



PUTNAM EXAM SEMINAR  
FALL 2012

ASSIGNMENT 10  
DUE NOVEMBER 7

**Exercise 1.** Let  $A$  be a positive real number. What are the possible values of  $\sum_{j=0}^{\infty} x_j^2$ , given that  $x_0, x_1, \dots$  are positive numbers for which  $\sum_{j=0}^{\infty} x_j = A$ ? [Putnam 2000, A1]

**Exercise 2.** Evaluate

$$\int_0^{\infty} \left( x - \frac{x^3}{2} + \frac{x^5}{2 \cdot 4} - \frac{x^7}{2 \cdot 4 \cdot 6} + \dots \right) \left( 1 + \frac{x^2}{2^2} + \frac{x^4}{2^2 \cdot 4^2} + \frac{x^6}{2^2 \cdot 4^2 \cdot 6^2} + \dots \right) dx.$$

[Putnam 1997, A3]