$k(x, x') = ck_1(x, x')$ where $c > 0$

Let Gram maxtrix with $k_1(x, x')$ be K_1, which is positive semi-definite,

Gram matrix with $k(x, x')$ be K.

$k(x, x') = ck_1(x, x')$ can be represented as $K = cK_1$

since K_1 is positive semi-definite, for any nonzero vector $u, u^T K_1 u \geq 0$

$c > 0 \rightarrow u^T c K_1 u \geq 0 \rightarrow u^T K u \geq 0$

Thus, $k(x, x') = ck_1(x, x')$ is a valid kernel.