

QUIZ 2

(Math 258)

1. Let $A = \{1, 2, 3, 4, 5\}$ and $B = \{0, 3, 6\}$. Find: (5 pts)

(a) $A \cup B$

Answer: $\{0, 1, 2, 3, 4, 5, 6\}$

(b) $A \cap B$

Answer: $\{3\}$

(c) $A - B$

Answer: $\{1, 2, 3, 5\}$

(d) $B - A$

Answer: $\{0, 6\}$

(e) $P(A \cap B)$

Answer: $\{\emptyset, \{3\}\}$

2. Show that for any set A , we have $\overline{\overline{A}} = A$. (3 pts)

Answer:

$$\begin{aligned}\overline{\overline{A}} &= \{x \mid \neg x \notin \overline{A}\} \\ &= \{x \mid \neg \neg x \in A\} \\ &= \{x \mid x \in A\} \\ &= A\end{aligned}$$

3. Show that for any set A , we have $0 - A = 0$. (4 pts)

Answer: $0 - A = \{x \mid x \in 0 \wedge x \notin \overline{A}\}$
 $= 0.$

4. Show that for any sets A and B , we have $A - B = A \cap \bar{B}$. (4pts)

Answer: $A - B = \{x \mid x \in A \wedge x \text{ (not) } \in B\}$
 $= A \cap \bar{B}$

5. The successor of a set A is the set $A \cup \{A\}$. Find the successors of the following sets: (4 pts)

(a) $\{\emptyset\}$

(b) $\{\emptyset, \{\emptyset\}\}$

How many elements does the successor of a set with n elements have?

Answer:

(a) $\{\emptyset, \{\emptyset\}\}$

(b) $\{\emptyset, \{\emptyset\}, \{\emptyset, \{\emptyset\}\}\}$.

$n + 1$.