

MATH 31 - Calculus. Homework 7. Due Th. 04/03/2025. Professor Luis Fernández

NAME: _____

Do not write your answers here except the graph.

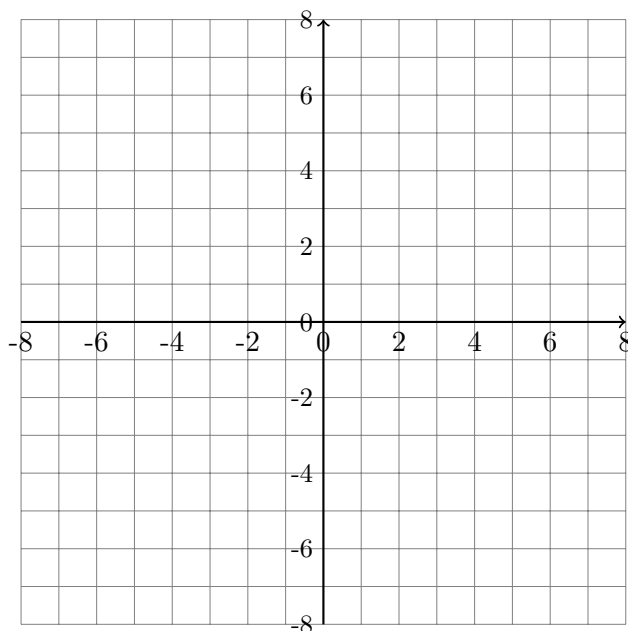
Write your answers in other sheets and **STAPLE them to this one.**

1. Find the absolute maximum and the absolute minimum of the function $f(x) = 2x^3 - 3x^2 - 12x + 1$ in the interval $[-2, 3]$.
2. Verify that the function $f(x) = \ln x$ satisfies the hypotheses of the Mean Value Theorem on the interval $[1, 4]$. Then find all numbers c that satisfy the conclusion of the Mean Value Theorem.
3. Sketch, on the axes below, the graph of a function that satisfies the following conditions.

$f'(4) = 0$, $f'(x) < 0$ when $x < 4$, and $f'(x) > 0$ when $x > 4$.

$f''(2) = 0$, $f''(6) = 0$, $f''(x) < 0$ when $x < 2$ or $x > 6$, and $f''(x) > 0$ when $2 < x < 6$.

$\lim_{x \rightarrow \infty} f(x) = 3$, and $\lim_{x \rightarrow -\infty} f(x) = 3$.



4. For the function $f(x) = x^3 - 3x^2 - 9x + 4$,
 - (a) Find the intervals on which f is increasing or decreasing.
 - (b) Find the local maximum and minimum values of f .
 - (c) Find the intervals of concavity and the inflection points.