

Solution of HW # 1

1. $B \cup C = \{0 \leq x < \infty\}$; $B \cap C = \emptyset$; $A \cup C = \{0 \leq x \leq 20\}$
 $A \cap C = \{3 \leq x \leq 18\}$ $\overline{A \cap B} = \{\text{all real numbers}\}$

2. a- $P[A \cap B] = P[B] - P[B \cap \overline{A}]$
 $= 0.97 - 0.06 = 0.91$



b- $P[A \cup B] = P[A] + P[B] - P[A \cap B]$
 $= 0.92 + 0.97 - 0.91 = 0.98$

3. a- $P[\overline{A} \cap B] = P[B] - P[A \cap B]$
 $= 0.7 - 0.5 = 0.2$

$P[A \cap \overline{B}] = P[A] - P[A \cap B]$
 $= 0.6 - 0.5 = 0.1$

$P[\overline{A} \cap \overline{B}] = 1 - P[A \cup B]$
 $= 1 - \{P[A] + P[B] - P[A \cap B]\}$
 $= 1 - \{0.6 + 0.7 - 0.5\} = 1 - 0.8 = 0.2$

b- $P[A \cup B] = 0.8$

$P[\overline{A} \cup B] = 1 - P[A \cap \overline{B}] = 1 - 0.1 = 0.9$

$P[A \cup \overline{B}] = 1 - P[B \cap \overline{A}] = 1 - 0.2 = 0.8$

$P[\overline{A} \cup \overline{B}] = 1 - P[A \cap B] = 1 - 0.5 = 0.5$

4. $P[A] = 0.4$, $P[B] = 0.5$, $P[C] = 0.3$

$P[A \cap B] = 0.2$ $P[A \cup B] = 0.7$ $P[A \cap C] = 0$

$P[A \cup C] = 0.7$, $P[B \cap C] = 0.2$

$P[B \cup C] = 0.6$