

Name: \_\_\_\_\_

AP Calculus – Volume or Cross Sections Practice

1. Find the volume of the solid whose base is the region bound by the curves  $y = x^2$  and  $y = 8 - x^2$ , and whose cross sections are perpendicular to the  $x$ -axis are

(a) Squares **136.533**

(b) Semicircles **53.6165**

2. Let  $R$  be the region bound by the graphs of  $y = \frac{1}{\sqrt{x}}$  and the  $y = 0$  for  $4 \leq x \leq 9$ . Find the volume of the solid whose base is the region  $R$  and whose cross sections are perpendicular to the  $x$ -axis equilateral triangles.

**0.351**

3. Let  $f$  and  $g$  be the functions given by  $f(x) = 2x(1 - x)$  and  $g(x) = 3(x - 1)\sqrt{x}$  for  $0 \leq x \leq 1$ . Find the volume of the solid whose base is the region bounded by  $f$  and  $g$  and whose cross sections are perpendicular to the  $x$ -axis are quarter circles.

**1.1725**

4. Let  $R$  be the region enclosed by the graphs of  $y = e^x$ ,  $y = x^3$ , and the  $y$ -axis.

(a) Find the area of  $R$ . **2.4315**

(b) Find the volume of the solid with base on region  $R$  and cross sections perpendicular to the  $x$ -axis. The cross sections are triangles with height equal to three times the length of their base. **5.267**

(c) Find the volume of the solid with base on region  $R$  and cross sections perpendicular to the  $y$ -axis. The cross sections are rectangles with height equal to six times the length of their base. **8.9178**

5. Consider the region bounded by the graph of  $f(x) = \ln x$ , and the lines  $x = 5$  and  $y = 0$ .

(a) Find the area of this region. **4.047**

(b) Find the volume of the solid with cross sections perpendicular to the  $x$ -axis if the cross sections are semicircles. **1.907**

(c) Find the volume of the solid with cross sections perpendicular to the  $y$ -axis if the cross sections are equilateral triangles. **5.298**