BRONX COMMUNITY COLLEGE

of The City University of New York

DEPARTMENT OF MATHEMATICS and COMPUTER SCIENCE

CSI 30

Chapters 2 and 3 Review

1. List the members of the following set.

   $\{x | x$ `is an integer such that` $x^2 < 25\}$

2. For sets $A = \{1, 3, 5, 7, 9\}$, $B = \{1, 2, 3, 5\}$, and $C = \{1, 3, 5, 7, 9, 11\}$, determine which of the following statements are true or false.

   a) $A \subseteq B$

   b) $A \subseteq C$

   c) $B \subseteq C$

3. Determine whether the following statements are true or false.

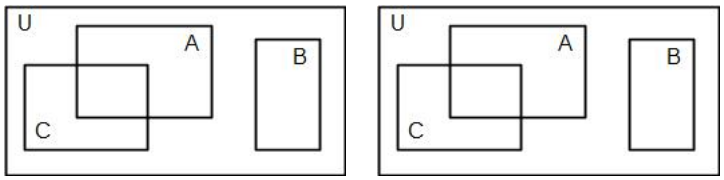
   a) $3 \in \{\emptyset, 3, \{3\}\}$

   b) $\{3, 1\} \subseteq \{1, \{2\}, \{3\}, \{1, 3\}\}$

4. Let universe set $U = \{1, 2, 3, 4, 5, 6, 7\}$, and sets $A = \{1, 2\}$, $B = \{2, 3, 4\}$, $C = \{4, 5, 6, 7\}$. Find

   - $A \times C$
   - $A \bigcap B \bigcap C$
   - $|C|$
   - $\overline{B}$
   - $A - B$
   - $(A \bigcup C) \bigcap B$

5. For the given sets (see the Venn Diagramm) show on the Diagramm



a) $A \bigcap C \bigcap \overline{B}$ **b)** $\overline{A \bigcup B} \bigcap C$

6. Use set identities to prove the following identity:
   $\overline{A \cup \overline{B}} = \overline{A} \cap B$

7. Determine whether the function $f(x) = x^5 + 1$, where $f(x) : Z \to Z$ is
   a) one-to-one?
   b) onto?
   c) bijection?

8. Determine the domain, the codomain/target, and the range of the function $f(x) = x^2 + 3$

9. Find $f \circ g$ and $g \circ f$, where $f(x) = 2x$ and $g(x) = 3x + 5$, are functions from $\mathbf{R}$ to $\mathbf{R}$.

10. Is function $g(x) = x^3 - 4$ invertible? If yes, explain why and find its inverse function. If no, provide explanations also.