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.

If $f'(x) < 0$ for all $x \in (a, b)$, then $f$ is decreasing.

If $f''(x) > 0$ for all $x \in (a, b)$, then $f$ is concave up ($f'$ increasing).

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

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Example:

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

\[ f'(x) < 0 \Rightarrow f \text{ dec} \]

\[ f'(x) < 0 \Rightarrow f \text{ conc up} \]

**Example**

\[ f(x) = e^{-x} \]

so \[ f'(x) = -e^{-x} < 0 \]

\[ f''(x) = e^{-x} > 0 \]
Sketch the graph of a function which satisfies the following:

- $f(2) = 1$
- $f'(x) < 0$ for $x < 2$
- $f'(x) > 0$ for $x > 2$
- $f''(x) < 0$ for all $x \neq 2$
On what interval(s) is $f$ increasing? $f' > 0$ (above x-axis)

The numbers appearing in your answers must be chosen from the following list:
-10.00, -6.04, -5.04, -3.96, -1.00, 3.04, 6.99, 10.00

Give the x-coordinate(s) of all inflection point(s) of $f$.

The numbers appearing in your answers must be chosen from the following list:
-10.00, -6.04, -5.04, -3.96, -1.00, 3.04, 6.99, 10.00