PUTNAM EXAM SEMINAR
FALL 2010

QUIZ 1
SEPTEMBER 1

Problem 1. Evaluate the infinite product

$$\prod_{n=2}^{\infty} \frac{n^3+1}{n^3-1}.$$

Problem 2. A function f is defined for all positive integers and satisfies

$$f(1) = 2010$$

and

$$f(1) + f(2) + \cdots + f(n) = n^2 f(n).$$

Compute the exact value of $f(2010)$.

Problem 3. Show that every positive integer can be written as the sum of integers of the form $2^s 3^t$ such that no summand divides another.