5. [15 points] Suppose $g(x)$ is a differentiable function defined for all real numbers x. The derivative and second derivative of $g(x)$ are given by

$$g'(x) = x^2(x+4)(x+2)^{1/3} \qquad \text{and} \qquad g''(x) = \frac{2x(x+3)(5x+8)}{3(x+2)^{2/3}}.$$

a. [2 points] Find the x-coordinates of all critical points of $g(x)$.
If there are none, write "NONE".

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

b. [2 points] Find the x-coordinates of all critical points of $g'(x)$.
If there are none, write "NONE".

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

c. [6 points] Find the x-coordinates of all local maxima and local minima of $g(x)$.
If there are none of a particular type, write "NONE". Use calculus to find and justify your answers, and be sure to show enough evidence to demonstrate that you have found all local extrema.

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

d. [5 points] Find the x-coordinates of all inflection points of $g(x)$.
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 $x =$ _____