

7. [10 points] Suppose $f(x)$ is a continuous function defined for all real numbers whose derivative and second derivative are given by

$$f'(x) = \arctan\left(\frac{(2x-3)^2}{(x+1)^3}\right) \quad \text{and} \quad f''(x) = \frac{(x+1)^3(2x-3)(13-2x)}{(x+1)[(x+1)^6 + (2x-3)^4]}.$$

- a. [5 points] Find all critical points of $f(x)$ and all values of x at which $f(x)$ has a local extremum. Use calculus to find and justify your answers, and be sure to show enough evidence to demonstrate that you have found all local extrema. For each answer blank below, write NONE if appropriate.

Answer: Critical point(s) at $x =$ _____

Local max(es) at $x =$ _____ Local min(s) at $x =$ _____

- b. [5 points] Find the x -coordinates of all inflection points of $f(x)$. If there are none, write NONE. Use calculus to find and justify your answers, and be sure to show enough evidence to demonstrate that you have found all inflection points.

Answer: Inflection point(s) at $x =$ _____