

Due September 15, 2023 (in class).

Problem 1:

Consider the sample space,

$$S = \{copper, sodium, nitrogen, potassium, uranium, oxygen, zinc\}$$

Now, define the following events:

$$A = \{copper, sodium, zinc\}$$

$$B = \{sodium, nitrogen, potassium\}$$

$$C = \{oxygen\}$$

List the elements of the sets corresponding to the following events:

- (a) \bar{A}
- (b) $A \cup C$
- (c) $(A \cap \bar{B}) \cup \bar{C}$
- (d) $\bar{B} \cap \bar{C}$
- (e) $A \cap B \cap C$
- (f) $(\bar{A} \cup \bar{B}) \cap (\bar{A} \cap C)$

Problem 2:

Suppose that a family is leaving on a summer vacation in their camper and that A is the event that they will experience mechanical problems, B is the event that they will receive a ticket for committing a traffic violation, and C is the event that they will arrive at a campsite with no vacancies. Referring to the Venn diagram below, list the numbers of the regions that represent the following events:

- (a) The family will experience no mechanical problems and will not receive a ticket for a traffic violation but will arrive at a campsite with no vacancies.
- (b) The family will experience both mechanical problems and trouble in locating a campsite with a vacancy but will not receive a ticket for a traffic violation.
- (c) The family will either have mechanical trouble or arrive at a campsite with no vacancies but will not receive a ticket for a traffic violation.
- (d) The family will not arrive at a campsite with no vacancies.

