5. [12 points] A continuous function $h(x)$, its derivative $h'(x)$, and its second derivative $h''(x)$ are given by

$$h(x) = \frac{x}{x^2+1}, \qquad h'(x) = \frac{1-x^2}{(x^2+1)^2}, \qquad \text{and} \qquad h''(x) = \frac{2x(x^2-3)}{(x^2+1)^3}.$$

Note that the critical points of $h(x)$ are ± 1, and the critical points of $h'(x)$ are 0 and $\pm\sqrt{3}$.

For each part below, you must use calculus to find and justify your answers. Be sure your conclusions are clearly stated and that you show enough evidence to support them.

a. [4 points] Find the x-coordinates of all global minima and global maxima of $h(x)$ **on the interval** $[0, 2]$. If there are none of a particular type, write NONE.

Answer: Global min(s) at $x =$ __________ and Global max(es) at $x =$ __________

b. [4 points] Find the x-coordinates of all global minima and global maxima of $h(x)$ on the interval $(-\infty, \infty)$. If there are none of a particular type, write NONE.

Answer: Global min(s) at $x =$ __________ and Global max(es) at $x =$ __________

c. [4 points] Find the x-coordinates of all inflection points of $h(x)$ on the interval $(-\infty, \infty)$.

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