(1) Sketch a region whose area is represented by

$$\int_{-\sqrt{2}/2}^{\sqrt{2}/2} (\sqrt{1-x^2} - |x|)\, dx$$

and evaluate using geometry.

(2) Use the Comparison Test to determine whether or not the integral converges.

(a) $\displaystyle\int_1^\infty \frac{1}{\sqrt{x^5+2}}\, dx$

(b) $\displaystyle\int_0^5 \frac{1}{x^{1/3}+x^3}\, dx$

(c) $\displaystyle\int_0^1 \frac{|\sin x|}{\sqrt{x}}\, dx$

(d) $\displaystyle\int_0^\infty \frac{1}{(x+x^2)^{1/3}}\, dx$