

Test 1 (6th November 2023)

There are 24 volleyball players and 16 table tennis players at a sports training camp. Probability that a randomly chosen athlete passes the set limit of 50 push-ups per minute is $\frac{3}{4}$, while a randomly chosen volleyball player passes this limit with probability $\frac{5}{6}$. Athletes try to pass the limit in a random order, independently of each other as well as of previous attempts, and the number of attempts for each athlete is unlimited. On average, 10 athletes try to pass the limit during one training day. Calculate the probability that

1. a randomly chosen athlete who passes the limit is a table tennis player, (2 points)
2. among the first six athletes who try to pass the limit, there are at least 2 volleyball players, (2 points)
3. at the latest, the fourth athlete who tries to pass the limit is a volleyball player, (2 points)
4. no more than three table tennis players try to pass the limit during two training days, (2 points)
5. we wait at least half a training day for an athlete who tries to pass the limit. (2 points)