1. $A \cup B = B \cup A$ Commutative Rule

2. $(A \cup B) \cup C = A \cup (B \cup C)$ Associative Rule

3. $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ Distributive Rule

4. $(A^c)^c = A$ Complement of a Complement Rule

5. $(A \cap B)^c = A^c \cup B^c$ DeMorgan's Rule

6. $A \cap A^c = \emptyset$ where $\emptyset$ denotes the null set

7. $A \cap S = A$

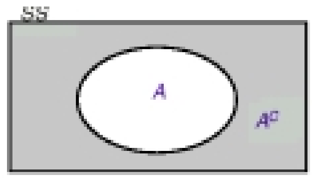

FIGURE 2.10 Venn diagram depiction of the region corresponding to the complement of event A, A^c whose area can be thought of as a representation of $P(A^c)$.

Complement Probability Rule
$P(A^c) = 1 - P(A)$

Verification

We can write SS as $SS = A \cup A^c$ by the definition of the complement of an event. From the probability axiom 2, $P(SS) = 1$ and so $P(SS) = P(A \cup A^c) = 1$. Finally, by definition A and A^c are mutually exclusive so by axiom 3 we can write $P(A \cup A^c) = P(A) + P(A^c) = 1$. Solving this for $P(A^c)$

$$P(A^c) = 1 - P(A)$$

which is the desired result.