WRITTEN ASSIGNMENT #5 - SOLUTION

Let $f(x) = \dfrac{x^5}{5} - x^4 + x^3 + 2x^2 - 4x + 1$.

1. (1 point) Find $f'(x)$ and factor it into linear factors.
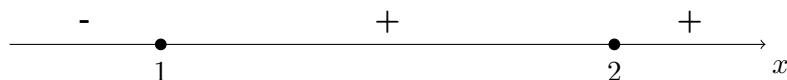
> **Solution:**
> $$f'(x) = x^4 - 4x^3 + 3x^2 + 4x - 4 = (x-2)^2(x-1)(x+1)$$

2. (2 points) Find the critical numbers of $f(x)$ on the open interval $(0, 3)$.

> **Solution:** Critical numbers of $f(x)$ on $(0,3)$ are $x = 1$ and $x = 2$.

3. (3 points) Find the local extrema of $f(x)$ on the open interval $(0, 3)$.

> **Solution:**
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> Thus we have a local min at $x = 1$ with $f(1) = -\frac{4}{5}$.

4. (2 points) Find the absolute maximum and absolute minimum values of $f(x)$ on the closed interval $[0, 3]$.

> **Solution:**
> $$f(0) = 1$$
> $$f(1) = \boxed{-\frac{4}{5} \text{ - absolute minimum}}$$
> $$f(2) = -\frac{3}{5}$$
> $$f(3) = \boxed{\frac{8}{5} \text{ - absolute maximum}}$$