ABSOLUTE EXTREMA

Tutorial 11.1. Absolute extrema on a closed interval
Let \( f(x) = 3x + e^{-2x} \) defined on \([-1, 2]\). Find the absolute extrema if they exist, and the points \( x \) at which they occur.

Tutorial 11.2. Relative extrema
Let \( f(x) = 2x^{3/7} - 3x^{5/7} \). Determine what the relative extrema (if any) of \( f \) are and give their value.

Tutorial 11.3. Higher derivatives
(a) Let \( f(x) = x^3 - 2x - 3x + 1 \). Determine the intervals where \( f \) is concave up or concave down, as well as any inflection points.
(b) Let \( g(x) = \ln(x^2 + 1) \). Determine the intervals where \( g \) is concave up or concave down, as well as any inflection points.

Tutorial 11.4. Maximising area
Suppose you have 248 meters of fencing. What is the largest possible rectangular area you can enclose with this amount of fencing? What is the geometric significance of your solution?