Math 10B - Calculus of Several Variables II
Quiz 4
May 13, 2011

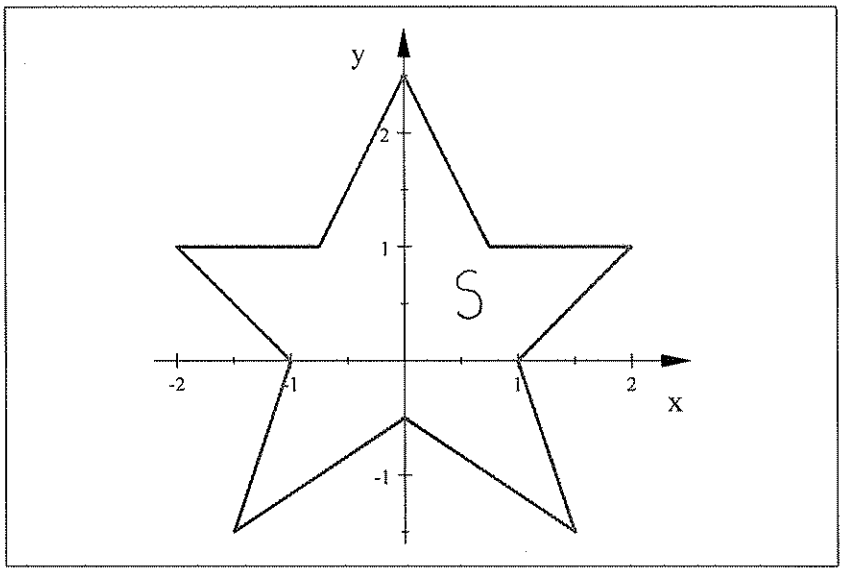
Name: Key

Total
/10

Compute the following line integral:

$$\int_C \log(1+x^2)\,dx + \arctan y^3\,dy$$

where C is the curve, oriented counterclockwise, depicted below:



(the vertices of C are $(0, 2.5)$, $(0.75, 1)$, $(2, 1)$, $(1, 0)$, $(1.5, -1.5)$, $(0, -0.5)$, $(-1.5, -1.5)$, $(-1, 0)$, $(-2, 1)$, $(-0.75, 1)$ listed in clockwise order.)

C is a simple closed curve, so by Green's theorem:

$$\int_C \log(1+x^2)dx + \arctan(y^3)dy = \iint_S \left(\frac{\partial}{\partial x}(\arctan(y^3)) - \frac{\partial}{\partial y}(\ln(1+x^2))\right)dA$$

$$= \iint_S (0-0)\,dA = \boxed{0}$$