

Week 5 Recitation Problems

MATH:114, Recitations 309 and 310

Volumes

1. Suppose the functions $f(x)$ and $g(x)$ bound a closed region R in the plane. Rotate R around the x axis to get a solid of rotation S_R . How does the **washer** method find the volume of S_R ? Use words or pictures to explain, including relevant geometric formulas or ideas.

2. Let $f(x) = x^2$ and $g(x) = x + 2$, and let R be the closed region bounded by $f(x)$ and $g(x)$. Find the volume of the solid generated by rotating R around the x axis.

3. Let the functions $p(x)$ and $q(x)$ bound a closed region C in the plane. Rotate C around the x axis to get a solid of rotation S_C . How does the **shell** method find the volume of S_C ? Use words or pictures to explain, including relevant geometric formulas.

4. Why might it be difficult to use the shell method with the functions $f(x)$ and $g(x)$ from Problem 2? (*Hint: how do we find the inverse of $f(x)$?*)

5. Let $p(x) = x^2$ and $q(x) = -x^4$. Set up an integral to find the volume of the solid found by rotating the region bounded by $p(x)$, $q(x)$, and the vertical line $x = 1$ around the y axis. If you have time, compute this integral!