

AP CALCULUS AB
Supplement 6.5
Average Value, Area, and Volume

Name _____
Date _____
Period _____

1. (w/o calculator) Find the area of the region bounded by $x + y^2 - 4y = 0$ and $x + y = 0$.

2. (w/ calculator) Find the area of the region bounded by $y = x^4 - 4x^2$ and $y = x^2 - 4$.

3. (w/ calculator) Consider the region R bounded by the curves $g(x) = e^{2x}$ and $h(x) = 2x + 2$.
 - a. Find the volume of the solid formed by revolving R around each axis.
 - i. x -axis

 - ii. $x = 3$

 - iii. $y = -1$

 - b. A solid is formed with base R such that cross sections are equilateral triangles with one side in the xy -plane perpendicular to the x -axis. Calculate the volume of the solid.

4. (w/o calculator) Find the average value for the function $f(x) = 3^{-x}$ on the interval $0 \leq x \leq 2$.

5. Let R be the region bounded by the curves $y = \frac{1}{\sqrt{x}}$, $y = 1$, and $x = 4$.

a. (w/o calculator) Find the area of R .

b. (w/o calculator) Suppose the line $x = k$ divides R into two regions of equal area. Find the value of k .

c. (w/ calculator) Find the volume of the solid generated by revolving R about the y -axis.

d. (w/ calculator) Find the volume of the solid generated by revolving R about the line $y = 2$.

e. (w/ calculator) Find the volume of the solid whose base is the region R and whose cross sections cut by perpendicular planes to the x -axis are equilateral triangles.

Supplement 6.5 Answers

1. $\frac{125}{6}$

2. 8

3ai. 8.54965

3aii. 19.00497

3aiii. 14.672903

3b. 0.3344

4. $\frac{4}{9\ln 3}$

5a. 1

5b. $\frac{3}{2} + \sqrt{2}$

5c. $\frac{17\pi}{3}$

5d. $\pi(1 + \ln 4)$

5e. $\frac{\sqrt{3}}{4}(\ln(4) - 1)$