

5.1-What Does f' say about f ?

Read Section 5.1 in the text and complete the following on your own :

If $f'(x) > 0$ for all $x \in (a, b)$, then f is **increasing** on (a, b)

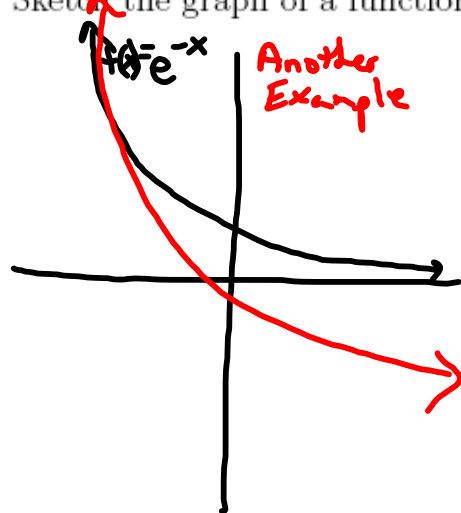
If $f'(x) < 0$ for all $x \in (a, b)$, then f is **decreasing** on (a, b)
Concavity: f conc up \curvearrowright f' inc ($f'' > 0$)

If $f''(x) > 0$ for all $x \in (a, b)$, then f is **concave up** (f' inc)
 f conc down \curvearrowleft f' dec ($f'' < 0$)

If $f''(x) < 0$ for all $x \in (a, b)$, then f is **concave down** (f' dec)

Example:

Sketch the graph of a function whose slope is always negative and increasing.



$$f' < 0$$
$$f \text{ dec}$$

$$f' \text{ inc}$$
$$f \text{ conc up}$$

$$f'(x) = -e^{-x} \text{ always negative}$$

$$f''(x) = e^{-x} \text{ always positive}$$

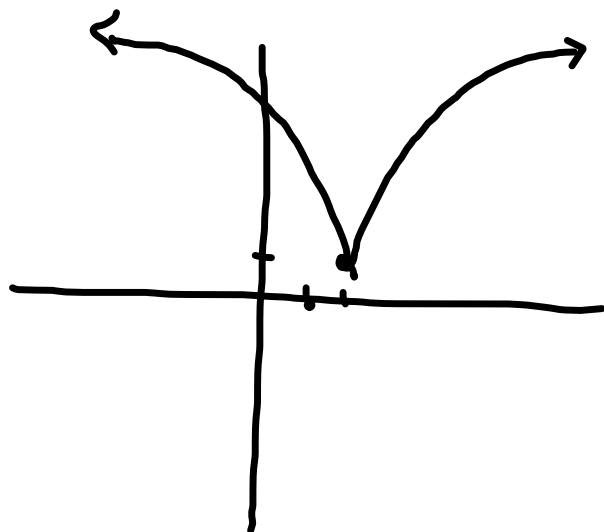
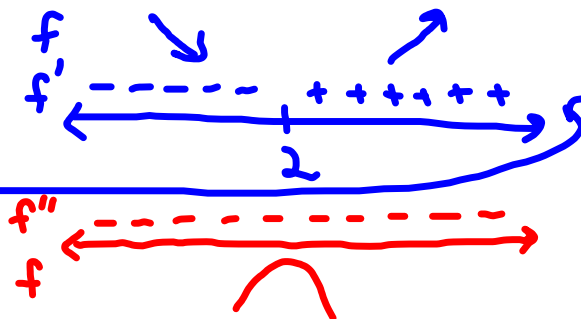
Sketch the graph of a function which satisfies the following:

$$f(2) = 1 \quad (2, 1)$$

$$f'(x) < 0 \text{ for } x < 2$$

$$f'(x) > 0 \text{ for } x > 2$$

$$f''(x) < 0 \text{ for all } x$$



Key to graph: always one of the following:



Properties of the Graph of the Derivative

Graph of the Derivative f'

Quit

New Graph

Text Question

On what interval(s) is f increasing?
 $f' > 0$

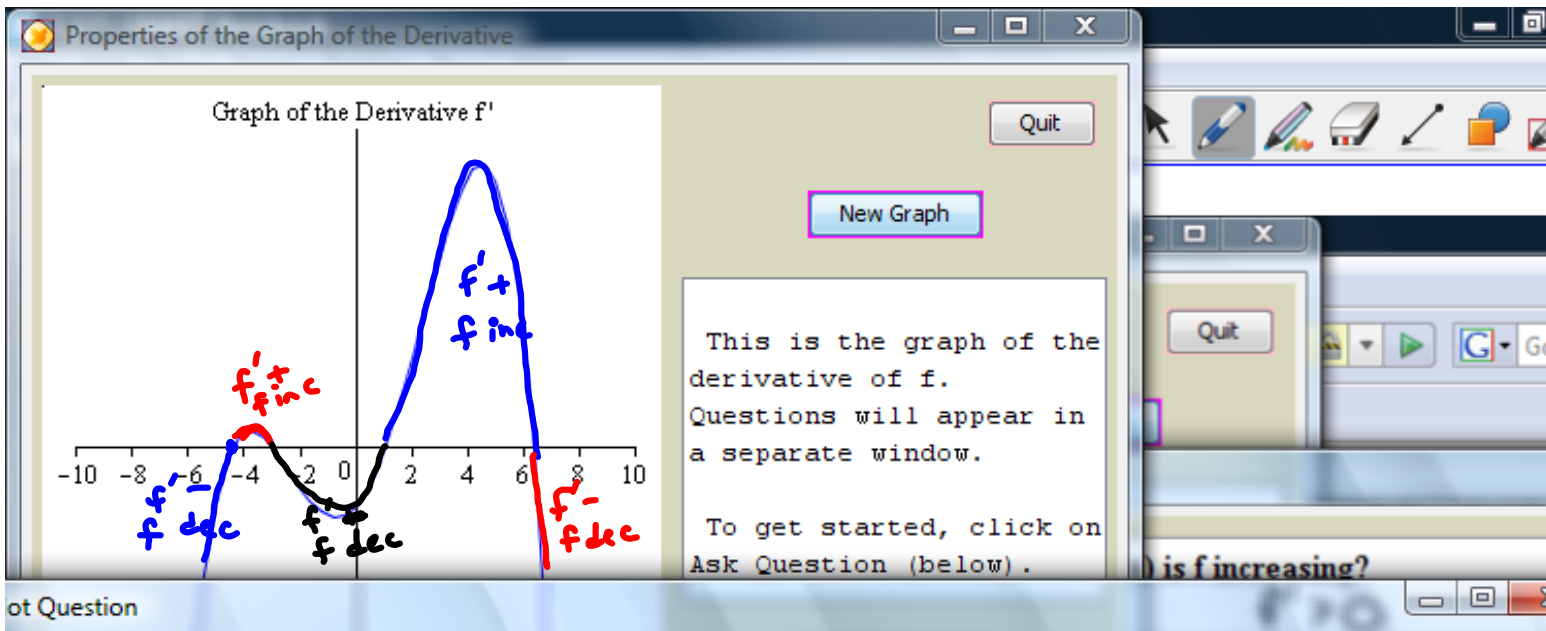
The numbers appearing in your answers must be chosen from the following list:

-10.00, -5.00, -4.39, -3.77, -3.00, -.71, 1.06, 3.00, 4.48, 6.34, 8.00, 10.00

Enter Your Answer: $[-4.39, -3.00], [1.06, 6.34]$

48.

https://www.math.tamu.edu/maple/maplets/Maplets/Graph_df.maplet www.math.tamu.edu



Which of these graphs is f ? Click below the Plot.

