1. If the position in meters of a body moving along s-axis is \( s = t^3 - 12t^2 + 45t \) in the time interval \([0, 10]\), then find the time interval(s) where the particle is moving forward.

2. Find \( \frac{d^{999}}{dx^{999}} \sin x \)

3. Find the points on the curve \( y = \frac{(x + 1)(3x - 1)}{x - 2} \) where the tangent line is horizontal. 
   (Just find the x-coordinate)
4. For what values of $a$ and $b$ is

\[ f(x) = \begin{cases} 
  x^2 + ax + b & x < 0 \\
  2 \cos x + \tan x & x \geq 0
\end{cases} \]

differentiable everywhere.

5. Find \( \lim_{x \to \pi/6} \frac{\cot x - \sqrt{3}}{x - \pi/6} \)