Worksheet # 6

MATH 294 ESP Workshop

Spring 2016

Problem 1.
  (1) Negate the statement:
    There is a real number x so that $|x + 3| \leq 1$ and $|x - 4| \leq 2$.
  (2) Write the contrapositive of the statement:
    If the sky is blue then $2 + 2 = 4$.
Which of the statements are true and which are false?

Problem 2. You are shown a set of four cards placed on a table, each of which has a number on one side and a color on the other. The visible faces of the cards show 3, 8, red, and brown. Which card(s) must you turn over in order to test the truth of the following proposition?

  Proposition: *If a card shows an even number on one face, then its opposite face is red.*

Problem 3. Let X be a set. For $A, B \subset X$ let
$$A \Delta B = (A \setminus B) \cup (B \setminus A).$$

  (1) Draw a Venn diagram with universal set X and subsets A and B. Shade in the region that represents $A \Delta B$.
  (2) Show there exists $I \subset X$ so that for every $A \subset X$, $A \Delta I = A = I \Delta A$.
  (3) Show for every $C \subset X$ there exists $C' \subset X$ so that $C \Delta C' = I = C' \Delta C$ for the I you found in the previous part.