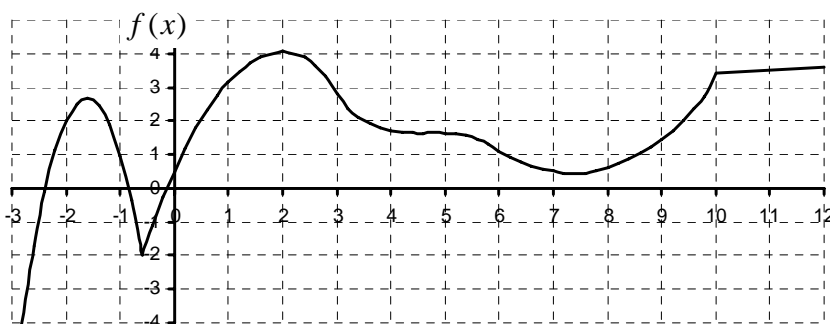


1. Use the graph of $f(x)$ shown below with domain $[-3,12]$ to find the following:



- Find the values of x where $f'(x) = 0$.
- Find the values of x where $f'(x)$ is undefined.
- Find the inflection points of $f(x)$.
- Find all the local maximums and minimums of $f(x)$.
- Find all the global maximums and minimums of $f(x)$.

2. Using the graph and your answers to the questions above, do the following:

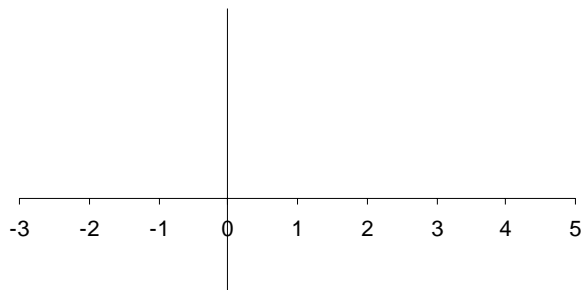
- Label all the critical points on a number line. Determine the sign of $f'(x)$ between each critical point. How does the information on this number line help you determine which critical points correspond to local maximums, minimums, or neither?
- Label all the points on a number line where $f''(x)$ is either zero or undefined. Determine the sign of $f''(x)$ between each marked point. How does the information on this number line help you determine which points correspond to inflection points?

3. In each case, sketch a graph of a continuous function with the given properties.

A. $f'(-1) = 0$ and $f'(3) = 0$

$$f'(x) \quad \begin{array}{c} \text{--} \quad | \quad \text{+} \quad | \quad \text{--} \\ \hline \quad \quad -1 \quad \quad \quad \quad 3 \quad \quad \end{array}$$

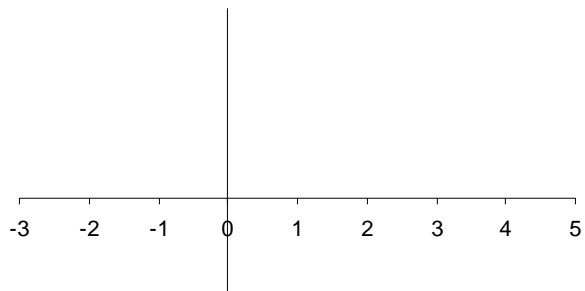
$$f''(x) \quad \begin{array}{c} \quad \quad \text{+} \quad \quad | \quad \quad \text{--} \\ \hline \quad \quad \quad \quad \quad \quad \quad \quad \quad 2 \quad \quad \end{array}$$



B. $g'(1) = 0$ and $g'(4)$ is undefined

$$g'(x) \quad \begin{array}{c} \text{+} \quad | \quad \text{--} \quad | \quad \text{--} \\ \hline \quad \quad 1 \quad \quad \quad \quad \quad \quad 4 \quad \quad \end{array}$$

$$g''(x) \quad \begin{array}{c} \quad \quad \text{--} \quad \quad | \quad \quad \text{+} \\ \hline \quad \quad \quad \quad \quad \quad \quad \quad \quad 4 \quad \quad \end{array}$$

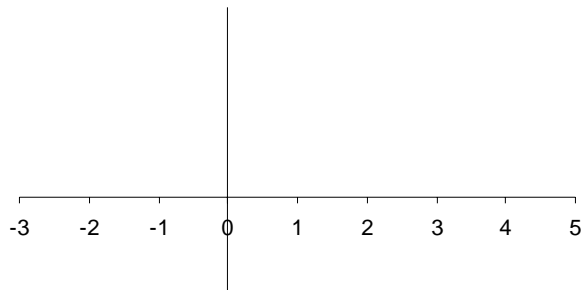


C. $h'(-2) = 0$ and $h'(2) = 0$

$h'(0)$ is undefined

$$h'(x) \quad \begin{array}{c} \text{+} \quad | \quad \text{--} \quad | \quad \text{+} \quad | \quad \text{--} \\ \hline \quad \quad -2 \quad \quad \quad \quad 0 \quad \quad \quad \quad 2 \quad \quad \end{array}$$

$$h''(x) \quad \begin{array}{c} \quad \quad \text{--} \quad \quad | \quad \quad \text{+} \\ \hline \quad \quad \quad \quad \quad \quad \quad \quad \quad 0 \quad \quad \end{array}$$



4. Use Calculus to determine i) critical points, ii) local extrema, iii) inflection points, and iv) intervals where $f(x)$ is concave up or down. Include an accurate graph that illustrates these features. Do this on a separate sheet of paper.

A. $f(x) = x^4 + 2x^3 - 1$

B. $f(x) = \frac{8x-16}{x^2}$

C. $f(x) = 2x + 3x^{2/3}$