omega \).
   - \( \gamma_1 \) is homotopic with fixed end points to a reparameterization of \( \gamma_2 \) in \( \Omega \).
   - \( \Omega \) is simply connected.

   No, the answer is incorrect.

   Score: 0

   Accepted Answers:
   - \( \Omega \) is a convex set.
   - \( \gamma_1 \) is homotopic to \( \gamma_2 \) with fixed end-points in \( \Omega \).
   - \( \gamma_1 \) is homotopic as closed curves to \( \gamma_2 \) in \( \Omega \).
   - \( \gamma_1 \) is homotopic with fixed end points to a reparameterization of \( \gamma_2 \) in \( \Omega \).
   - \( \Omega \) is simply connected.

   Score: 0

   Accepted Answers:

2) Let \( \gamma \) be the triangular path \( \gamma_0 \sim \gamma_1 \sim \gamma_2 \) with \( s_1, s_2, s_3 \) being the points 0, 3i and \( -3 \). Then \( \int \frac{1}{z} \, dz = \)

   - \( 0 \)
   - \( 12 \)
   - \( 6 \)

   No, the answer is incorrect.

   Score: 0

   Accepted Answers:
   - \( 12 \)

3) Let \( \gamma \) be the closed curve, \( \gamma(t) = \frac{x}{4} \) for \( t \in [0, 2\pi] \). Then the value of the integral \( \int \frac{\tan(z)}{z} \, dz \) is ________

   No, the answer is incorrect.

   Score: 0

   Accepted Answers:
   - \( \frac{1}{2} \)

4) Consider the following two statements:
   
   (i) Let \( \gamma_1(t) = e^{it} \) for \( t \in [0, 2\pi] \) and \( \gamma_2 \) be the polygonal path \( \gamma_0 \sim \gamma_1 \sim \gamma_2 \sim \gamma_3 \sim \gamma_4 \) where the points \( s_1, s_2, s_3, s_4 \) are \( 2i, 3i, -2i, -3i \) respectively. Then

   \[ \int_{\gamma_1} \frac{dz}{z^2 + 1} = \int_{\gamma_2} \frac{dz}{z^2 + 1} \]

   (ii) Let \( \gamma(t) = e^{it} \) for \( t \in [0, 2\pi] \).

   Then

   \[ \int_{\gamma} \frac{z^2}{z^2 + 5z + 6} \, dz = \]

   Check the boxes corresponding to which true statement(s) b) are given.

   - The statement (i) is true, but (ii) is false.
   - The statement (i) is false, but (ii) is true.
   - Both the statements (i) and (ii) are true.
   - Both the statements (i) and (ii) are false.

   No, the answer is incorrect.

   Score: 0

   Accepted Answers:
   - Both the statements (i) and (ii) are true.

5) The value of the integral \( \int_{-\infty}^{\infty} \frac{\sin(2t)}{t} \, dt \) is ________

   No, the answer is incorrect.

   Score: 0

   Accepted Answers:
   - \( \frac{\pi}{2} \)