

Homework 9 Problems

ECON 441: Introduction to Mathematical Economics

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Exercise 11.2

Find the extreme value(s) of each of the following four functions, and determine whether they are maxima or minima:

1. $z = x^2 + xy + 2y^2 + 3$

2. $z = -x^2 - y^2 + 6x + 2y$

3. $z = ax^2 + by^2 + c$; consider each of the three subcases:

(a) $a > 0, b > 0$

(b) $a < 0, b < 0$

(c) a and b opposite in sign

4. $z = e^{2x} - 2x + 2y^2 + 3$

5. Consider the function $z = (x - 2)^4 + (y - 3)^4$.

(a) Establish by intuitive reasoning that z attains a minimum ($z^* = 0$) at $x^* = 2$ and $y^* = 3$.

(b) Is the first-order necessary condition satisfied?

(c) Is the second-order sufficient condition satisfied?