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List of selected exercises

1 Recommended Exercises from JR

305, 309, 310, 311, 312, 313, 318, 322, 323

2 Extra Exercises on Independence and Conditional Probability

1. (Tenta210818.2)

   2. Varje morgon tar Matilda antingen busslinje 4 eller busslinje 7 till jobbet. Hon kommer exakt i tid om bussen avgår som den ska. Hållplatsen för buss nummer 4 är närmare hennes hus, så hon tar den med 70% sannolikhet. Den har dock en sannolikhet på 10% att vara sen, medan buss nummer 7 bara har en sannolikhet på 6% att vara sen.

   (a) Vad är hennes sannolikhet att ankomma sent? (1)

   (b) Om hon är försenad en viss dag, vad är sannolikheten att hon tog buss 4? (2)

   (c) Hur ofta skulle hon behöva ta buss 7 för att minska sannolikheten att komma sent till 7%? (2)

   Answer: a) 0.088, b) 0.795, c) 75% of the time.

2. An urn contains 5 red balls and 10 blue balls. We draw two balls from the urn without replacement. What is the probability that the second ball is red?

   Answer: $\frac{1}{3}$.

3. A lottery has 100 tickets in total, of which 5 are winning ones. First Elin draws one, then Colin draws one. Let E be the event that Elin has a winning ticket, and C be the event that Colin has a winning ticket.

   a) Calculate the following probabilities:

   $$P(E), P(C|E), P(C|E^*), P(C).$$

   b) Are E, C independent?

   Answer: a) $\frac{1}{20}, \frac{4}{99}, \frac{5}{99}, \frac{1}{20}$, *b) No.*

4. Consider throwing two fair dice. Let A denote the event that "the sum of two dice is 6", B denote the event that "the first die equals 4", and C denote that " the sum of two dice is 7".

   - Are A and B independent?
   - Are B and C independent?

   Answer: a) No, b) Yes.