

# Calculus - Volumes w/ Cross-Sections

Key



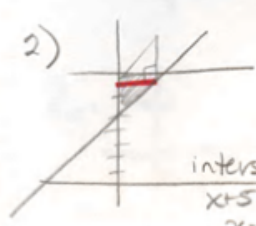
$y = 3x^2 + 8, y = -x, x = 3 \perp x\text{-axis}$

a)  $\square$  b)  $\triangle$  c)  $\ominus$  Intersection  $3x^2 + 8 = -x$   
 $x = -1.3006\dots$   
 Store in A

a)  $A_{\square} = s^2$   
 $V = \int_{-1.3006}^3 [3x^2 + 8 - (-x)]^2 dx =$

b)  $A_{\triangle} = \frac{1}{2}bh = \frac{\sqrt{3}}{4}s^2$   
 $V = \int_{-1.3006}^3 \frac{\sqrt{3}}{4} [3x^2 + 8 + x]^2 dx =$

c)  $A_{\circ} = \frac{1}{2}\pi r^2 = \frac{1}{2}\pi \left(\frac{3x^2 + 8 + x}{2}\right)^2$   
 $V = \int_{-1.3006}^3 \frac{1}{2}\pi \left[\frac{3x^2 + 8 + x}{2}\right]^2 dx =$



$y = x + 5, y = 7, y\text{-axis}, \perp y\text{-axis}$  c.s. right isos. triangle

$A_{\triangle} = \frac{1}{2}bh = \frac{1}{2}s^2$

$V = \int_5^7 \frac{1}{2} [y - 5 - 0]^2 dy =$

intersect  $x + 5 = 7$   
 $x = 2$   
 But wrt  $y$   
 $y = 7$   
 wrty  $\rightarrow$   
 $y = x + 5$   
 $y - 5 = x$



$A_{\square} = bh, h = 3 \perp x\text{-axis}$   $y = \frac{1}{2}x + 4, x = 1, x = 6$

$V = \int_1^6 \left(\frac{1}{2}x + 4 - 0\right) 3 dx =$

Calculus Name \_\_\_\_\_

Find the volumes using Cross-Sections

GRAPH the region, draw the reference rectangle, SHOW integral and then use calculator.

1. Find the volume of the solid created with the base of the region between  $y = 3x^2 + 8$  and  $y = -x$  and  $x = 3$ , and cross-sections perpendicular to the  $x$ -axis of a) square, b) equilateral triangle, c) semi circle.
2. Find the volume of the solid formed with the base of the region formed by  $y = x + 5$ ,  $y = 7$ , and the  $y$ -axis, cross-sections perpendicular to the  $y$ -axis in the shape of a right triangle.
3. Find the volume of the solid formed by cross-sections of rectangle with height 3 perpendicular to the  $x$ -axis with the base region formed by the  $x$ -axis,  $y = \frac{1}{2}x + 4$ ,  $x = 1$  and  $x = 6$ .