

§3.4: Concavity

“I WILL ...

...identify concavity of a graph.”

f'	f''

I. Definitions

A. Concave _____: f'' is greater than 0

B. Concave _____: f'' is less than 0

C. _____: $f'' = 0$ or *DNE* (undefined), and f'' CHANGES SIGNS

II. To Determine Concavity

A. Find $f'(x)$ and $f''(x)$ and solve for $f''(x) = 0$

B. Determine the intervals and establish Point of Inflection, apply to original function

1. $f'(x)$ changes from increasing to decreasing or vice versa (max/min)

2. $f''(x)$ crosses x -axis

C. Develop a table to establish the necessary points

D. Write a conclusion

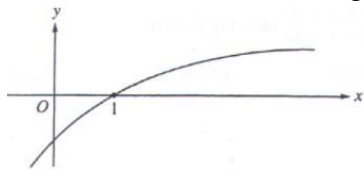
<p>Ex 1: Determine the point of inflection and discuss the concavity of $f(x) = \frac{1}{3}x^3$</p>	<p>Ex 2: Determine the point of inflection and discuss the concavity of $f(x) = 2x^3 - 3x^2 - 12x + 5$</p>
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Your Turn: Determine the point of inflection and discuss the concavity of $h(x) = x^3 - x$

Ex 3: Determine the point of inflection and discuss the concavity of $f(x) = \frac{6}{x^2+3}$

Ex 4: Determine the point of inflection and discuss the concavity of $f(x) = (x - 1)^{2/3}$

AP 1) Determine from the graph whether f possesses extrema on the interval $[a, b]$



(A) $f(1) < f'(1) < f''(1)$

(B) $f(1) < f''(1) < f'(1)$

(C) $f'(1) < f(1) < f''(1)$

(D) $f''(1) < f(1) < f'(1)$

Vocabulary	Process and Connections	Answer and Justifications