

Complex Functions 2010: Hand-in exercise 7

March 14, 2010

1. Prove the theorem below, only using theory from pages ≤ 103 (4th ed.).
(Hint: study the proof of Goursat's Theorem, page 105)

Theorem: *Let T be an isosceles rectangled triangle and let f be a complex function which is holomorphic on T . Then*

$$\oint_{\partial T} f = 0.$$

2. Define $f(z) := e^{iz^2}$ and consider the triangle with vertices $0, R, R + iR$.
Use the theorem above to prove that

$$\int_{-\infty}^{\infty} \sin(t^2) dt = \sqrt{\frac{\pi}{2}}.$$