

You learn a lot talking math with others. Thus you are **strongly** encouraged to work in groups (up to size 17) on homework. A group is to come to an agreement of the finished paper. Over Blackboard, ONE group member (e.g., Bella) should submit the finished paper while each of the other group members (as so that I can return a commented graded paper to you) should just pull up the assignment on Blackboard and write a note in the white **Comment** box that, e.g., Bella submitted my paper.

Metric Space Exercise 5. Variant of 2.1.45.13 (p. 92).

See the (2 pages, updated, 2 due to questions in class) handout on Metric Spaces Basic Definitions.

In problems 5a-5d, you may use anything on this handout, from class lectures, and the book.

Metric Space Exercise 5a. Show that for all subsets A and B of a metric space X ,

$$A^\circ \cap B^\circ = (A \cap B)^\circ.$$

Metric Space Exercise 5b. Show that for all subsets A and B of a metric space X ,

$$\overline{A \cup B} = \overline{A} \cup \overline{B}.$$

Metric Space Exercise 5c. Show by means of an example that, in general,

$$A^\circ \cup B^\circ \neq (A \cup B)^\circ.$$

Metric Space Exercise 5d. Show by means of an example that, in general,

$$\overline{A \cap B} = \overline{A} \cap \overline{B}.$$

Metric Space Exercise 5e. Let S be a subset of a metric space X . Show that

$$(S^\circ)^c = \overline{S^c}.$$

From Metric Spaces Basic Definitions, you may use anything up to, and including, (6i) on page 2.

You may not use (7i) on page 2.