Stat 330
Homework 1

Sean Gordon

January 20, 2020

---

1)

(a) $\Omega = \{$T T T, T T H, T H T, T H H,
H T T, H T H, H H T, H H H$\}$

(b) A = {T T H, T H T, H T T}
B = {T T H, T H T, H T T, T T T}
C = {T H H, H H H}

(c) $\overline{A}$ = {T T T, T H H, H T H, H H T, H H H}
A ∪ B = {T T H, T H T, H T T, T T T}
A ∩ B = {T T H, T H T, H T T}
A ∩ C = { }

---

2)

A = {1, 3, 5}
B = {1, 5, 10}
$\overline{A}$ = {2, 4, 6, 7, 8, 9, 10}
$\overline{B}$ = {2, 3, 4, 6, 7, 8, 9}

(a) A ∩ B = {1, 5}
$\overline{A \cap B}$ = {2, 3, 4, 6, 7, 8, 9, 10}
$\overline{A} \cup \overline{B}$ = {2, 3, 4, 6, 7, 8, 10}

(b) A ∪ B = {1, 3, 5, 10}
$\overline{A \cup B}$ = {2, 4, 6, 7, 8, 9}
$\overline{A} \cap \overline{B}$ = {2, 4, 6, 7, 8, 9}

---

3)

Total probability sums to 1.0, $\therefore$
$1k + 2k + 3k + 4k + 5k + 6k = 21k = 1.0$
$k = 1.0 / 21 = 0.0476 \Rightarrow$

$[1] = 1*0.0476 = 0.0476$
$[2] = 2*0.0476 = 0.0952$
$[3] = 3*0.0476 = 0.1429$
$[4] = 4*0.0476 = 0.1905$
$[5] = 5*0.0476 = 0.2381$
$[6] = 6*0.0476 = 0.2857$

---

4)

(a) {(1,1),(1,2),(1,3),(1,4),(1,5),(1,6),
(2,1),(2,2),(2,3),(2,4),(2,5),(2,6),
(3,1),(3,2),(3,3),(3,4),(3,5),(3,6),
(4,1),(4,2),(4,3),(4,4),(4,5),(4,6),
(5,1),(5,2),(5,3),(5,4),(5,5),(5,6),
(6,1),(6,2),(6,3),(6,4),(6,5),(6,6)}

(b) 6 possible options for '7' out of 36 possible outcomes:
$6/36 = 1/6$ chance

(c) 6 possible options for '7' out of 36 possible outcomes,
2 possible options for '11' out of 36 possible outcomes:
Cannot get a 7 and an 11, $8/36 = 2/9$ chance

(d) 18 possible options for even first die out of 36 possible outcomes,
2 possible options for '11' out of 36 possible outcomes, with 1 overlap $\Rightarrow$ 1 option:
$7/36$ chance

---

5)

(a) $P(MB \cup HD) = 35 + 30 - 20 = 45\%$

(b) $1 - P(MB \cup HD) = 100 - 45 = 65\%$

---

6)

(a) $P(L \cap S) = 40 + 30 - 50 = 20\%$

(b) $P(L \cup S) = 100 - 50 = 50\%$

(c) $P(L \text{ xor } S) = 100 - 50 - P(L \cap S) = 30\%$