Calc AB

Lesson 45

9/28/15

Agenda: 9/28/15

HW leader:

Period 3: HaydenN

Period 4: Hannah P

lesson 45

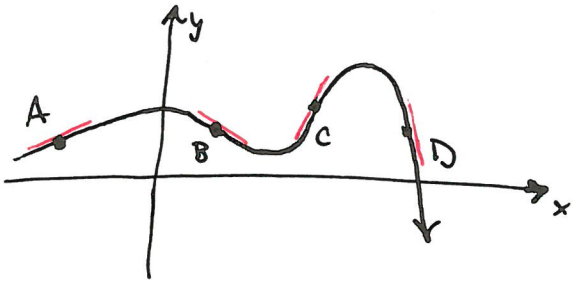
f' to characterize f

f' to find max/min

- $f'(x) > 0$ on $[a,b]$ then $f(x)$ is increasing on $[a,b]$
- $f'(x) < 0$ on $[a,b]$ then $f(x)$ is decreasing on $[a,b]$
- $f'(x) = 0$ on $[a,b]$ then $f(x)$ is constant on $[a,b]$

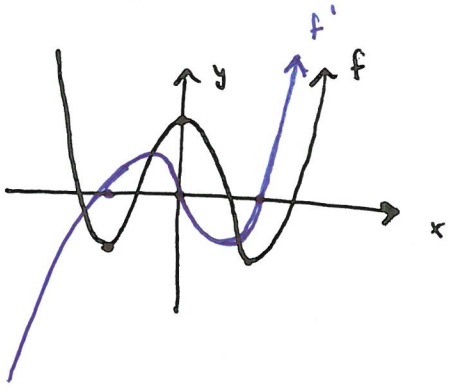
f	↑/↓	↺/↻
f'	+/-	↑/↓
f''		+/-

Ex. Shown is the graph of f, order from smallest to largest the value of f' at the labeled points



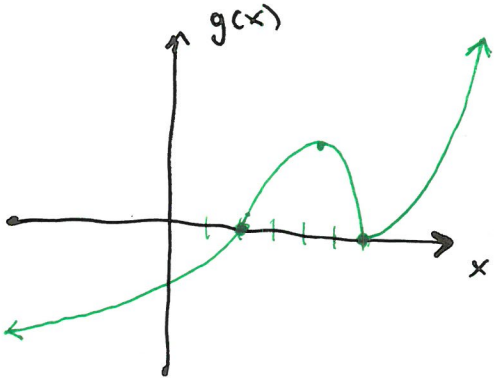
D, B, A, C

Ex. Sketch the graph of f' given f



Ex. Sketch a possible graph of a function with

1. $\lim_{x \to -\infty} g(x) = -\infty$
2. $g'(x) > 0$ on $(6,\infty)$
3. $g(x) < 0$ on $(-\infty, 2)$
4. $g(x) = 0$ at $x = 2$ and $x = 6$
5. $g'(x) = 0$ at $x = 4$
6. $g'(x)$ is undefined at $x = 6$



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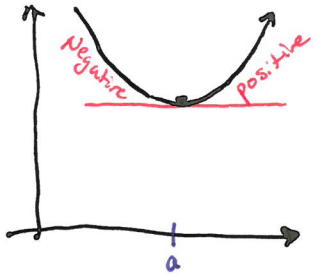
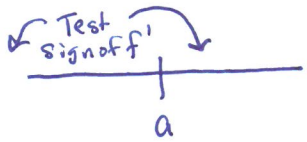
Using f' to find max or min





Ex. Use the first derivative to find the local max/mins of

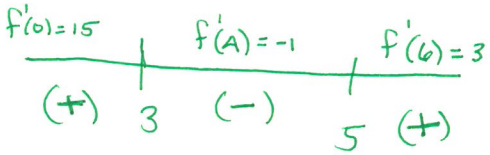
$$f(x) = \frac{x^3}{3} - 4x^2 + 15x - 370$$

$f'(x) = x^2 - 8x + 15 = (x-5)(x-3)$

Critical numbers: $x = 5$ or $x = 3$

Critical points: $(3, -367)$ $(5, -368\frac{1}{3})$

Sign of f':



local max at $x = 3$

local min at $x = 5$