

3.3 Sketching Derivatives

Standards:

MCA3

MCA3a



[Old] Computing Derivatives Algebraically

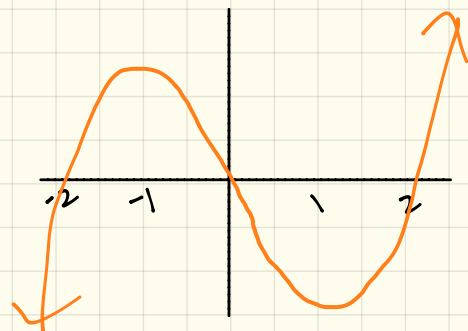
Find the derivative of $f(x)$.

$$f(x) = x^3 - x$$

$$f'(x) = 3x^2 - 1$$

[New] Sketching Derivatives (Graphically)

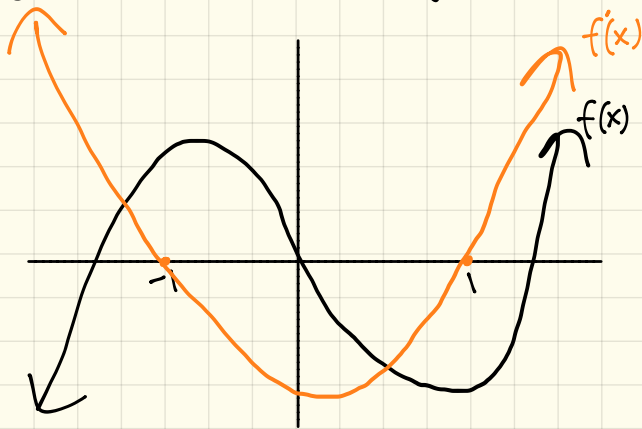
Let's consider the graph of the function: $f(x) = x^3 - x$.



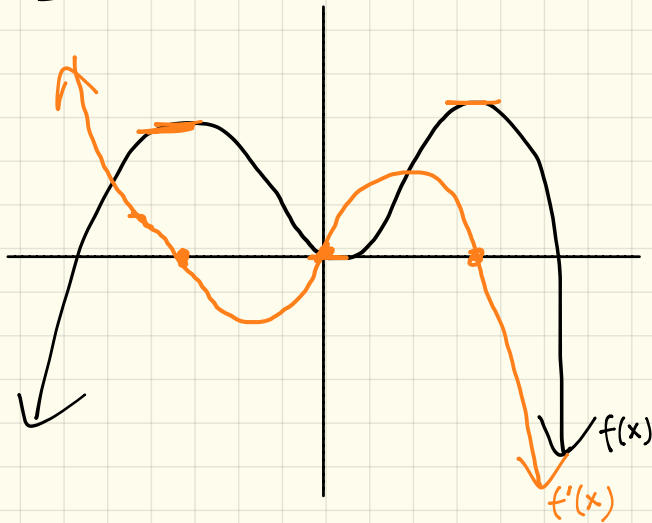
Goal: To graph (or sketch) the derivative of the function.

- We can estimate the value of the derivative at any value of x by determining (or estimating) the slope of the tangent line at every arbitrary point $(x, f(x))$.
- When determining the new x & y coordinates for the derivative's graph,
 - ↳ x -coordinates stay the same as the position function's graph.
 - ↳ y -coordinates become a new y -coordinate being the slope of the $f(x)$ at the corresponding x -value.

[Example 1] Sketch the derivative of this graph.



[Example 2]



[Example 3] Using $f(x)$, sketch $f'(x)$, $f''(x)$, $f'''(x)$, and $f^{(4)}(x)$.

