Problem 1. Compute $\int_0^2 \frac{x^3 dx}{6x^2 - 12x + 8}$. Hint: what is $(x-2)^3$?

Problem 2. Two rivers run parallel 2 miles appart. Two cities A and B lie between the rivers; each city is equidistant from the rivers and the cities are 3 miles appart. A scientist wishes to travel from A to B, collecting a sample of water from each river during his journey. What is the length of the shortest path he can follow. Justify your answer.

Problem 3. A square is build on each side of a parallelogram (outside). Prove that the centers of these four squares form a square.

Problem 4. Prove that $1^{2007} + 2^{2007} + \ldots + n^{2007}$ is divisible by n iff n is odd or $4|n$.