Math 173 - Quiz 10

April 19, 2018

Name key

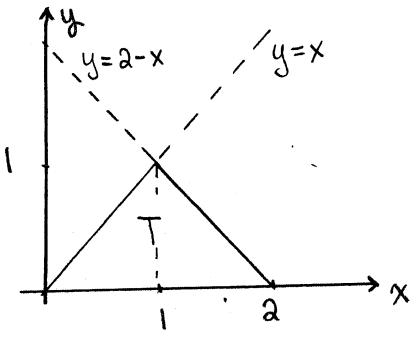
Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (10 points) Let T be the triangle in the xy-plane with vertices at $(0,0)$, $(1,1)$, and $(2,0)$. Evaluate the double integral

$$\iint_T (2x+y+1)\,dA.$$

Carry out the integration by hand.



$$\int_{y=0}^{y=1} \int_{x=y}^{x=2-y} (2x+y+1)\,dx\,dy$$

$$= \int_0^1 x^2 + xy + x \Big|_y^{2-y} dy$$

$$= \int_0^1 (4-4y+y^2+2y-y^2+2-y-y^2-y^2-y)\,dy$$

$$= \int_0^1 (6-4y-2y^2)\,dy = 6-2-\frac{2}{3} = \boxed{\frac{10}{3}}$$

Follow-up: Write the iterated integral(s) with the opposite order of integration. Do not re-evaluate.

$$\int_{x=0}^{x=1} \int_{y=0}^{y=x} (2x+y+1)\,dy\,dx + \int_{x=1}^{x=2} \int_{y=0}^{y=2-x} (2x+y+1)\,dy\,dx$$