1. Is it possible that an event is independent of itself? If so, when?

A: Let A be an event. If A is independent of itself, then P(A) = P(A\A) = P(A)2, so P(A) is 0 or 1. So this is only possible in the extreme cases that the event has probability 0 or 1.

1. Is it always true that if A and B are independent events, then Ac and Bc are independent events? Show that it is, or give a counterexample.

A: Yes because we have

P(A^c Ω b^c) = 1-P(AuB) = 1-(p(A)+P(B) –P(AΩB)) since A and B are independent this become

1-P(A)-p(B)+p(A)P(B) = (1-P(A))(1-P(B)) = P(A^c)P(B^c)