

Discussion Problems 7 (Thu., Nov. 9)

1. Let R be the region bounded by $y = \sin x$, for $0 \leq x \leq \pi$ and $y = 0$. Find the volume of the solid generated by revolving R around (a) the y -axis and (b) the x -axis.
2. Consider the region r bounded by the curves $y = x^2 + 2$, $y = \frac{1}{2}x + 1$, $x = 0$, and $x = 1$. Set up the integrals for the volume of the solid generated by revolving R around (a) the y -axis and (b) the x -axis, (c) the line $x = -2$, (d) the line $y = -2$, and (e) the line $y = 4$. Explain how you would compute these integrals.
3. Write down, but do not compute, the integral for the arc length of the curve given by $x = e^{y^2}$, $0 \leq y \leq 1$.
4. (a) Compute the length of the curve $y = e^x$ between $x = 0$ and $x = 1$. (Try substitution $1 + e^{2x} = t^2$.)
(b) Compute the length of $y = \ln x$ between $x = 1$ and $x = e$. (Try to use (a).)
5. Compute the surface area of the surface generated by rotating the curve $y = \cos x$, $0 \leq x \leq \pi/2$, around the x -axis.