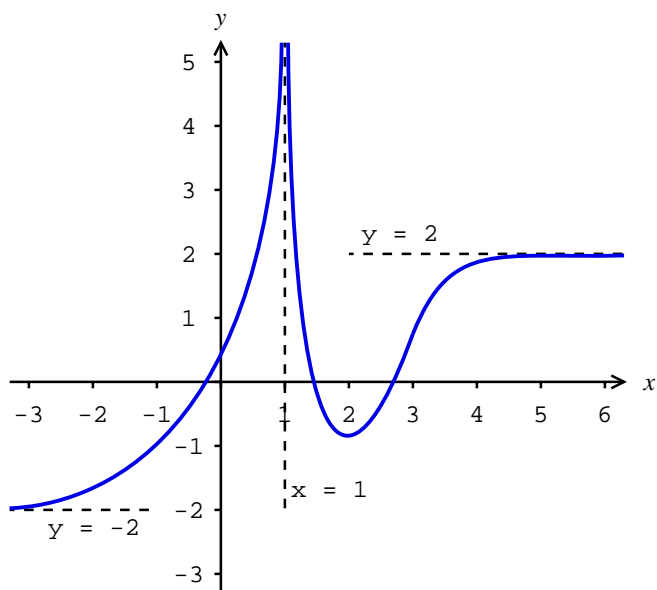


1 (10 pts). Sketch the graph of a function g satisfying all of the properties below.

- $\lim_{x \rightarrow -\infty} g(x) = -2$, $\lim_{x \rightarrow 1} g(x) = \infty$, and $\lim_{x \rightarrow \infty} g(x) = 2$.
- $g'(x) > 0$ if $x < 1$ or $2 < x$.
- $g'(x) < 0$ if $1 < x < 2$.
- $g''(x) > 0$ if $x < 1$ or $1 < x < 3$.
- $g''(x) < 0$ if $3 < x$.

Solution:

1. (Source: 4.3.27-31) The correct graph has to look pretty much like this:



The function $g(x)$ must have the three asymptotes labeled in the picture, a local min (of some value less than 2) at $x = 2$, and an inflection point at $x = 3$ (where $g'(x)$ has a local maximum).