

MATH 253 – WORKSHEET 21
ITERATED INTEGRALS ON PLANAR DOMAINS

The integral of $f(x, y)$ on $D = \{(x, y) \mid a \leq x \leq b, g_1(x) \leq y \leq g_2(x)\}$ is

$$\iint_D f(x, y) \, dx \, dy = \int_{x=a}^{x=b} dx \int_{y=g_1(x)}^{y=g_2(x)} dy f(x, y)$$

- (1) Consider $f(x, y) = (1 - x^2)^{3/2}$ on $D = \{x^2 + y^2 \leq 1\}$.
- (a) What is the range of x values in the domain?
 - (b) For each x value, what is the range of y values?
 - (c) Write the domain in the suggested form.
 - (d) Set up an iterated integral.
 - (e) Do the integral.

(2) Let D be the finite region bounded by the curves $x = y$ and $x = 2 - y^2$. Find $\iint_D y \, dx \, dy$.