

## Sections Européennes - Session 2025

### Sujet n°24

*Please do not write on this document and do not forget to hand it back to the jury at the end of the exam.*

### FUNCTIONS

A small business produces and sells handmade wooden toys. The owner wants to maximize the daily profit. The profit function  $P(x)$  is a quadratic function that depends on the number of toys  $x$  produced and sold per day.

The data stored in the accounting system of this business provides following information :

- When 10 toys are produced and sold, the daily profit is €200.
- The fixed costs are €150. Hence, when 0 toys are produced, the daily profit is – €150.
- The maximum possible daily production is 40 toys.
- When the maximum number of toys is produced, the profit becomes negative due to increased labor costs and decreased quality, resulting in a loss of €100.

The owner of this business aims to achieve a daily profit of €350.

Based on your analysis of the profit function, what is your opinion on the realism of this goal ? Explain your reasoning, considering both mathematical and practical business aspects.