

NAME AND SECTION: _____

INSTRUCTOR'S NAME: _____

1. Find the volume of a solid obtained by rotating the region bounded by $y = 1$ and $y = 2 - x^2$ about the x -axis.

You will need to remember the formula for the Washer method, that is

$$V = \int_a^b \pi R^2(x) - \pi r^2(x) dx$$

- (a) Draw this region on the cartesian plane and shade it.

- (b) If we are going to compute this volume using the washer method, what are the bounds a and b for the integration?

(c) Given a cross section through x , what is the length of the outer radius $R(x)$?

(d) Given a cross section through x , what is the length of the outer radius $r(x)$?

(e) Set up and write down the integral for the volume of this solid

(f) Compute the integral above.

2. What is the volume of a solid torus with radii r and R ?
- (a) Consider the torus as the solid obtained by rotating the region bounded by a circle around the x -axis. Draw this region on the cartesian plane and find the equation for the curve that bounds it.
- (b) If we are going to compute the volume of the torus using the washer method, what are the bounds a and b for the integration?

- (c) Given a cross section through x , what is the length of the outer radius $R(x)$?
- (d) Given a cross section through x , what is the length of the outer radius $r(x)$?
- (e) Set up and write down the integral for the volume of the solid torus
- (f) Compute the integral above and find a formula for the volume of the torus
[Hint: you might want to compute the integral by interpreting it in terms of area]