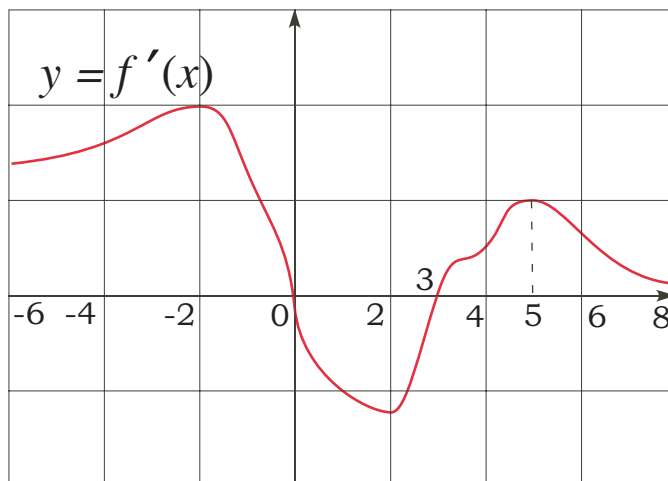


1. The graph of the **derivative** of $f(x)$ for $-6 \leq x \leq 8$ is given below. Answer the following questions:



- (a) For which values of x are there the critical points of $f(x)$ for $-6 \leq x \leq 8$?
- (b) Find the values of x for which $f(x)$ is **increasing** for $-6 \leq x \leq 8$.
- (c) Find the values of x for which $f(x)$ is **decreasing** for $-6 \leq x \leq 8$.
- (d) Find the value of x for which there is a point of inflection on the graph of $f(x)$ for $-6 \leq x \leq 8$?
- (e) Find the values of x for which the graph of $f(x)$ is **concave up** for $-6 \leq x \leq 8$.
- (f) Find the values of x for which the graph of $f(x)$ is **concave down** for $-6 \leq x \leq 8$.

2. Find the following limits

a. $\lim_{x \rightarrow 0^+} \frac{\sin x - x}{\cos(2x) - 1}.$

b. $\lim_{x \rightarrow 0^+} (1 + 3x)^{1/x}.$

3. The derivative $f'(x)$ of the function $f(x)$ is given below:

$$f'(x) = 3x\sqrt[3]{x-1}.$$

For the following questions you may assume that $f(x)$ is defined for $-\infty < x < \infty$.

- a. Find the critical points of $f(x)$.
- b. Determine the concavity of $f(x)$ for $-\infty < x < \infty$. Fill your answers in the blanks below.

Concave Up: _____ Concave Down: _____

- c. Find the value of x for which there is a point of inflection on the graph of $f(x)$?