Question 1. [4 marks]

(a) [2 marks] Suppose that \( f(10) = 0 \) and \( f'(x) \geq \frac{3}{4}, \) for all values of \( x. \) How small can \( f(12) \) possibly be?

(b) [2 marks] Show that

\[
|\sin(2a) - \sin(2b)| \leq 2|a - b|,
\]

for all real numbers \( a \) and \( b. \)
Question 2. [4 marks]

(a) [2 marks] Find the relative extrema of \( f(x) = 5x^5 - 3x^3 \).

(b) [2 marks] Find the intervals of concavity and the inflection points for \( f(x) = 1 + \frac{1}{x} - \frac{1}{x^2} \).