Math 1190 Quiz #8

**Problem 1:** Divide the numbers 1, 2, 3, 4, and 5 into two arbitrarily chosen sets. Prove that one set contains two numbers and their difference.

**Problem 2:** Determine the value of
\[
(1 - \sqrt{1 + \frac{1}{27}})^{1/3} + \left(1 + \sqrt{1 + \frac{1}{27}}\right)^{1/3}.
\]

**Problem 3:** For \(x \neq 0\), define \(f(x) = x^8 - x^5 - \frac{1}{x} + \frac{1}{x^4}\). Show that \(f(x) \geq 0\).
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Problem 3: For $x \neq 0$, define $f(x) = x^8 - x^5 - \frac{1}{x} + \frac{1}{x^4}$. Show that $f(x) \geq 0$. 