

**Name:**

**Section:**

**Instructions:** This is your fifth quiz. The problems are drawn from chapter 9. Please write legibly. Please show all work. You must show **ALL** work to receive credit. The quiz is due tomorrow in section.

**Problem 1:** Consider the parametric curve defined by

$$(x(t), y(t)) = \left(\frac{t^2}{2} + 1, t\right)$$

(a) Compute the tangent vector to this curve. At what  $(x, y)$  coordinate does the curve have a horizontal tangent?

(b) Set up the integral for evaluating the arc length of the above curve. You need not evaluate it.

(c) Set up the integral for evaluating the surface area of the surface of revolution obtained by revolving the above curve about the x-axis.

(d) Compute the surface area of the surface of revolution obtained by rotating the curve in part (a) about the x-axis for  $t$  values between 0 and 1. (Do the integral in part (c))

(e) Give the formula for the area enclosed by a simple closed curve defined parametrically by  $(1 + \cos(t), 1 + \sin(t))$ , and evaluate the resulting integral.