

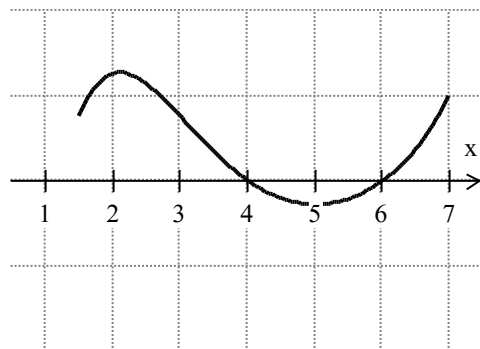
AP Calculus AB - Connections among the graphs of f , f' , and f''

**** If the answer to a question cannot be determined from the graph provided, write "CBD" ****

@ MEANS TO JUSTIFY

1. Assume that the graph shown is the graph of $f(x)$ on the domain $[1.5, 7]$. Give all approximate...

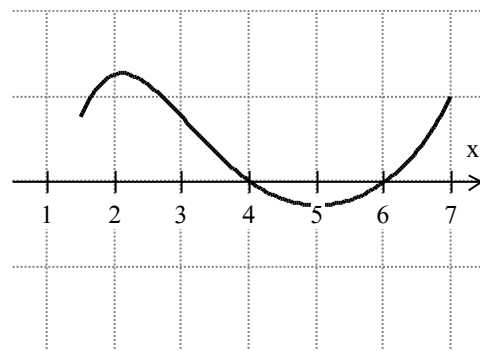
- a) x-values where $f(x)$ has a local maximum
- b) x-values where $f(x)$ has a local minimum
- c) intervals where $f(x)$ is increasing
- d) intervals where $f(x)$ is decreasing
- e) x-values where $f(x)$ has a point of inflection
- f) intervals where $f(x)$ is concave up
- g) intervals where $f(x)$ is concave down



This is a graph of $f(x)$

2. Assume that the graph shown is the graph of $f'(x)$ on the domain $[1.5, 7]$. Give all approximate...

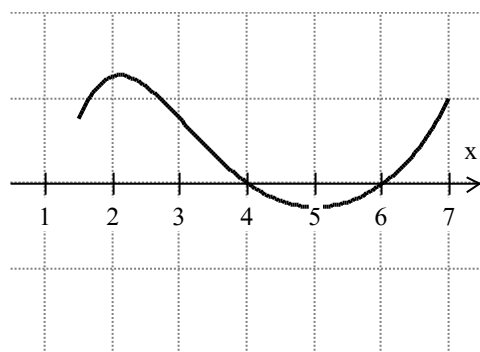
- a) x-values where $f(x)$ has a local maximum @
- b) x-values where $f(x)$ has a local minimum @
- c) intervals where $f(x)$ is increasing @
- d) intervals where $f(x)$ is decreasing @
- e) x-values where $f(x)$ has a point of inflection
- f) intervals where $f(x)$ is concave up
- g) intervals where $f(x)$ is concave down



This is a graph of $f'(x)$

3. Assume that the graph shown is the graph of $f''(x)$ on the domain $[1.5, 7]$. Give all approximate...

- a) x-values where $f(x)$ has a local maximum
- b) x-values where $f(x)$ has a local minimum
- c) intervals where $f(x)$ is increasing
- d) intervals where $f(x)$ is decreasing
- e) x-values where $f(x)$ has a point of inflection @
- f) intervals where $f(x)$ is concave up @
- g) intervals where $f(x)$ is concave down @



This is a graph of $f''(x)$

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Answers Key

1.
 - a) $x = 2, X=7$
 - b) $X=1.5, x = 5$
 - c) $[1.5, 2] \cup [5, 7]$
 - d) $[2, 5]$
 - e) $x = 3$
 - f) $(3, 7)$
 - g) $(1.5, 3)$

2.
 - a) $x = 4, x=7$ $f(x)$ has a local max at $x=4$, b/c $f'(x)$ goes from + to - at $x=4$. $f(x)$ has a local max at $x=7$ b/c $x=7$ is an endpoint and $f'(x) > 0$ to the left of $x=7$.
 - b) $x=1.5, x = 6$ $f(x)$ has a local min at $x=1.5$ b/c $x=1.5$ is an endpoint and $f'(x) > 0$ to the right of $x=1.5$. $f(x)$ has a local min at $x=6$ b/c $f'(x)$ goes from - to + at $x=6$.
 - c) $f(x)$ is increasing on the intervals $[1.5, 4] \cup [6, 7]$ b/c $f'(x) > 0$ on the intervals.
 - d) $f(x)$ is decreasing on the interval $[4, 6]$ b/c $f'(x) < 0$ on the interval.
 - e) $x = 2, x = 5$
 - f) $(1.5, 2) \cup (5, 7)$
 - g) $(2, 5)$

3.
 - a) CBD
 - b) CBD
 - c) CBD
 - d) CBD
 - e) $x = 4, x = 6$ $f(x)$ has a point of inflection at $x=4$ b/c $f''(x)$ changes signs at $x=4$. $f(x)$ has a point of inflection at $x=6$ b/c $f''(x)$ changes signs at $x=6$.
 - f) $f(x)$ is concave up on the intervals $(1.5, 4) \cup (6, 7)$ b/c $f''(x) > 0$ on the intervals.
 - g) $f(x)$ is concave down on the interval $(4, 6)$ b/c $f''(x) < 0$ on the interval.