6.3.2 Show that \[ \int_C z^{-1} \, dz = 2\pi i, \] where \( C \) is the square with vertices \( 1 \pm i \) and \( -1 \pm i \), and having a positive orientation.

6.3.6 Let \( C \) be the triangle with vertices \( 0, 1, \) and \( i \) and having positive orientation. Show that

(a) \[ \int_C 1 \, dz = 0 \]

(b) \[ \int_C z \, dz = 0 \]

6.3.7 Evaluate \[ \int_C (4z^2 + 4z - 3)^{-1} \, dz = \int_C (2z - 1)^{-1} (2z + 3)^{-1} \, dz \]

for

(a) the circle \( C = C_1(0) \), oriented positively.

(b) the circle \( C = C_1(-2/3) \), oriented positively.

(c) the circle \( C = C_3(0) \), oriented positively.

[Hint: Use partial fraction expansion to rewrite the integrand.]

6.3.8 Use Green’s theorem to show that the area enclosed by a simple closed contour \( C \) is

\[ \frac{1}{2} \int_C x \, dy - y \, dx. \]

6.3.10 Evaluate \[ \int_C (z^2 - 1)^{-1} \, dz \] for the contours shown in Figure 6.29. [Note the orientation of these curves.]