

Calculus II
Review for Test 1
Luczak

DO NOT GIVE DECIMAL APPROXIMATIONS.

1. Find the area bounded by the graphs of $y = \sin x$ and $y = \cos x$ on $\left[\frac{\pi}{4}, \frac{5\pi}{4}\right]$. Sketch the region.
2. Set up the integral(s) needed to find the area of the region between $f(x) = x^3 + x^2 + 1$ and $g(x) = -x^2 + 3x + 1$. Sketch the region.
3. Given $f(y) = y^2 + 4y$ and $g(y) = -2y$. Find the area of the region bounded by $f(y)$ and $g(y)$.
4. Set up but do not evaluate the integrals that would be needed to find the area of the region bounded by $y = 3x$, $y = x$ and $x + y = 4$. Sketch the region.
5. Sketch the region bounded by $y = e^x$, $y = 0$, $x = 0$ and $x = 2$. Set up the integral that could be used to find the volume of the solid generated by revolving this region about the y axis. Indicate the method you are using (i.e. disc or shell method) and include in your sketch a representative rectangle. Do not evaluate the integral.
6. Sketch the region bounded by $y = e^x$, $y = 0$, $x = 0$ and $x = 2$. Find the volume of the solid generated by revolving this region about the x axis. Indicate the method you are using (i.e. disc or shell method) and include in your sketch a representative rectangle.
7. Sketch the region bounded by $y = x^2$ and $y = \sqrt{x}$. Set up the integral that could be used to find the volume of the solid generated by revolving this region about the line $x = 1$. Indicate the method you are using (i.e. disc or shell method) and include in your sketch a representative rectangle. Do not evaluate the integral.
8. Sketch the region bounded by $y = \frac{1}{x^2}$, $y = 1$ and $y = 3$ in the first quadrant. Set up the integral that could be used to find the volume of the solid generated by revolving this region about the line $x = 1$. Indicate the method you are using (i.e. disc or shell method) and include in your sketch a representative rectangle. Do not evaluate the integral.

9. Write the definite integral that represents the arc length of the graph of $f(x) = \frac{2}{3}(x-7)^{\frac{3}{2}}$ over the interval $[7,14]$. Do not evaluate the integral.
10. Write the definite integral that represents the area of the surface formed by revolving the graph of $y = 1 - x^2$ on the interval $[0,1]$ about the x axis. Do not evaluate the integral.
11. Write the definite integral that represents the area of the surface formed by revolving the graph of $y = 1 - x^2$ on the interval $[0,1]$ about the y axis. Do not evaluate the integral.
12. Find the volume of the solid whose base is bounded by the graphs of $y = x + 1$ and $y = x^2 - 1$ where the cross sections are squares taken perpendicular to the x axis.
13. Find the center of mass for the region with constant density ρ bounded by the graphs of $y = x^3$, $y = 0$ and $x = 1$.
14. A trapezoidal plate 8 feet wide at the bottom and 4 feet wide at the top is submerged vertically in water such that the bases are parallel to the surface. If the distances from the surface of the water to the lower and upper bases are 10 ft and 6 ft, respectively, find the force exerted by the water on the plate. ($w = 62.4$)