Exercise 8.10

Introduction to Discrete Mathematics
MATH 2001

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ABSTRACT. This is Exercise 8.10 from Hammack [Ham13, Ch. 8]:

Exercise 8.10. If A and B are subsets of a set X, then $(A \cap B)^C = A^C \cap B^C$.

Solution. We have that for an element $x \in X$,

$$\begin{aligned} x \in (A \cap B)^C &\iff x \notin (A \cap B) \\ &\iff x \text{ is not in both } A \text{ and } B \\ &\iff x \notin A \text{ or } x \notin B \\ &\iff x \in (A^C \cup B^C) \end{aligned}$$

Therefore, the elements of $(A \cap B)^C$ are the same as the elements of $A^C \cup B^C$, and so the sets are equal. □

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REFERENCES

[Ham13] Richard Hammack, *Book of proof*, Creative Commons, 2013.

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