Calculus I
Practice Problems 6

1. Let $y = x^4 - x^3 - x + 1$. Find the value of x where y has its absolute minimum.

2. Find all local maxima and minima of the function $f(x) = x(4 + x^{-2})$.

3. Find the absolute maxima and minima of the function

$$f(w) = w\sqrt{w+1}$$

on the interval $-1 \leq w \leq 4$.

4. Find the maximum and the minimum of $y = x\sqrt{1-x^2}$ on the interval $-1 \leq x \leq 1$.

5. Let $y = \sin^2 x + \cos x$, for x in the interval $[-\pi, \pi]$. Find the absolute maximum and minimum of y.

6. Let $y = \dfrac{x}{x^2 - 4x + 3}$. Find the intervals in which y is increasing; in which y is decreasing.

7. For what number x between 0 and 1 is $x^{1/3} - x$ a maximum?

8. Show that the equation $2x^{12} - 3x^6 + x = 0$ has a root strictly between 0 and 1.