1. Evaluate the integral

a) $\displaystyle\int_0^{\pi/12} \sin(3x-2)\,dx$

b) $\displaystyle\int x(4x^2+1)^6\,dx$

c) $\displaystyle\int x^3(x^2+3)^3\,dx$

d) $\displaystyle\int \frac{\sin\sqrt{x}}{\sqrt{x}}\,dx$

e) $\displaystyle\int_0^1 x^2e^{x^3}\,dx$

f) $\displaystyle\int \frac{x+\arcsin x}{\sqrt{1-x^2}}dx$

g) $\displaystyle\int \frac{2x^2+4x}{x^3+3x^2-4}dx$

h) $\displaystyle\int \frac{e^x}{e^x+1}\,dx$

i) $\displaystyle\int_e^{e^4} \frac{dx}{x\sqrt{\ln x}}$

j) $\displaystyle\int \frac{x\,dx}{\sqrt{1+x^4}}$

k) $\displaystyle\int_1^4 \frac{1}{x^2}\sqrt{\frac{1}{x}+1}\,dx$

l) $\displaystyle\int \tan x\ln(\cos x)\,dx$

2. Sketch the region bounded by the given curves and find the area of the region.
   (a) $y=x^2+2$, $y=2x+5$, $x=0$, $x=6$.
   (b) $y=\cos x$, $y=\sin 2x$, $x=0$, $x\pi/2$.
   (c) $x+y^2=2$, $x+y=0$.
3. Find the area of the triangle with vertices $(0,0)$, $(3,1)$, $(6,-6)$.
4. Find the volume of the solid S whose base is a region bounded by the parabola $y=1-x^2$ and the x-axis, and cross sections perpendicular to the y-axis are equilateral triangles.
5. Find the volume of the solid S whose base is the triangular region with vertices (0,0), (2,0), (0,1), and cross sections perpendicular to the x-axis are semicircles.
6. Set up the integrals to find the volume of the solid obtained by rotating the region bounded by the curves $y=4-x^2$, $y=1$, $x=1$, $x=2$ about the indicated lines using the method of disks/washers.
   (a) about the line $y=1$
   (b) about the x- axis
   (c) about the line $y=5$
   (d) about the line $y=-3$
   (e) about the line $y=0.5$

(f) about the line $x = 1$

(g) about the y- axis

(h) about the line $x = 2$

(i) about the line $x = 5$

(j) about the line $x = -2$

(k) about the line $x = 0.5$