

Examen Parcial 1
Norman Daniel Vianke Orellana

Problema 1

a) $\binom{32}{5} = 201,376$

$$\binom{20}{3} \binom{12}{2} = \frac{115,240}{201,376} = 0.573 \text{ #}$$

b)

$$\binom{32}{2} = 496 \quad \frac{496}{201,376} = 0.002 \text{ #}$$

c)

$$\binom{12}{0} \binom{20}{5} = \frac{15,504}{201,376} = 0.076$$

$$1 - 0.076 = 0.923 \text{ #}$$

d)

$$\binom{12}{5} \binom{20}{0} = 792$$

$$\binom{12}{4} \binom{20}{1} = 9,900$$

$$\binom{12}{3} \binom{20}{2} = + 41,800$$
$$\hline 52,492$$

$$\frac{52,492}{201,376} = 0.26 \text{ #}$$

Problema 2

$$1) B = \{ \emptyset, A, \bar{A}, S \}$$

$$i) \emptyset \in B$$

$$2) i) \bar{\emptyset} = S$$

$$ii) \bar{S} = \emptyset$$

$$iii) \bar{\bar{A}} = A$$

$$iv) A = \bar{\bar{A}}$$

$$3) i) \emptyset \cup S = \{ S \} \in B$$

$$ii) \emptyset \cup A = \{ A \} \in B$$

$$iii) \emptyset \cup \bar{A} = \{ \bar{A} \} \in B$$

$$iv) A \cup \bar{A} = \{ S \} \in B$$

$$v) A \cup S = \{ S \} \in B$$

$$vi) \bar{A} \cup S = \{ S \} \in B$$

R/ $\therefore B$ es una sigma algebra

2) Si $A \subset B$ entonces $P(A) \leq P(B)$

Dem: como $B = A \cup (B - A)$

$$P(B) = P(A) + P(B - A)$$

Entonces:

$$P(B \cap A) = P(B \cap A) \quad \therefore \text{QED.}$$

Problema 3

$$a) P(P/M) = 0.7 \quad P(N/M) = 0.3$$

$$P(P/H) = 0.4 \quad P(N/H) = 0.6$$

$$P(H) = 0.25 \quad P(M) = 0.75$$

$$P(H/N) = \frac{(0.25)(0.6)}{(0.25)(0.6) + (0.75)(0.3)}$$

$$= \frac{0.15}{0.15 + 0.225} = 0.4$$

— #

b)

$$P(M)P(P/M) + P(H)P(P/H)$$

$$(0.75 + 0.7) + (0.25 + 0.4)$$

$$0.525 + 0.1 = 0.625$$

— #

Problema 4

a) $(0.02)(0.02) = 0.0004$ #

b) No tiene razon, No tiene razon porque cada salto que da el paracaidista es un evento independiente.

Problema 5

a) $P(A_1) = 0.1$

$$P(A_2) = 0.15$$

$$P(A_1 \cap A_2) = 0.3$$

$$P(A_1 \cup A_2) = (0.1 + 0.15) - 0.3 = 0.22$$
 #

b) $P(A_1/A_2) = \frac{0.03}{0.15} = 0.2$ #

Problema 6

$$P(A) = 0,8$$

$$P(B) = 0,7$$

a) NO porque $P(A \cap B) = 0,56$

$$\begin{aligned} \text{b) } P(A \cup B) &= P(A) + P(B) - P(A \cap B) \\ &= P(A) + P(B) - P(A \cap B) \leq 1 \\ (0,7 + 0,8) - 1 &\leq P(A \cap B) \\ 0,5 &\leq P(A \cap B) \end{aligned}$$

c) El valor máximo de $P(A \cap B)$ es 0,7

d) NO porque A y B son mutuamente excluyentes si y solo si $(A \cap B) = 0$