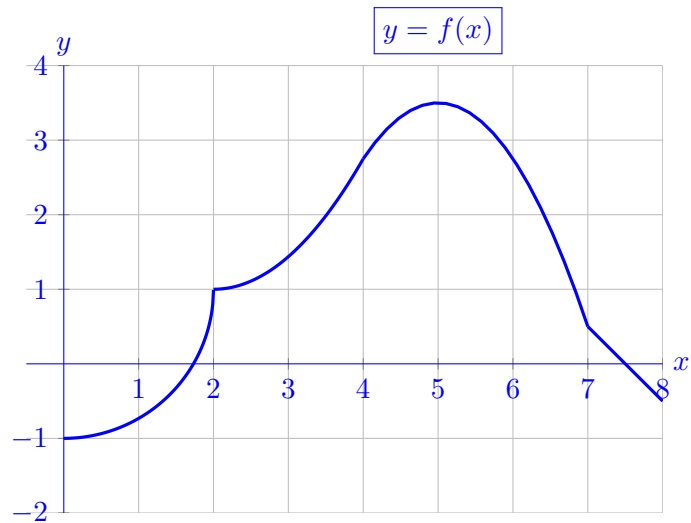


5. [9 points] In each of the following questions, draw a graph satisfying **all** the properties listed. There may be many correct answers. Make sure that your graph clearly shows all of the properties listed.

a. [5 points] The function $f(x)$ satisfies each of the following properties:

Solution:

- i) $f(x)$ is continuous on $(0, 8)$.
- ii) $f(x)$ has a local maximum at $x = 5$.
- iii) $f''(x) < 0$ on $(4, 7)$.
- iv) $\lim_{x \rightarrow 2^-} f'(x) = \infty$ and $\lim_{x \rightarrow 2^+} f'(x) = 0$



b. [4 points] The function $g(x)$ satisfies each of the following properties:

Solution:

- i) $g(x)$ is defined on $(0, 8)$.
- ii) $g(x)$ has an inflection point at $x = 3$.
- iii) $g(x)$ is discontinuous at $x = 6$.
- iv) $g(x)$ has a local maximum at $x = 6$.
- v) $g(x)$ has global maxima only at $x = 1$ and $x = 5$.

