

1. Consider $f(x) = x^4 - 8x^3 + 18x^2 - 16x + 12$ on $[-2, 6]$.
 - (a) Find all critical numbers of $f(x)$ in the indicated interval.
 - (b) Find the absolute maximum and minimum values of $f(x)$ on the indicated interval.
 - (c) Keeping in mind that the graph of $f(x)$ cannot change direction, except at a critical number, sketch the graph of $f(x)$, at least in terms of increasing/decreasing.
 - (d) From your graph, find all local minima and maxima of $f(x)$ on the indicated interval.

(Hint: One critical number is $x = 1$.)

2. Consider $\frac{\ln x}{x}$ on $[-1, 5]$.
 - (a) Find all critical numbers of $f(x)$ in the indicated interval.
 - (b) Find the absolute maximum and minimum values of $f(x)$ on the indicated interval.
 - (c) Keeping in mind that the graph of $f(x)$ cannot change direction, except at a critical number, sketch the graph of $f(x)$, at least in terms of increasing/decreasing.
 - (d) From your graph, find all local minima and maxima of $f(x)$ on the indicated interval.

3. Consider $e^{-2x} \sin(3x)$ on $[0, 2]$.
 - (a) Find all critical numbers of $f(x)$ in the indicated interval.
 - (b) Find the absolute maximum and minimum values of $f(x)$ on the indicated interval.
 - (c) Keeping in mind that the graph of $f(x)$ cannot change direction, except at a critical number, sketch the graph of $f(x)$, at least in terms of increasing/decreasing.
 - (d) From your graph, find all local minima and maxima of $f(x)$ on the indicated interval.

(Hint: Don't forget that $\tan(\theta + \pi) = \tan \theta$.)