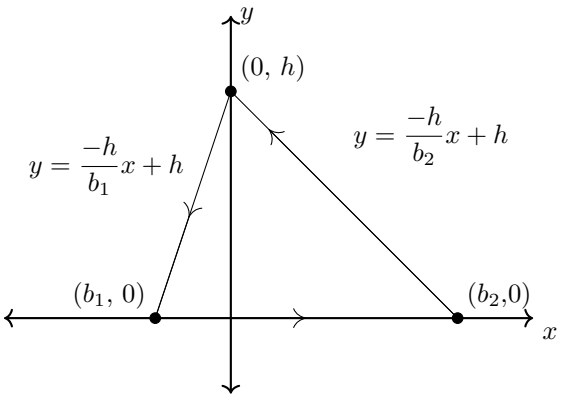
MATH 2222H&J Spring 2016
Quiz 7 Name: _____

Show all work clearly and in order. Justify your answers algebraically whenever possible. Unjustified work may not receive full credit.

In Quiz 5 we modeled the following triangle:



and computed its area using a double integral over its interior. In this quiz we will use Green's theorem to find an appropriate line integral to compute the area of the triangle. Recall that if C is a positively oriented closed contour boundary of a region R in the plane, then Green's theorem shows us that

$$\text{Area}(R) = \iint_R 1 dA = -\oint_C y dx. \tag{1}$$

We decompose the triangle into three contours C_1 the left leg, C_2 the bottom leg, and C_3 the right leg. Consequently,

$$-\oint_C y dx = -\left(\oint_{C_1} y dx + \oint_{C_2} y dx + \oint_{C_3} y dx\right).$$

1. (*2 points*) Find parametrizations $\vec{r}_1$ for C_1, $\vec{r}_2$ for C_2, and $\vec{r}_3$ for C_3. Make sure the orientation of the curve C formed by C_1, C_2, and C_3 has orientation that matches the figure above.

2. (*3 points*) Use formula (1) to compute the the area of the triangle using the line integral.