Class prep quiz on section 4.5, Stewart's Calculus (8th ed.)

Suppose $f(x)$ is a differentiable function such that:

- $f(x) = 0$ for $x = -5, -3, 2$, and $f(x) > 0$ for $-5 < x < -3$ and $2 < x$; otherwise, $f(x) < 0$.
- $f'(x) = 0$ for $x = -4, -1, 1$, and $f'(x) > 0$ for $x < -4$, $-1 < x < 1$, and $1 < x$; otherwise, $f'(x) < 0$.
- $f''(x) = 0$ at $x = -2, 0, 1, 3$, and $f''(x) > 0$ for $-2 < x < 0$ and $1 < x < 3$; otherwise, $f''(x) < 0$.

That is enough information for you to make a good qualitative sketch of the graph of $f(x)$, which is probably the most efficient way to answer the questions below.

1. For which values of x is f **increasing**?
   (a) $-1 \leq x$ (b) $-1 \leq x \leq 1$
   (c) $x \leq -4$, $-1 \leq x \leq 1$ (d) $x \leq -4$, $-1 \leq x$
2. At which values of x does $f(x)$ have an **inflection point**?
   (a) $x = -4, -2, -1, 0, 1, 2$ (b) $x = -2, 0, 1, 3$
   (c) $x = -5, -3, -2$ (d) $x = -4, -1, 1$
3. At which value(s) of x does f have a **local minimum**?
   (a) $x = -4$ (b) $x = -4, 1$ (c) $x = -1$ (d) $x = -1, 1$
4. Which of the following is a possibility for the values of $\lim_{x \to +\infty} f(x)$ and $\lim_{x \to -\infty} f(x)$?
   (a) $\lim_{x \to +\infty} f(x) = -10$, $\lim_{x \to -\infty} f(x) = -20$
   (b) $\lim_{x \to +\infty} f(x) = -10$, $\lim_{x \to -\infty} f(x) = -\infty$
   (c) $\lim_{x \to +\infty} f(x) = +300$, $\lim_{x \to -\infty} f(x) = -20$
   (d) $\lim_{x \to +\infty} f(x) = +300$, $\lim_{x \to -\infty} f(x) = -\infty$