

TEST 2

(Math 258 B)

1. (i) Let $A = \{s, p, q, r\}$ and $B = \{a, p, b, c, r, e\}$. Find: (40 pts)

(a) $A \cup B$

(b) $A \cap B$

(c) $A - B$

(d) $B - A$

(ii) Let $A = \{a, b, c\}$ and $B = \{1, 2\}$. Find:

(a) $P(A)$

(b) $A \times B$

(iii) Let $A = \{\emptyset, \{\emptyset\}\}$. Find:

(a) $P(A)$

(b) $P(P(A))$

2. Determine which of the following sets is the power set of a set. For the ones that are power sets, write down the set. (10 pts)

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

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

3. Show that if $A \subseteq B$, then $A \cup B = B$. (10 pts)

4. Show that if $A \subseteq B$, then $\mathcal{P}(A) \subseteq \mathcal{P}(B)$. (10 pts)

5. Show that for any sets A and B , we have $A - B = A \cap \overline{B}$. (10 pts)

6. The **symmetric difference** of two sets A and B , denoted by $A \oplus B$, is the set containing those elements that belong to either A or B , but not in both. Answer the following: (20 pts)

(a) Show that $A \oplus \emptyset = A$ (b) If $A \oplus B = A$, what can you say about B ? Explain.