Consider a Bayesian linear basis function model for the response associated with a single input, \( x \), in which the basis functions are \( \phi_0(x) = 1 \) and \( \phi_j(x) = \gamma \exp(- (x - \mu_j)^2 / (2s^2)) \), for \( j = 1, 2, 3, \ldots \).

Let the prior for \( \beta_0 \) be \( N(0, \omega_0^2) \), and let the prior for all the \( \beta_j \) for \( j = 1, \ldots, M - 1 \) be \( N(0, \omega_j^2) \). (All these \( \beta_j \) are independent in the prior.)

Suppose that for a particular \( M \), we independently draw \( \mu_j \) for \( j = 1, \ldots, M - 1 \) from the uniform distribution on the interval \((-\sqrt{M}/2, \sqrt{M}/2)\), and that we set all \( \omega_j^2 \) for \( j > 0 \) to \( 1/\sqrt{M} \).

Find the limit of the covariance function that this setup defines as \( M \) goes to infinity. In other words, the limit, for any \( x \) and \( x' \), of

\[
K(x, x') = \sum_{j=0}^{M-1} \omega_j^2 \phi_j(x) \phi_j(x')
\]