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Unit overview

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Conditioning and Bayes rule vertical2**EXERCISE: THE MULTIPLICATION RULE** (4/4 points)

Are the following statements true or false? (Assume that all conditioning events have positive probability.)

1. $P(A \cap B \cap C^c) = P(A \cap B)P(C^c | A \cap B)$

True ▼



Answer: True

2. $P(A \cap B \cap C^c) = P(A)P(C^c | A)P(B | A \cap C^c)$

True ▼



Answer: True

3. $P(A \cap B \cap C^c) = P(A)P(C^c \cap A | A)P(B | A \cap C^c)$

True ▼



Answer: True

4. $P(A \cap B | C) = P(A | C)P(B | A \cap C)$

True ▼



Answer: True

Answer:

1. True. This is the usual multiplication rule applied to the two events $A \cap B$ and C^c .

2. True. This is the usual multiplication rule.

3. True. This is because

$$P(C^c \cap A | A) = \frac{P(C^c \cap A \cap A)}{P(A)} = \frac{P(C^c \cap A)}{P(A)} = P(C^c | A).$$

So, this statement is equivalent to the one in part 2.

4. True. This is the usual multiplication rule

 $P(A \cap B) = P(A)P(B | A)$ applied to a model/universe in which event C is known to have occurred.

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