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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

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

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

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

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

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

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

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