

IMM - DTU

02405 Probability

2005-9-1

KKA/bfn,kka

It may be useful to make a sketch similar to the one given at page 22 in Pitman.

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From the text the following probabilities are given:

$$P(A) = 0.6$$

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From the text the following probabilities are given:

$$P(A) = 0.6 \quad P(A^c) = 1 - P(A) = 0.4$$

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From the text the following probabilities are given:

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$$P(B) = 0.4$$

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$$P(B) = 0.4 \quad P(B^c) = 1 - P(B) = 0.6$$

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Question a) Using inclusion/exclusion

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Question a) Using inclusion/exclusion p. 22 (p. 72)

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B)$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A)$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B)$$

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$$P(AB) = P(A \cap B) = 0.2$$

Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB)$$

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$$P(AB) = P(A \cap B) = 0.2$$

Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

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$$P(A^c)$$

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Question b) Complement rule p. 21 (p. 72)

$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

It may be useful to make a sketch similar to the one given at page 22 in Pitman.

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Question b) Complement rule p. 21 (p. 72)

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Question c) Complement rule

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Question d) Difference rule

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Question a) Using inclusion/exclusion p. 22 (p. 72)

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Question b) Complement rule p. 21 (p. 72)

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Question a) Using inclusion/exclusion p. 22 (p. 72)

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Question b) Complement rule p. 21 (p. 72)

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Question d) Difference rule p. 22 - note that $A^cB \subset A$

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Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B)$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

Question b) Complement rule p. 21 (p. 72)

$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB)$$

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Question d) Difference rule p. 22 - note that $A^cB \subset A$

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Question e) Inclusion/exclusion

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

Question b) Complement rule p. 21 (p. 72)

$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c)$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

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Question b) Complement rule p. 21 (p. 72)

$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c) = P(A)$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

Question b) Complement rule p. 21 (p. 72)

$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c) = P(A) + P(B^c)$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

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$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c) = P(A) + P(B^c) - P(A \cap B^c)$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

Question b) Complement rule p. 21 (p. 72)

$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c) = P(A) + P(B^c) - P(A \cap B^c)$$

Using d)

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

Question b) Complement rule p. 21 (p. 72)

$$P(A^c) = 1 - P(A) = 1 - 0.6 = 0.4$$

Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c) = P(A) + P(B^c) - P(A \cap B^c)$$

Using d) with the rules of A and B interchanged

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From the text the following probabilities are given:

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Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c) = P(A) + P(B^c) - P(A \cap B^c)$$

Using d) with the rules of A and B interchanged

$$= P(A) + 1 - P(B) - (P(A) - P(AB))$$

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Question a) Using inclusion/exclusion p. 22 (p. 72)

$$P(A \cup B) = P(A) + P(B) - P(AB) = 0.6 + 0.4 - 0.2 = 0.8$$

Question b) Complement rule p. 21 (p. 72)

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Question c) Complement rule

$$P(B^c) = 1 - P(B) = 1 - 0.4 = 0.6$$

Question d) Difference rule p. 22 - note that $A^cB \subset A$

$$P(A^cB) = P(B) - P(AB) = 0.4 - 0.2 = 0.2$$

Question e) Inclusion/exclusion

$$P(A \cup B^c) = P(A) + P(B^c) - P(A \cap B^c)$$

Using d) with the rules of A and B interchanged

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Question f) Inclusion/exclusion ("reversed")

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