5.3-Derivatives and the Shapes of Curves

Mean Value Theorem:

**Recall 5.1:** What $f'$ and $f''$ say about $f$:

*Second Derivative Test:*

*Examples:*

Determine where the function $x^3 - 3x^2 + 4$ is increasing and decreasing, concave up, and concave down.
Find the horizontal and vertical asymptotes, intervals of direction, and intervals of concavity for 
\( f(x) = \ln |1 - x^2| \) and sketch the graph.

**On Your Own:** #1, 5, 7, 9, 13, 17, 19, 21, 35, 43, 45