

Solution for exercise 1.3.8 in Pitman

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

From the text the following probabilities are given:

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

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

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

Question a)

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

Question b)

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

Question c)

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

Question d)

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

Question e)

$$P(A \cup B^c) = 1 - P(B) + P(AB) = 1 - 0.4 + 0.2 = 0.8$$

Question f)

$$P(A^c B^c) = 1 - P(A) - P(B) + P(AB) = 1 - 0.6 - 0.4 + 0.2 = 0.2$$