Remember:

(1) Explain your answers and show all working. Points will be deducted for lack of explanation or lack of working.
(2) Give exact answers, not decimal approximations.

1. A chain 50 ft long weighing 2 lb/foot hangs over a cliff with one end $A$ anchored to the cliff. A cannonball of weight 20 lb is attached to the lower end $B$. A nylon line of negligible weight is attached to the point $P$ on the chain 10 ft above the cannonball. The nylon line is then hauled in to bring point $P$ to the top of the cliff, so that the section of chain between $A$ and $P$ hangs doubled up below the cliff edge, and the section between $P$ and $B$ hangs down from the cliff edge. How much work is done while hauling in the nylon line?

2. A function $f(x)$ is defined implicitly by the equation

\[ f(x)^3 + x^3 f(x) = 51. \]

(a) Find an explicit expression for $f^{-1}(x)$ in terms of $x$.
(b) Find $(f^{-1})'(x)$, and use it to find the tangent line to the graph of $y = f(x)$ at $x = 2$. 