

HW 1 — Due: Aug 26, 9:19 AM (in tutorial session)

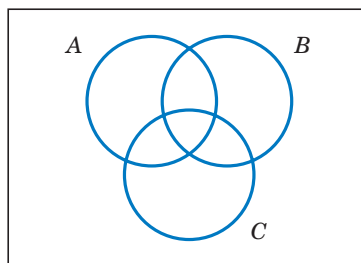
Lecturer: Prapun Suksompong, Ph.D.

Instructions

- (a) ONE part of a question will be graded (5 pt). Of course, you do not know which part will be selected; so you should work on all of them.
- (b) It is important that you try to solve all problems. (5 pt)
The extra questions at the end are optional.
- (c) Late submission will be heavily penalized.

Problem 1. (Set Theory)

- (a) Three events are shown on the Venn diagram in the following figure:



Reproduce the figure and shade the region that corresponds to each of the following events.

- (i) A^c
- (ii) $A \cap B$
- (iii) $(A \cap B) \cup C$
- (iv) $(B \cup C)^c$
- (v) $(A \cap B)^c \cup C$

[Montgomery and Runger, 2010, Q2-19]

- (b) Let $\Omega = \{0, 1, 2, 3, 4, 5, 6, 7\}$, and put $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 6\}$, and $C = \{5, 6\}$. Find $A \cup B$, $A \cap B$, $A \cap C$, A^c , and $B \setminus A$.

For this problem, only answers are needed; you don't have to describe your solution.

Problem 2. For this problem, only answers are needed; you don't have to provide explanation.

For each of the sets provided in the first column of the table below, indicate (by putting a Y(es) or an N(o) in the appropriate cells of the table) whether it is “finite”, “infinite”, “countable”, “countably infinite”, “uncountable”.

Sets	Finite	Infinite	Countable	Countably Infinite	Uncountable
$\{1\}$					
$\{1, 2\}$					
$[1, 2]$					
$[1, 2] \cup [-1, 0]$					
$\{1, 2, 3, 4\}$					
the power set of $\{1, 2, 3, 4\}$					
the set of all real numbers					
the set of all real-valued x satisfying $\cos x = 0$					
the set of all integers					
$(-\infty, 0]$					
$(-\infty, 0] \cap [0, +\infty)$					