

Problem 7: Maximize a Function

Let $f(x) = e^{-Ax^2/2}$ where $A > 0$. Let a_1, a_2, \dots, a_n be n real numbers and define

$$F(x) = f(x - a_1)f(x - a_2) \cdots f(x - a_n)$$

Show that $F(x)$ attains its maximum at $x = \frac{1}{n}(a_1 + a_2 + \cdots + a_n)$, the average of the set of numbers a_1, \dots, a_n . Be sure to fully justify your answer.

As always, show your work, fully explain and justify your answer. A solution mainly obtained by computers or calculators will not be accepted.

Posting Date 4/3/2021. Submit solutions to Noah Aydin, Mathematics Department, RBH 319 by e-mail or hard-copy by 5 pm on April 16, 2021. An email submission must be a single pdf file. Hard copy submissions must be dropped in the file holder at my office door (Hayes 319) and must include a time stamp.