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 \textbf{increasing}.

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

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

If $f''(x) < 0$ for all $x \in (a, b)$, then $f$ is \textbf{concave down (}f'\text{ is decreasing)}.
Example:

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

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

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

\[ f(2) = 1 \]
\[ f'(x) < 0 \text{ for } x < 2 \]
\[ f'(x) > 0 \text{ for } x > 2 \]
\[ f''(x) < 0 \text{ for all } x \neq 2 \]
On what interval(s) is $f$ decreasing? $f'<0$

The numbers appearing in your answers must be chosen from the following list:
-10.00, -6.99, -3.26, .67, 2.95, 4.60, 6.04, 10.00

Interval: [-3.26, 4.60]

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

The numbers appearing in your answers must be chosen from the following list:
-10.00, -6.99, -3.26, .67, 2.95, 4.60, 6.04, 10.00