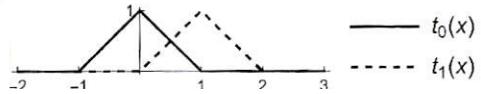


Name: _____

COL7(6)83 Quiz 6 Entry no.: _____

23 September, 2025

1. Consider the tent functions, $t_i(x) = \max(1 - |x - i|, 0)$, and let $S = \{t_0, t_1, t_2\}$. (i) Are the functions in S linearly independent? (ii) Are they orthogonal? Justify your answer in both cases.



2. Recall that the discrete cosine transform uses basis functions $s_u(x) = \alpha_u \cos(\pi u(x + \frac{1}{2})/N)$, where $\alpha_u = \sqrt{1/N}$ if $u = 0$ and $\sqrt{2/N}$ otherwise. Sketch $s_0(x)$ and $s_1(x)$, and explain informally why a different factor is used for $u = 0$.