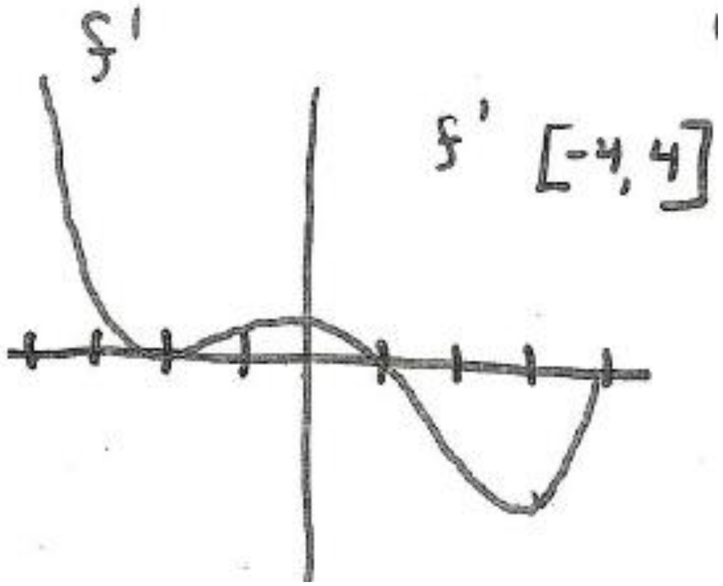
Graphs of functions and their derivatives

Connecting f’ with the graph of f



#1 a) On what interval is f increasing?

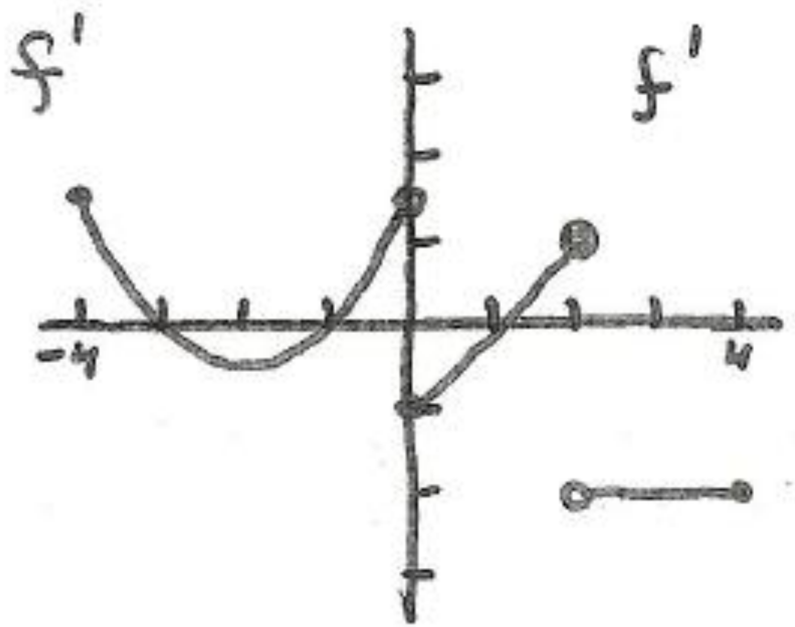
b) On what interval is the graph of f concave up?

c) At what x-coordinates does f have a local extrema?

d) What are x-coordinates of all inflection points of the graph?

e) Sketch a possible graph of f.

#2 a) Find the x-coordinates of all local extrema and points of inflection of f.



b) Sketch a possible graph of f.

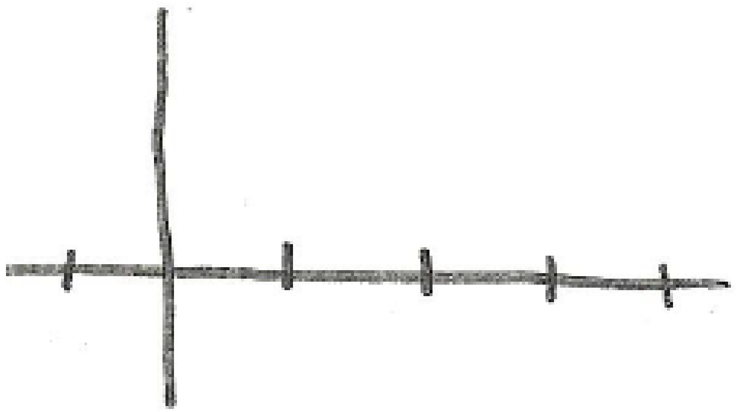
#3 $f'(x) = 4x^3 - 12x^2$

a) Identify where the extrema of f occurs.

b) Find the intervals on which f is increasing and decreasing.

c) Find where the graph of f is concave up and concave down.

d) Sketch a possible graph for f.



Example:
A function f is continuous on the interval [-4, 3] with the following properties.

Intervals	-4 < x < -2	X = -2	-2 < x < 1	X = 1	1 < x < 3
f’	Neg	0	Neg	DNE	Pos
f’’	Pos	0	Neg	DNE	Neg

a. Find the x-coordinates of all relative extrema on the domain [-4, 3]. Classify them as relative max or relative mins. Justify your answer.

There is a relative minimum at x = 1 because f’(1) DNE and f’ changes from negative to positive, which indicates that f(x) changes from decreasing to increasing at x = 1.

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f'	Neg	0	Neg	DNE	Pos
f''	Pos	0	Neg	DNE	Neg

b. Find the x-coordinates of any point of inflection on the domain [-4, 3]. Justify your answer.

There is an inflection point at x = -2 because f''(-2) = 0 and f'' changes from positive to negative, which indicates f(x) changes from concave up to concave down at x = -2.

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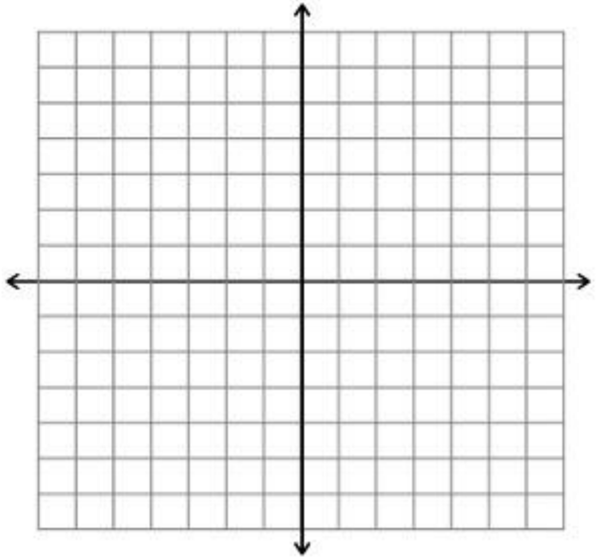
Sketch a possible graph of f(x), given that f(-4) = 6 and f(3) = 2.



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