

**MAT1001 Quiz 8 - L1 / T1-4**  
**Time: 15 Minutes**

Student Name: \_\_\_\_\_ Student ID: \_\_\_\_\_

1. [10 Points] Find three different functions  $f$  such that the graphs  $y = f(x)$ , from  $x = 0$  to  $x = a$ , has length exactly  $\sqrt{2}a$ . Show how you obtain these functions.

2. [10 Points] The region

$$\{(x, y) : 0 \leq x \leq 1, 0 \leq y \leq \sqrt{x}\}$$

is revolved about the line  $x = -1$  to generate a solid. Find the volume of the solid.

3. [10 Points] A bowl has a shape of a hemisphere (*hemi-* is a prefix that means “half”) of radius 5 meters, with the bottom being narrower and the top being wider (so the bowl is 5 meters deep). Water is poured to the bowl at the rate of 0.2 cubic meter per second. How fast is the water level in the bowl rising when the water is 4 meters deep?