Math 231 Worksheet 5

1. Find the absolute maximum and absolute minimum of f on the given interval.

$$f(x) = 2x^3 - 3x^2 + 4, \quad [-1, 2].$$

2. Let $f(x) = (x^2 - 1)^3$. Find the absolute maximum and absolute minimum values of f on the interval $[-1, 2]$.

1. To find the critical numbers, set

$$f'(x) = 6x^2 - 6x = 0$$

that is,

$$6x(x-1) = 0.$$

Therefore $x = 0$ and $x = 1$ are the critical numbers. The corresponding critical points are $(0, 4)$ and $(1, 3)$. Next, the endpoints are $(-1, -1)$ and $(2, 8)$.

So the maximum of f is $\max\{4, 3, -1, 8\} = 8$, attained at $x = 2$; the minimum of f is $\max\{4, 3, -1, 8\} = -1$, attained at $x = -1$.