

Math Camp

Day 2 Exercises

Solutions

Exercise 1

- a) $x_1^* = 5$ (Minimum), $x_2^* = 3$ (Maximum)
- b) $x_1^* = 0$ (Minimum), $x_2^* = 2$ (Maximum), $x_3^* = 4$ (Minimum)
- c) $x^* = 8$ (Maximum)
- d) $x^* = 5$ (Inflection point)

Exercise 2

- a) $(x_1^*, x_2^*) = (1, 2)$ (Minimum)
- b) $(x_1^*, x_2^*) = (4, 3)$ (Maximum)

Exercise 3

- a) Critical values: $(x_1^*, x_2^*, \lambda^*) = (42, 30, 276)$
- b) $\lambda^* = 276$
- c) $f(42, 30) = 9936$ when $x_1 + x_2 = 72$ and $f\left(\frac{365}{12}, \frac{511}{12}\right) \approx 10,213.92$ when $x_1 + x_2 = 73$.
Difference $\approx 10,214 - 9936 \approx 278$