Solution Manual For:
Introduction to Linear Optimization
by Dimitris Bertsimas & John N. Tsitsiklis

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Introduction

Acknowledgements

Special thanks to Dave Monet for helping find and correct various typos in these solutions.

Chapter 1 (Introduction)

Exercise 1.1

Since $f(\cdot)$ is convex we have that

$$f(\lambda x + (1 - \lambda)y) \leq \lambda f(x) + (1 - \lambda)f(y). \qquad (1)$$

Since $f(\cdot)$ is concave we also have that

$$f(\lambda x + (1 - \lambda)y) \geq \lambda f(x) + (1 - \lambda)f(y). \qquad (2)$$

Combining these two expressions we have that f must satisfy each with equality or

$$f(\lambda x + (1 - \lambda)y) = \lambda f(x) + (1 - \lambda)f(y). \qquad (3)$$

This implies that f must be linear and the expression given in the book holds.

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RJ Alexander

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