Find the following for $f(x) = x^3 - 3x^2 + 33$ (if they exist; if they don't exist, state so). Use this information to graph f.

Note $f'(x) = 3x^2 - 6x$, $f''(x) = 6x - 6$, $f(-2) = 13$, $f(-3) = -21$

[1.5] 1a.) critical numbers: ____________________

[1.5] 1b.) local maximum(s) occur at $x =$ ____________________

[1.5] 1c.) local minimum(s) occur at $x =$ ____________________

[1.5] 1d.) The global maximum of f on the interval [0, 5] is ________ and occurs at $x =$ ______________

[1.5] 1e.) The global minimum of f on the interval [0, 5] is ________ and occurs at $x =$ ______________

[1.5] 1f.) Inflection point(s) occur at $x =$ ____________________

[1.5] 1g.) f increasing on the intervals ____________________

[1.5] 1h.) f decreasing on the intervals ____________________

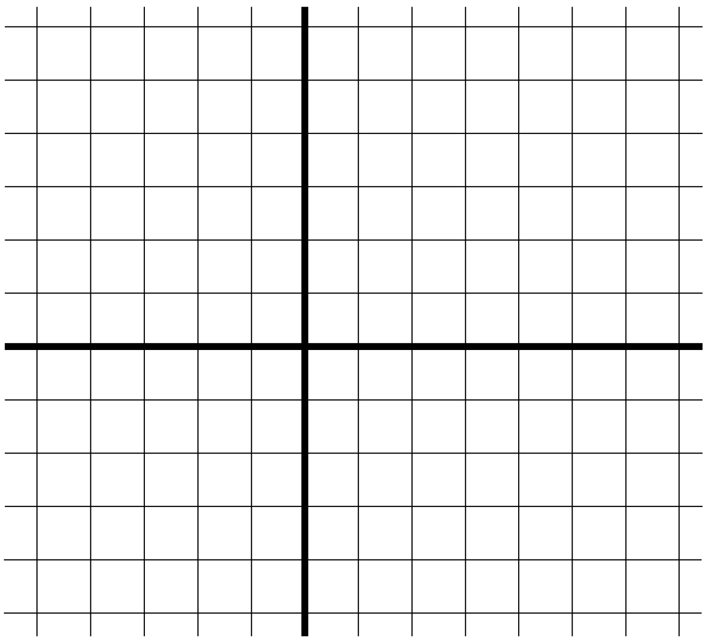
[1.5] 1i.) f is concave up on the intervals ____________________

[1.5] 1j.) f is concave down on the intervals____________________

[1.5] 1k.) Equation(s) of vertical asymptote(s)____________________

[4] 1l.) Equation(s) of horizontal and/or slant asymptote(s)____________________

[4.5] 1m.) Graph f



$f(x) = x^3 - 3x^2 + 33$

$f'(x) = 3x^2 - 6x = 3x(x-2) = 0$ or DNE, critical points: $x = 0, 2$

Check increasing/decreasing between critical points (f'(x) = 0, DNE) and singleton points not in domain (where function could change between increasing/decreasing).

$f''(x) = 6x - 6 = 0$ or DNE, so possible inflection point: $x = 1$

Check concave up/down between possible inflection points (f"(x) = 0, DNE) and singleton points not in domain (where function could change between concave up/down).