

**MATH 4280 – Hurley – homework problem February 6, 2008**

1. Let  $S = \{s_1, s_2\}$  have probabilities  $p_1 \geq p_2$ , and let  $C^2$  be an optimal binary encoding of  $S^2 = \{s_1s_1, s_1s_2, s_2s_1, s_2s_2\}$ .
  - (a) Find a constant  $k$  such that  $L(C^2) = 2$  if and only if  $p_1 \leq k$ . Prove your answer.
  - (b) Find a formula for  $L(C^2)$  when  $p_1 > k$ .