

EXERCISES #18

GLOBAL MAXIMA AND MINIMA II

Exercise 1. Find the global maximum and minimum values of f on the given domain.

- (1) $f(x, y, z) = xy^2z$, on the domain $\{x^2 + y^2 + z^2 = 4\}$
- (2) $f(x, y, z) = x^2 + y^2 + z^2$, on the domain $\{x^2 + y^2 + z^2 + xy = 12\}$
- (3) $f(x, y, z) = x^4 + y^4 + z^4$, on the domain $\{x^2 + y^2 + z^2 = 1\}$

Exercise 2. Find the global maximum and minimum values of f on the given domain.

- (1) $f(x, y, z) = xyz$, on the domain $\{x^2 + y^2 + z^2 \leq 1\}$
- (2) $f(x, y, z) = x^2 + y^2 + z^2$, on the domain $\{x^4 + y^4 + z^4 \leq 1\}$
- (3) $f(x, y, z) = x^2 + y^2 + z^2$, on the domain $\{x^2 + y^2 + z^2 + xy - xz - yz \leq 1\}$

Exercise 3. Find the global maximum and minimum values of f on the given domain.

- (1) $f(x, y, z) = z$, on the domain $\{x^2 + y^2 + z^2 = 1, x + y - z = 0\}$
- (2) $f(x, y, z) = x^2 + y^2$, on the domain $\{x^2 + y^2 + z^2 = 50, x - z = 0\}$