

STATISTICS, Homework Exercises 4.

1. Test the hypothesis whether the following die is fair with level of significance $\alpha = 0.05$. We cast it $n = 1200$ times and get the frequencies of the sides: $\nu_1 = 184$, $\nu_2 = 212$, $\nu_3 = 190$, $\nu_4 = 208$, $\nu_5 = 212$, $\nu_6 = 194$.
2. We asked 460 persons whether they like coffee (yes/no) or tea (yes/no). 416 like both, 5 like none of them, 16 like coffee but do not like tea, and 23 like tea but do not like coffee. Decide whether the attitudes toward coffee and tea are independent with level of significance $\alpha = 0.05$.
3. The number of boys in 500 families with 5 children is investigated. There were 20 families with no boy, 75 with 1, 145 with 2, 140 with 3, 85 with 4, and 35 with 5 boys. Decide (with level of significance $\alpha = 0.05$) whether the number of boys in a 5-children family follows binomial distribution.
4. The following scores are obtained on a test of dexterity and aggression administered to a random sample of 10 high-school seniors:

Dexterity	23	29	45	36	49	41	30	15	42	38
Aggression	45	48	16	28	38	21	36	18	31	37

Find the Spearman's rank correlation between dexterity and aggression based on this sample.

5. How could you use linear regression for fitting the curve $y = \alpha e^{\beta x}$ to your data?