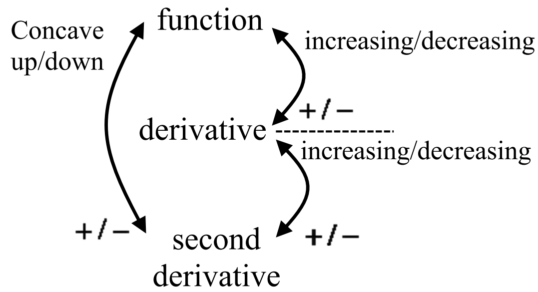
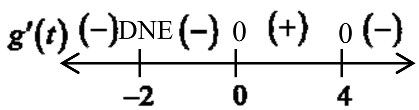


Evidence		Interpretation
f is concave up	$\rightarrow$	$f'' > 0$
f is concave down	$\rightarrow$	$f'' < 0$
f is increasing / slopes of tangents > 0	$\rightarrow$	$f' > 0$
f is decreasing / slope of tangents < 0	$\rightarrow$	$f' < 0$
f' is increasing / slopes of tangents > 0	$\rightarrow$	$f'' > 0$
f' is decreasing / slopes of tangents < 0	$\rightarrow$	$f'' < 0$
$f' > 0$	$\rightarrow$	f is increasing
$f' < 0$	$\rightarrow$	f is decreasing
$f'' > 0$	$\rightarrow$	f' is increasing
$f'' > 0$	$\rightarrow$	f is concave up
$f'' < 0$	$\rightarrow$	f' is decreasing
$f'' < 0$	$\rightarrow$	f is concave down
"f is differentiable"	$\rightarrow$	f is continuous
"f is twice differentiable"	$\rightarrow$	f is continuous and differentiable f' is continuous and differentiable

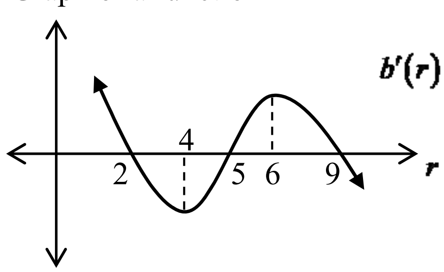
To justify your answer using Calculus, you must (1) have evidence, (2) interpret the evidence, and (3) state your answer in a complete sentence.

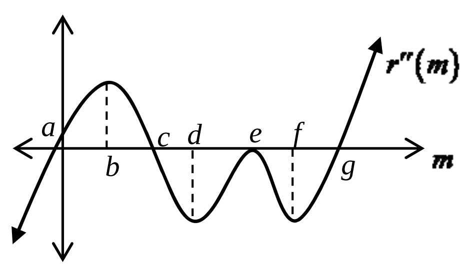
What is considered evidence?

- ✓ Labeled sign chart



- ✓ Graph of a function

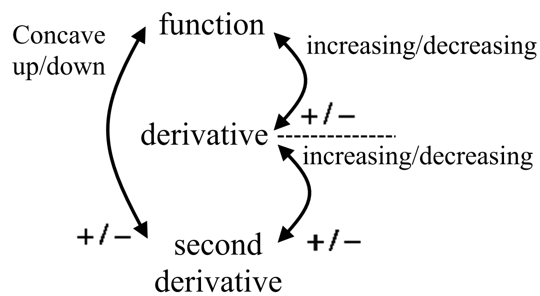




- ✓ Complete sentence.

2005 AB #3 "The function T is decreasing and twice differentiable."
2007 AB #3 "The functions f and g are differentiable for all real numbers, and g is strictly increasing."

Connections between $f(x), f'(x)$, and $f''(x)$.



$f(x)$ is increasing if an only if $f'(x)$ is positive.
$f(x)$ is decreasing if and only if $f'(x)$ is negative.

$f(x)$ has a relative minimum if and only if $f'(x)$ changes sign from negative to positive.
$f(x)$ has a relative maximum if and only if $f'(x)$ changes sign from positive to negative.

$f(x)$ has a relative minimum at $x=c$ because $f'(c)=0$ and $f''(c)$ is positive.
$f(x)$ has a relative maximum at $x=c$ because $f'(c)=0$ and $f''(c)$ is negative.

$f(x)$ is concave up if and only if $f''(x)$ is positive.
$f(x)$ is concave down if and only if $f''(x)$ is negative.

$f(x)$ is concave up if and only if $f'(x)$ is increasing.
$f(x)$ is concave down if and only if $f'(x)$ is decreasing.

$f(x)$ has an inflection point at $x=c$ if and only if $f''(x)$ changes sign.
$f(x)$ has an inflection point at $x=c$ if $f'(x)$ changes from [decreasing to increasing] or [increasing to decreasing].