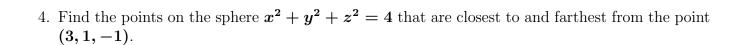
14.8 Constrained Optimization and Lagrange Multipliers

1.	Motivation:
т.	TVIOUI VAUIOII.

- 2. Method of Lagrange Multipliers: To find the maximum and minimum values of f(x, y, z) subject to the constraint g(x, y, z) = k:
 - (a) Find all values of x, y, z and λ such that

$$abla f(x,y,z) = \lambda \nabla g(x,y,z) \quad ext{and} \quad g(x,y,z) = k.$$

- (b) Evaluate f at all the points (x, y, z) that result from Step (a). The largest of these values is the maximum value of f; the smallest is the minimum value of f.
- 3. Example: Find the extreme values of $f(x,y) = x^2 + 2y^2$ given the constraint $x^2 + y^2 = 1$.



5. The production of a company is given by the Cobb-Douglas function $P=200L^{2/3}K^{1/3}$. Cost constraints on the business force $2L+5K\leq 150$. Find the values of the labor L and capital K to maximize production.

6. Find the maximum/minimum values of $f(x,y) = x^2 + y^2$ subject to 2x + 3y = 6.