AP Calculus – Area & Volumes – Practice #1

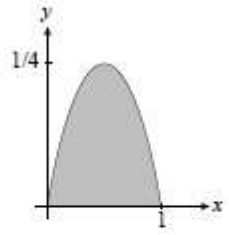
1.) What is the area of the region between the graphs of $y = x^2$ and $y = -x$ from $x = 0$ to $x = 2$?

a.) $\frac{2}{3}$	b.) $\frac{8}{3}$	c.) $\frac{14}{3}$	d.) 4	e.) $\frac{16}{3}$

2.) Let R be the region enclosed by the graph of $y = 1 + \ln(\cos^4 x)$, the x-axis and the lines $x = -\frac{2}{3}$ and $x = \frac{2}{3}$. The closest integer approximation to the area of R is

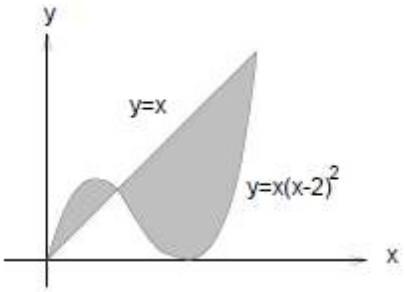
a.) 0	b.) 1	c.) 2	d.) 3	e.) 4

3.) Find the area of the indicated region



$$f(x) = x - x^2$$

4.) Express the area using integrals.



5.) Let $L(x)$ be the line tangent to the graph of $f(x) = \cos(x)$ at $x = 1$.

a) Write an equation of $L(x)$

b) What is the area of the region bound by the line L, the function f and the y-axis?

6.) The area of the region enclosed by the graphs of $y = x^2$ and $y = x$ is

a.) $\frac{1}{6}$	b.) 1	c.) $\frac{1}{2}$	d.) $\frac{5}{6}$	e.) $\frac{1}{3}$

7.) Find the area of the region bounded by the graphs of $f(y) = y^2$ and $g(y) = y + 2$

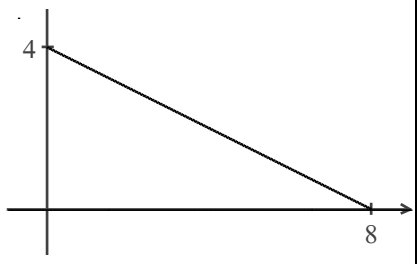
8.) Find the area of the region bounded by $y = x^3$ and $y = \sqrt{x}$.

9.) The base of a solid is the region in the first quadrant enclosed by the graph of $y = 10 - x^2$ and the coordinate axes. If every cross section of the solid perpendicular to the y-axis is a square, the volume of the solid is given by

a.) $\int_0^{10} (10 - y)\, dy$	b.) $\pi \int_0^{\sqrt{10}} (10 - x^2)\, dx$
c.) $\pi \int_0^{10} (10 - y)^2\, dy$	d.) $\int_0^{\sqrt{10}} (10 - x^2)^2\, dx$
e.) $\int_0^{\sqrt{10}} (10 - x^2)\, dx$	

10.) The base of a solid is a region in the first quadrant bounded by the x-axis, the y-axis and the line $x + 2y = 8$ as shown in the figure at the right. If cross sections of the solid perpendicular to the x-axis are semicircles, what is the volume of the solid?

a.) 12.566	b.) 14.661	c.) 16.755
d.) 67.021	e.) 134.041	



11.) The base of a solid is the region in the first quadrant bounded by the graph of the y-axis and the graph of $y = \tan^{-1}(x)$, the horizontal line $y = 3$ and the vertical line $x = 1$. For this solid, each cross section perpendicular to the x-axis is a square. What is the volume of the solid?