7. [14 points] For positive $A$ and $B$, the force between two atoms is a function of the distance, $r$, between them:

$$f(r) = -\frac{A}{r^2} + \frac{B}{r^3} \quad r > 0.$$ 

a. [2 points] Find the zeroes of $f$ (in terms of $A$ and $B$).

b. [7 points] Find the coordinates of the critical points and inflection points of $f$ in terms of $A$ and $B$.

c. [5 points] If $f$ has a local minimum at $(1, -2)$ find the values of $A$ and $B$. Using your values for $A$ and $B$, justify that $(1, -2)$ is a local minimum.