Q1) Find length of the curve given by \( r(t) = \frac{1}{3} t^3 \hat{i} + t^2 \hat{j} + 2t \hat{k} \); \( 0 \leq t \leq 2 \)

Q2) If \( f(x, y, z) = x^2 + 3y^2 - z^2 \) then find directional derivative of \( f(x, y, z) \) at \((3, 1, 2)\) in the direction of vector \( \hat{i} - \hat{j} + \hat{k} \).