#1. Find the absolute maximum and absolute minimum of $f(x) = x^3 - 3x^2 + 3x - 1$; *on* $[0,1]$

#2. Find the absolute maximum and absolute minimum of $f(x) = x^{\frac{4}{3}} + 4x^{\frac{1}{3}}$; *on* $[-1,1]$

#3. Suppose that x and y are both functions of t and are related by the equation $x^2 + y^2 = 8$.

Calculate $\dfrac{dx}{dt}$ if: $x = 2$, $y = 2$, $\dfrac{dy}{dt} = 3$

#4. A person is standing on a pier and pulling a boar inward by pulling a rope at the rate of 4 meters per second. The end of the rope is 3 meters above the water level. How fast is the boat approaching the base of the pier when 5 meters of rope are left to pull in? (Disregard sagging of the rope and assume the rope is attached to the boat at water level).