Homework #6 • MATH 322 • Theorems on Contour Integration

- submit your write-up into your Section's box by noon, Friday 20 October.
- please acknowledge collaborations & assistance from colleagues.

C) Contour Integrals (2 pages max, 10pts, from last week) Problems #3 and #4 (page 129).

D) Integration & Antiderivatives (3 pages, 15pts) Before embarking on this problem, read carefully the discussion for Example 4 from Section 43.

Consider instead the complex contour integral

$$\int_C z^{1/3}\,dz$$

where the contour C is either C_1 or C_2 of Figure 53, and carry out the following steps:

i) Give a branch definition for $f_1(z) = z^{1/3}$ for which $f_1(-3) = -\sqrt[3]{3}$ over a domain that includes $z = 3$ and a contour C_1 (from $z = -3$ to 3).

ii) What is the value of $f_1(3)$?

iii) What is the value of the contour integral following C_1?

iv) Give a branch definition for $f_2(z) = z^{1/3}$ for which $f_2(-3) = -\sqrt[3]{3}$ over a domain that includes $z = 3$ and a contour C_2 (from $z = -3$ to 3).

v) What is the value of $f_2(3)$?

vi) What is the value of the contour integral following C_2?

vii) Explain clearly how the antiderivative formula is used to obtain the different results for the contours C_1 and C_2.

E) Square Root & Area (one separate for page each, 10pts) Problems #6 and #7 (page 156). In #7, be clear that all of the requirements for invoking Green's Theorem are satisfied.