A few integrals

Math 403, section 1

March 27, 2002

Suppose \( f(z) = \frac{e^z}{z(z-3)^2} \).

Problem #1
Compute the integral \( \int_{\alpha} f(z) \, dz \) where \( \alpha \) is the closed curve shown: line segments from 2 to \( 1 + i \) to \( i \) to \( -1 \) to \( -i \) to 2.

Answer

Problem #2
Compute the integral \( \int_{\beta} f(z) \, dz \) where \( \beta \) is the closed curve shown: a circle of radius \( \frac{3}{2} \) centered at \( \frac{5}{2} \).

Answer

Problem #3
Compute the integral \( \int_{\gamma} f(z) \, dz \) where \( \gamma \) is the closed curve shown: a ellipse centered at 1 with axes parallel to the coordinate axes, with vertical semiminor axis of length 1 and horizontal semimajor axis of length 2.

Answer