1. In this problem you will find and classify the extreme values of the function $f(x) = x^2 - \frac{1}{6}x^3$, with some guidance.

   (a) Differentiate the function, then solve the equation $\dfrac{df}{dx} = 0$ to find all the critical values.

   (b) Make a positivity diagram for $\dfrac{df}{dx}$, then use the first derivative test to analyze each critical value.

2. Find and classify the critical values of $g(t) = 5t^3$ as local maximums, local minimums, or neither.

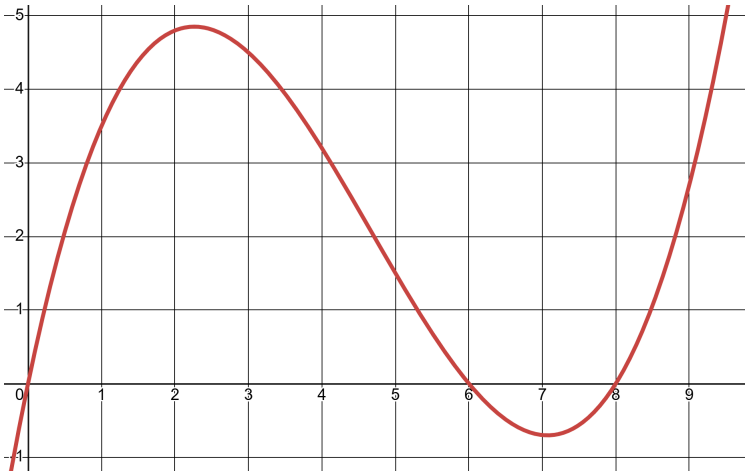
3. Suppose $f(x)$ is a function and you know that

   - The critical values of f are -8 and 7 and 12
   - $\dfrac{df}{dx}(-10) = 1$ and $\dfrac{df}{dx}(0) = 6$ and $\dfrac{df}{dx}(10) = -3$

   (a) Using this information, classify the critical values at -8 and 7 as local maximum, local minimum, or neither.

   (b) The information you are given is not enough to classify the critical value at 12. What additional information do you need to make the classification?

4. There is some function $g(x)$. Below is a graph of $\dfrac{dg}{dx}$ (NOT a graph of g).



Using this information, find and classify the critical values of $g(x)$ as local maximums, local minimums, or neither.

5. Find and classify the critical values of $h(x) = \dfrac{3}{2}x^4 - x^6$ as local maximums, local minimums, or neither.

6. Find and classify critical values of $f(t) = (t^2 - 3)e^t$ as local maximums, local minimums, or neither.