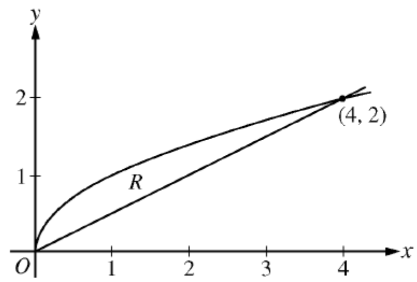
AP Calculus AB - Worksheet 63 **Volumes – Rotation and Cross-Sectional Area**

1	Find the **volume** of the solid generated by revolving the region bounded by $y=\sqrt{x}$ and the lines $y=2$ and $x=0$ about: a) the x-axis b) the y-axis c) the line $y=2$ d) the line $x=4$
2.	 Let R be the region bounded by the graphs of $y=\sqrt{x}$ and $y=\frac{x}{2}$, as shown in the figure above. a) Find the AREA of R. b) Find, but do not evaluate, an integral expression that can be used to find the volume of the solid generated by rotating the region R about the horizontal line $y=2$. c) The region R is the base of solid. Cross sections taken perpendicular to the x-axis are squares. Write, but do not evaluate, an integral expression that can be used to find the volume of this solid.
3	Given: $\int_0^4 f(x)dx=7;\ \int_0^9 f(x)dx=12;\ \int_4^9 g(x)dx=-2;\ \int_0^4 g(x)dx=8$ Find each of the following: $a)\ \int_0^9 g(x)dx$ $b)\ \int_4^9 f(x)dx$ $c)\ \int_9^4 g(x)dx$ $d)\ \int_4^9 [f(x)+3g(x)]dx$ $e)\ \int_9^9 g(x)$
4.	$\lim_{x\to 0}\frac{\sin 4x}{2x}$
5.	Find the volume of the solid whose base is the region bounded between the curves $y=x$ and $y=x^2$, and whose cross sections perpendicular to the x-axis are squares.
6	The base of a certain solid is the region enclosed by $y=\sqrt{x}, y=0,$ and $x=4$. Every cross section perpendicular to the x-axis is a semicircle with its diameter across the base. Find the volume of the solid.
7	Consider the region enclosed between $y=\sqrt{x},\ x=4,$ and the x-axis . Find the volume of the solid that is formed when the enclosed region is revolved about the ***y*-axis**.

Answers:

1. $a)\ 8\pi$ $b)\ \frac{32\pi}{5}$ $c)\ \frac{8\pi}{3}$ $d)\ \frac{224\pi}{15}$	2. a) $\frac{4}{3}$ b) $\pi\int_0^4\left(\left(2-\frac{x}{2}\right)^2-(2-\sqrt{x})^2\right)dx$ c) $\int_0^4\left(\left(\sqrt{x}-\frac{x}{2}\right)^2\right)dx$	3. a) 6 b) 5 c) 2 d) -1 e) 0	4. 2	5. $\frac{1}{30}$	6. π	7.