

Due: August 17, 2023

1. Find the stationary values (critical values) of the following (check whether relative maxima, or minima, or inflection points) assuming the domain to be the set of all real numbers.
 - a) $y = x^2 + 3$
 - b) $y = 3x^2 - 6x + 2$
2. Find the stationary values of the following (check whether relative maxima or minima or inflection points), assuming the domain to be the interval $[0, \infty)$.
 - a) $y = x^3 - 3x + 5$
 - b) $y = \frac{1}{3}x^3 - x^2 + x + 10$
 - c) $y = -x^3 + 4.5x^2 - 6x + 6$
3. Find the maximum and the minimum values and points:
 - a) $f(x) = x^2 - 5x + 3, -\infty < x < +\infty$
 - b) $f(x) = x^3 - x, -\infty < x < +\infty$
4. Solve the following exercises by the method of Lagrange multipliers:
 - a) Minimize the function $x^2 + 3y + 10$; subject to the constraint: $8 - x - y = 0$
 - b) Maximize $x^2 + xy - 3y^2$; subject to the constraint: $2 - x - 2y = 0$
 - c) Maximize $-2x^2 - 2xy - \frac{3}{2}y^2 + x + 2y$; subject to the constraint: $x + y - \frac{5}{2} = 0$