

Stat 330

Homework 2

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1)

(a) $|\Omega| \geq |A|$, $|\Omega| \geq 0$, therefore $|A|/|\Omega| \geq 0$

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

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

(c) $\bar{A} = \{\text{T T T}, \text{T H H}, \text{H T H}, \text{H H T}, \text{H H H}\}$
 $A \cup B = \{\text{T T H}, \text{T H T}, \text{H T T}, \text{T T T}\}$
 $A \cap B = \{\text{T T H}, \text{T H T}, \text{H T T}\}$
 $A \cap C = \{\}$

2)

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

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

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

3)

Total probability sums to 1.0, \therefore

$$1k + 2k + 3k + 4k + 5k + 6k = 21k = 1.0$$

$$k = 1.0 / 21 = 0.0476 \Rightarrow$$

$$[1] = 1 \cdot 0.0476 = 0.0476$$

$$[2] = 2 \cdot 0.0476 = 0.0952$$

$$[3] = 3 \cdot 0.0476 = 0.1429$$

$$[4] = 4 \cdot 0.0476 = 0.1905$$

$$[5] = 5 \cdot 0.0476 = 0.2381$$

$$[6] = 6 \cdot 0.0476 = 0.2857$$

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:

$$6/36 = 1/6 \text{ chance}$$

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

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

6)

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

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

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