

**AP Calculus BC – Unit 5, Part 2 Extra Practice**

**5.4 – Extra Practice**

#5b. Find the volume of a shape that has cross-sections which are circles perpendicular to the  $y$ -axis, where the diameter of the circles are bounded by the triangular area on the  $x$ - $y$  plane enclosed by  $y = 2x$ ,  $y = 4$ ,  $x = 0$ .

#6b. Find the volume of a shape that has cross-sections which are squares perpendicular to the  $x$ -axis, where the base of the object is bounded by  $x^2 + y^2 = 4$ .

#7b. Find the volume of a shape that has cross-sections which are rectangles with height twice the base, perpendicular to the  $x$ -axis, where the base of the object is bounded by  $x^2 + y^2 = 16$ .

#8b. Let  $R$  be the region in the first quadrant bounded by the graph of  $y = \frac{3}{x^2}$ , the horizontal line  $y = 2$ , and the vertical line  $x = \pi$ . Region  $R$  is the base of a solid which has semicircular cross sections perpendicular to the  $x$ -axis. Find the volume of the solid.

### 5.5 – Extra Practice

Find the arc length of the curve over the given interval.

#7b.  $y = -2x^3 + x - 5$       $-1 \leq x \leq 5$

#8b.  $y = \ln(x) + 8$       $3 \leq x \leq 7$

#9b.  $x = y^3 - 2y^2 + 2$       $-1 \leq y \leq 3$

#10b.  $x^2 + 2x + y^2 + 8y = 32$      *for*  $x \geq 3$

Find the surface area of the surface formed by rotating the portion of the curve indicated around the indicated axis.

#11b. *The portion of curve  $y = -3x + 6$  bounded by  $x = 0$ ,  $y = 0$   
rotated around the  $y$ -axis*

#12b. *The portion of curve  $y = x^2$  bounded by  $x = 4$ ,  $y = 0$   
rotated around the  $x$ -axis*

#13b. *The portion of curve  $y - 6 = x^2 + 7x$  bounded by  $y = 0$   
rotated around the  $x$ -axis*

## 5.6 – Extra Practice

Find a) the average value of the function over the interval and  
b) the average rate of change of the function over the interval  
**For this homework evaluate the integrals by hand**

#6b.  $y = 5x + 3$              $1 \leq x \leq 6$

#7b.  $y = \frac{1}{x}$              $2 \leq x \leq 10$