Name: _____

Section: _____

Answer all questions and show your work. Unsupported answers may receive *no credit*. You may not use a calculator on this quiz. Allow 15 minutes for the quiz.

1. (4 points) Find the average value of the function $f(x) = \sin(x/2)$ on the interval $[0, \pi]$.

- 2. (6 points) Consider the region in the plane $R = \{(x, y) : 0 \le y \le x^2, 0 \le x \le 2\}.$
 - (a) (1 point) We rotate R about the x-axis to obtain a solid S. We slice S by the plane perpendicular to the x-axis which contains x = a. Let A(a) be the area of the resulting cross-section.

Find a formula for A(a) when $0 \le a \le 2$.

- (b) (2 points) Express the volume of the solid S as an integral. (Do not evaluate the integral.)
- (c) (3 points) Let T be the solid obtained by rotating R about the line y = -1. Express the volume of T as an integral. (Do not evaluate the integral.)