EXERCISES #17

GLOBAL MAXIMA AND MINIMA

Exercise 1. Find the global maximum minimum values of f(x, y) on the region D.

- (1) $f(x,y) = x^2 + y^2 2x$, and D is the triangular region with vertices (2,0), (0,2) and (0, -2), including boundaries.
- (2) f(x,y) = x + y xy, and D is the triangular region with vertices (0,0), (0,2), and (4,0), including boundaries.

- (3) $f(x,y) = x^2 + y^2 + x^2y + 4$, and $D = \{(x,y) \mid |x| \le 1, |y| \le 1\}$. (4) $f(x,y) = x^2 + xy + y^2 6y$, and $D = \{(x,y) \mid -3 \le x \le 3, 0 \le y \le 5\}$. (5) $f(x,y) = x^2 + 2y^2 2x 4y + 1$, and $D = \{(x,y) \mid 0 \le x \le 2, 0 \le y \le 3\}$.

Exercise 2. Find the shortest distance from the point (2, 0, -3) to the plane x + y + z = 1.

Exercise 3. Find the point on the plane x - 2y + 3z = 6 that is closest to the point (0, 1, 1).

Exercise 4. Find the point on the surface $z = x^2 + y^2$ that are closest to the point (5, 5, 0).

Exercise 5. Find the points on the surface $y^2 = 9 + xz$ that are closest to the origin.