

AP Calculus BC

Review for Unit 6 Test, Part 2

For #1-4, find the volume of the solid described. **Sketch and setup the integral, but do not evaluate the integral.**

#1) The solid whose base is the region enclosed by $y = x^2$, $y = 2x$ (*in the first quadrant*) and whose cross-sections are perpendicular to the y -axis and are squares.

#2) The solid whose base is the region enclosed by $y = x^2$, $y = 2x$ (*in the first quadrant*) and whose cross-sections are perpendicular to the y -axis and are semicircles. (assume base = diameter of the semicircle).

#3) The solid whose base is the region enclosed by $y = x^2$, $y = 2x$ (*in the first quadrant*) and whose cross-sections are perpendicular to the y -axis and are right, isosceles triangles with a leg in the base region.

For #5-6, find the average value of the function on the given interval. **No sketch is required, but set up and evaluate the integral (by hand).**

#4) $f(x) = -x^4 + 2x^2 + 4$; $[-2, 1]$

#5) $f(x) = 4x^{\frac{1}{2}}$; $[0, 3]$

For #6-7, find the length of the curve described. **No sketch required, setup the integral, but do not evaluate the integral.**

#6) $f(x) = 2(x-1)^{\frac{3}{2}}$; $[1, 5]$

#7) $f(x) = \frac{x^3}{6} + \frac{1}{2x}$; $[1, 3]$

For #8-11, find the surface area of the surface of revolution described. **Sketch and setup the integral, but do not evaluate the integral.**

#8) $y = \sin x$, $0 \leq x \leq \pi$, *about the x -axis*

#9) $2y + x^2 = 1$, $0 \leq x \leq 1$, *about the y -axis*

#10) $x - 1 = 2y^2$, $1 \leq y \leq 2$, *about the x -axis*

#11) $x = \sqrt{2y - y^2}$, $0 \leq y \leq 1$, *about the y -axis*