1. (10 pts.) What is the minimum value of the expression $x^3 + y$ if $x + y = 4$ and $x \geq 0$? Justify your answer. (Your final answer should be exact, rather than a decimal approximation. For instance, if the final answer is $\pi$, then writing 3.14 is not exact.)

2. (10 pts.) Evaluate $\lim_{x \to 0} \frac{-1 + \cos x}{x^2}$. If you use l’Hôpital’s rule, mention it and justify your usage.