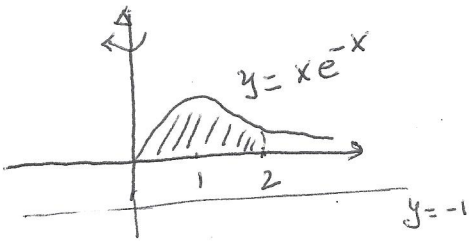
Calculus II—Class Work 5

Sols

Names:

1. Set up an integral for the volume of the solid obtained by rotating the region bounded by the given curve about the specified axis. Do not evaluate the integral.



a. $y = xe^{-x}$; $y = 0$; $x = 2$; about the y-axis.
b. $y = xe^{-x}$; $y = 0$; $x = 2$; about x=3.
c. $y = xe^{-x}$; $y = 0$; $x = 2$; about x=-1.
d. $y = xe^{-x}$; $y = 0$; $x = 2$; about y=-1.

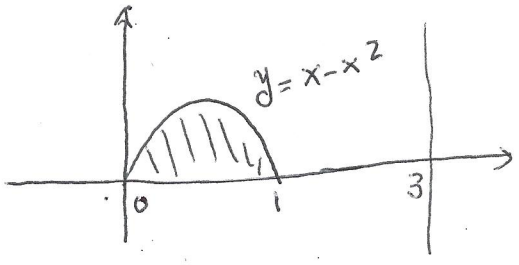
1.a $2\pi \int_0^2 x \cdot xe^{-x}\, dx$

b. $2\pi \int_0^2 (3-x) \cdot xe^{-x}\, dx$

c. $2\pi \int_0^2 (x+1) \cdot xe^{-x}\, dx$

d. $\pi \int_0^2 \left[(xe^{-x}+1)^2 - 1^2 \right] dx$

2. Find the volume of the solid obtained by rotating the region bounded by $y = x - x^2 and\ y = 0$; about x=3.



Volume: $2\pi \int_0^1 (3-x)(x-x^2)\, dx =$

$= 2\pi \int_0^1 (3x - x^2 - 3x^2 + x^3)\, dx =$

$= 2\pi \left[\frac{3}{2}x^2 - \frac{4}{3}x^3 + \frac{1}{4}x^4 \right]_0^1 =$

$= 2\pi \left[\frac{3}{2} - \frac{4}{3} + \frac{1}{4} \right] = \boxed{\frac{5\pi}{6}}$