

Recitation # 3: Volume by Slicing & Shells

Group work:

Problem 1 (a) Consider the region bounded by the curves $y = x^2 + 8$ and $y = 7x - 2$. Set up an integral that will compute the volume of the solid whose base is the region and whose cross sections perpendicular to the region and the x -axis are:

(i) Equilateral triangles

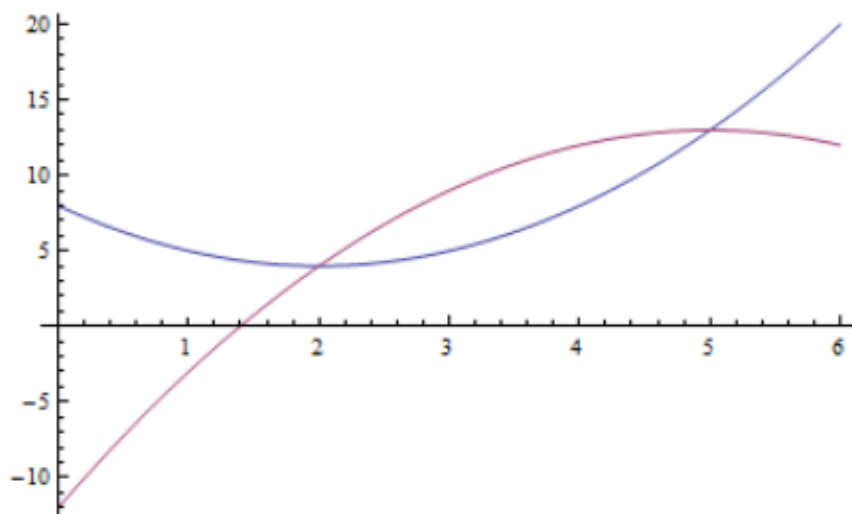
(ii) Semicircles

(b) Do the same as in (a), except that the solid's cross-sections are perpendicular to the region and the y -axis.

Instructor Notes: Do 1(a)(i) as a class. Have the students do 1(a)(ii) in groups and have a group present. Then split the two parts of (b) between the groups. Discuss as a class.

Problem 2 Set up an integral that will find the volume of the solid formed by revolving the region bounded by the curves $y = x^2 - 4x + 8$ and $y = -x^2 + 10x - 12$ about:

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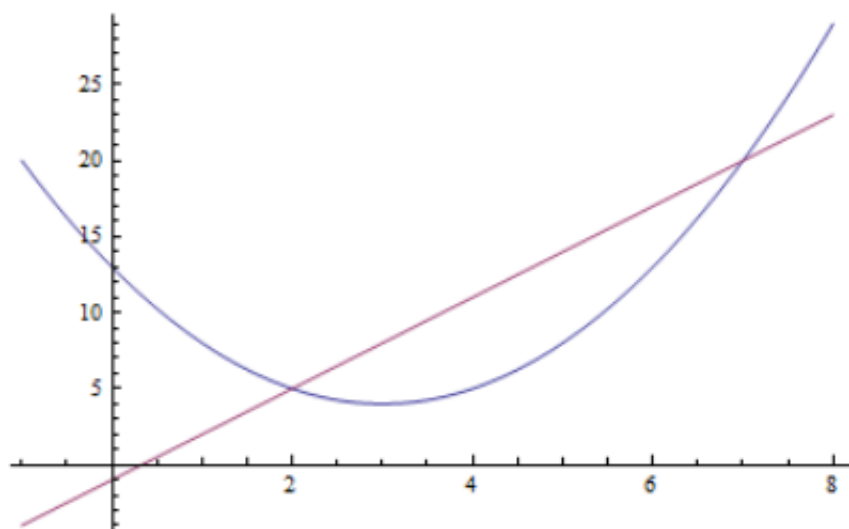


- (a) *the x-axis*
- (b) $y = -3$
- (c) $y = 15$

Instructor Notes: Split the parts between the different groups and allow students to present.

Problem 3 Set up an integral that will compute the volume of the solid generated by revolving the region bounded by the curves $y = x^2 - 6x + 13$ (i.e. $x = 3 \pm \sqrt{y - 4}$) and $y = 3x - 1$ about:

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Use both the washer method as well as the shell method for each problem. Which method would you prefer for each problem? Why?

(a) the x -axis

Instructor Notes: Split the two methods between groups. As a class, discuss which method was better to use in this circumstance.