

WORKSHEET 2: VOLUME - THE DISK AND WASHER METHOD

Due at the beginning of class on the day of Test 1

Direction: Solve the problems in this worksheet on separate sheets of paper. Write your solution neatly. Use standard size paper. Clearly label each problem, and include each problem in the correct order. No ragged edges. Staple multiple pages. At the top of the first page put your name, Math 2414, and the title of the worksheet. Show all work to justify your answer. Answer with insufficient work will receive no credit.

Problem 1: Apply the disk method-revolve about x -axis

Find the volume of the solid formed by revolving the region bounded by the given graphs about the x -axis

1. $y = \frac{1}{\sqrt{3x+5}}, y = 0, x = 0, x = 3.$

2. $y = e^{x/4}, y = 0, x = 0, x = 6.$

Problem 2: Apply the disk method-revolve about y -axis

Find the volume of the solid formed by revolving the region bounded by the given graphs about the y -axis

1. $x = 2\sqrt{y}, x = 0, y = 9.$

2. $y = 3(2 - x), y = 0, x = 0.$

Problem 3: Apply the washer method

Find the volume of the solid formed by revolving the region bounded by the given graphs about the x -axis

1. $y = x^2, y = 4x - x^2.$

2. $y = \sqrt{x}, y = -\frac{1}{2}x + 4, x = 0, x = 8.$

Problem 4: Revolve about a line that is not a coordinate axis

Find the volume of the solid formed by revolving the region bounded by the given graphs about the given line

1. $y = \frac{2}{1+x}, y = 0, x = 0, x = 4$ about the line $y = 4$

2. $xy = 1, y = 0, x = 1, x = 2$ about the line $x = -1$

Problem 5: Revolve about a line that is not a coordinate axis

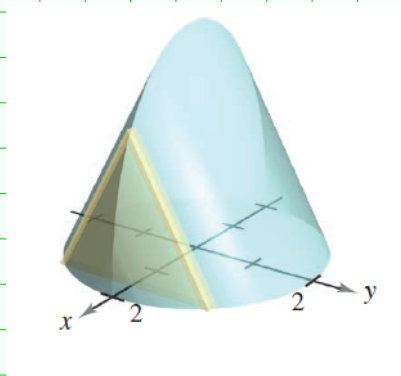
Set up (but do not evaluate) the integral to find the volume of the solid formed by revolving the region bounded by the given graphs about the given line

1. $y = \sin(x), y = \cos(x), 0 \leq x \leq \pi/4$, about the line $y = -1.$

2. $x = y^4, x = y$ about the line $x = 1.$

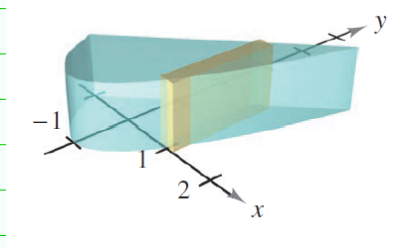
Problem 6: Volume of solid with given cross sections

Find the volume of the solid whose base is the region bounded by the circle $x^2 + y^2 = 4$ and whose cross sections perpendicular to the x -axis are equilateral triangles.



Problem 7: Volume of solid with given cross sections

Find the volume of the solid whose base is the region bounded by the curves $y = x + 1$ and $y = x^2 - 1$ and whose cross sections perpendicular to the x -axis are rectangles of height 1.



Problem 8: Volume of solid with given cross sections

The base of a solid is the triangular region in the xy -plane with vertices $(0,0)$, $(1,0)$ and $(0,1)$. Cross-sections perpendicular to the y -axis are squares. Find the volume of the solid.