

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 $f'(x) = 3x^2 - 6x$, $f''(x) = 6x - 6$, $f(-1) = -1$, $f(3) = 3$

[1.5] 1a.) critical numbers: 0, 2

[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

[1.5] 1g.) f increasing on the intervals $(-\infty, 0) \cup (2, +\infty)$

[1.5] 1h.) f decreasing on the intervals $(0, 2)$

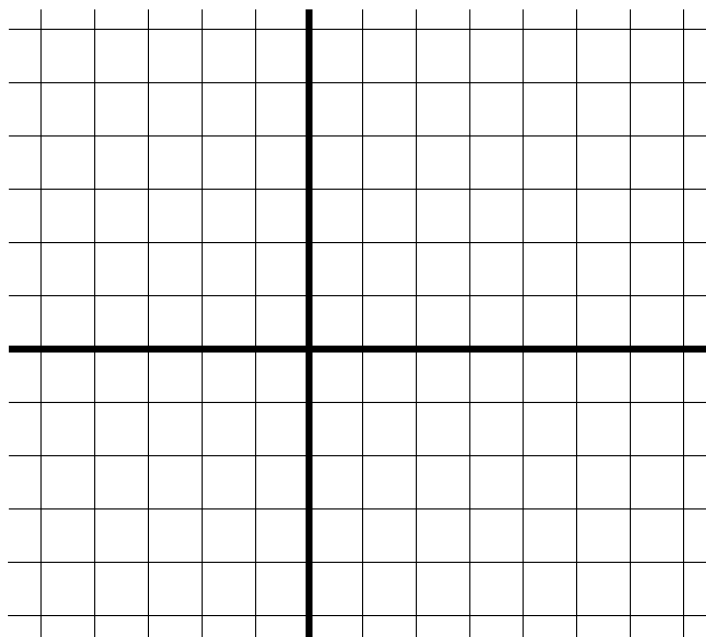
[1.5] 1i.) f is concave up on the intervals $(1, +\infty)$

[1.5] 1j.) f is concave down on the intervals $(-\infty, 1)$

[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



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

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

Check increasing/decreasing between critical points, points of discontinuity, and singleton points not in domain (where function could change between increasing/decreasing).

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

Check concave up/down between possible inflection points, points of discontinuity, and singleton points not in domain (where function could change between concave up/down).