

# TMATH 342: WrittenHW 2

Read Giusti's "Thinking Topologically" pages 17-22 and then do:

1. Let  $X = \{x_1, x_2, x_3, x_4, x_5, x_6\}$  and  
 $\tau_X = \{X, \{x_1\}, \{x_1, x_2\}, \{x_1, x_2, x_3\}, \{x_1, x_2, x_3, x_4\}, \{x_1, x_2, x_3, x_4, x_5\}, \{x_1, x_2, x_3, x_4, x_5, x_6\}, \emptyset\}$ .  
Let  $f : X \rightarrow X$  be defined so that  $f(x_i) = x_i$  if  $i \in \{1, 2, 3\}$  otherwise  $f(x_i) = x_3$ .
  - (a) [4] Verify  $X$  and  $\tau_X$  is a topology.
  - (b) [3] Find  $f^{-1}(\{x_1, x_2\})$ .
  - (c) [3] Determine if  $f$  is continuous on  $X$  with  $\tau_X$ . Justify your answer.

Note, in this class, it is more important to communicate clearly, than it is to be correct!  
Make sure that you edit your work (and your peers!!) so that your completed homework is easily understood!