

Guidelines for Curve Analysis for given $F(x)$

The First Derivative Test	The Second Derivative Test
<p>The Critical point $(c, f(c))$ is a relative local max where $f'(c) = 0$.</p> <div style="text-align: center;"> <p style="text-align: center;">$f'(c) = 0$</p> <p style="text-align: center;">$f'(x) > 0$ on Left $f'(x) < 0$ on Right</p> </div> <p>Sign Diagram: </p>	<p>If $f''(c) < 0$ at Critical point $x=c$, $(c, f(c))$ is a relative max.</p> <div style="text-align: center;"> <p style="text-align: center;">$f''(c) < 0$</p> <p style="text-align: right;">Concave Down</p> </div> <p>Sign Diagram: </p>
<p>The Critical point $(c, f(c))$ is a relative local min, where $f'(c) = 0$.</p> <div style="text-align: center;"> <p style="text-align: center;">$f'(c) = 0$</p> <p style="text-align: center;">$f'(x) < 0$ on Left $f'(x) > 0$ on Right</p> </div> <p>Sign Diagram: </p>	<p>If $f''(c) > 0$ at Critical point $x=c$, $(c, f(c))$ is a relative min.</p> <div style="text-align: center;"> <p style="text-align: center;">$f''(c) > 0$</p> <p style="text-align: right;">Concave up</p> </div> <p>Sign Diagram: </p>
<p>The Critical point $(c, f(c))$ is neither a relative local max or a relative min, where $f'(c) = 0$.</p> <div style="text-align: center;"> <p style="text-align: center;">$f'(c) > 0$ on Right</p> <p style="text-align: center;">$f'(c) < 0$ on Right</p> </div> <p>Sign Diagram: </p>	<p>If $f''(d) = 0$, $(d, f(d))$ is an inflection point.</p> <div style="text-align: center;"> <p style="text-align: center;">Inflection point</p> <p style="text-align: center;">Inflection point</p> <p style="text-align: center;">$f''(d)$ is undefined.</p> </div> <p>Sign Diagram: </p>