ESP
Kouba
Worksheet 12

1.) Find the area of the regions bounded by the the graphs of the following equations.

a.) $Y = X^2$, $Y = X + 2$

b.) $Y = \ln X$, $Y = 0$, $X = e$

c.) $X = Y^2$, $X = 3Y + 4$

2.) Consider the region R bounded by the graphs of $Y = \sqrt{X}$ and $Y = \frac{1}{4}X$. Using the disc method, set up but do not evaluate the integrals for the volume of the solids formed by revolving region R about

a.) the x-axis

b.) the line $Y = -1$

c.) the line $Y = 4$

d.) the y-axis

e.) the line $X = -5$

f.) the line $X = 20$

3.) Consider the region R bounded by the graphs of $Y = e^X$, $Y = 1$, and $X = 2$. Using the disc method, set up but do not evaluate the integrals for the volume of the solids formed by revolving region R about

a.) the x-axis
b.) the y-axis
c.) the line $y = 1$
d.) the line $x = 3$
e.) the line $y = 10$
f.) the line $x = -2$

4.) A solid is lying in the xy-plane between $x = 0$ and $x = 3$. Cross-sections taken perpendicular to the x-axis at x are squares of side length x. Compute the volume of the solid.

5.) A solid is lying in the xy-plane between $x = 0$ and $x = 3$. Cross-sections taken perpendicular to the x-axis at x are semi-circles of radius x. Compute the volume of the solid.

6.) A solid is lying in the region bounded by the graphs of $y = e^{-x}$, $y = x - 1$, $x = 0$, and $x = 1$. Compute the volume of the solid if cross-sections taken perpendicular to the x-axis are

a.) rectangles of height 5
b.) squares

7.) Redo problem 2.) using the shell method.

8.) Integrate

a.) $\int \frac{x}{x^2+4}\,dx$

b.) $\int \frac{x}{x^2-4}\,dx$

c.) $\int \frac{x^2}{x^2-4}\,dx$

d.) $\int \frac{1}{1+\sqrt{x}}\,dx$

e.) $\int \frac{1}{\sqrt{x}(1+x)}\,dx$