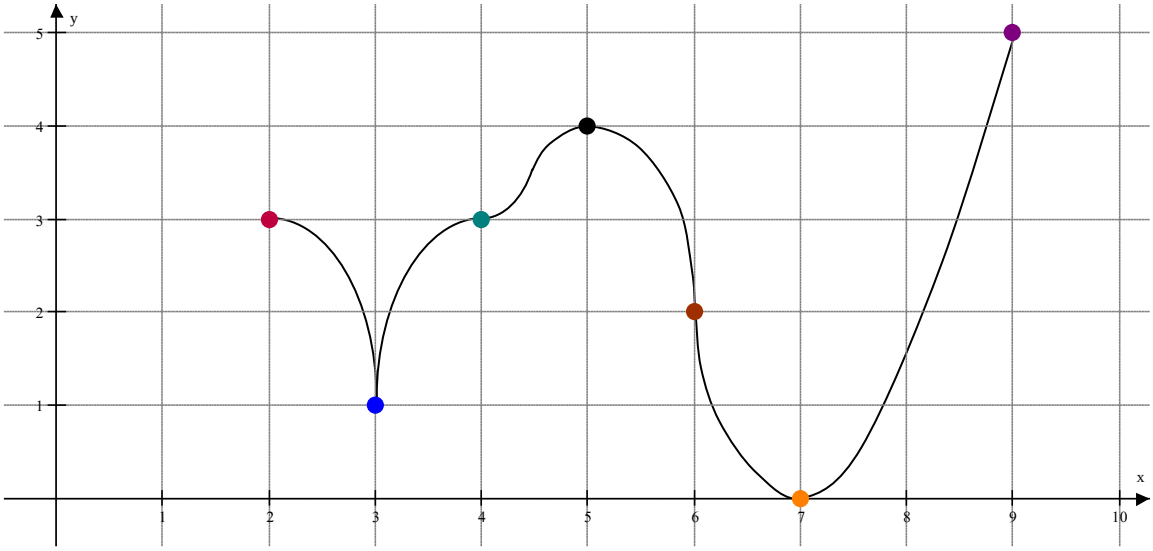
An Example Illustrating Relative vs. Absolute Extrema

Let $f(x)$ be a continuous function defined on the closed interval $[2, 9]$ whose graph is given below.



The critical numbers of f are 3, 4, 5, 6 and 7.

- $f'(x) = 0$ at $x = 4$, $x = 5$ and $x = 7$.
- $f'(x)$ does not exist at $x = 3$ (corner) and $x = 6$ (vertical tangent).

f has a relative maximum of 4 at the critical point $(5, 4)$.
f has a relative minimum of 1 at the critical point $(3, 1)$ and 0 at the critical point $(7, 0)$.

f has an absolute maximum of 5 at the endpoint $(9, 5)$.
f has an absolute minimum of 0 at the critical point $(7, 0)$.

f has neither a relative maximum nor a relative minimum at the critical points $(4, 3)$ and $(6, 2)$.