

Tutorial week 12

1. A research paper reported the sizes of 120 groups of borers. The groups sizes were:

| | | | | | | | | | | | | | |
|-------------|----|----|----|----|----|---|---|---|---|---|----|----|----|
| Group size: | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Frequency: | 24 | 16 | 16 | 18 | 15 | 9 | 6 | 5 | 3 | 4 | 3 | 0 | 1 |

Does the Poisson distribution provide a plausible model for the number of borers in a group?

2. 103 children attending a pre-school were classified by parents income group and by IQ (intelligence quotient).

| | | High IQ | Moderate/low IQ |
|--------------|---|---------|-----------------|
| Income group | A | 14 | 18 |
| | B | 25 | 8 |
| | C | 23 | 15 |

Do these data suggest that the fractions of IQ differ in the three income groups?

3. A study of the amount of violence viewed on television as it relates to the age of the viewer yields the results shown in the accompanying table for 81 people.

| Viewing | Age | | |
|---------------|-------|-------|-------------|
| | 16-34 | 35-54 | 55 and Over |
| Low violence | 8 | 12 | 21 |
| High violence | 18 | 15 | 7 |

Do the data indicate that viewing of violence is not independent of the age of the viewer?

4. As an additional exercise do problem 19 on p. 536 of Rice's book.

Computer Exercises week 12

1. A die is rolled 60 times and the number of times each face appears are recorded as follows:

| | | | | | | |
|-------|----|---|---|----|----|---|
| Face | 1 | 2 | 3 | 4 | 5 | 6 |
| Count | 11 | 7 | 9 | 15 | 12 | 6 |

Do these results cast doubt on the die's fairness?

- State your hypotheses.
 - Find χ^2 and the p -value. (Feel free to use the built-in command `chisq.test`)
 - State your conclusion.
2. An article in *J. Water Resources Control Fed.* (1969) reported data on the rate of oxygenation in streams at 20°C in a certain region (summarised in the following table). The sample mean and standard deviation were $\bar{x} = 0.173$ and $s = 0.066$. Are the data consistent with the assumption that the oxygenation rate has a normal distribution?

| Rate(per day) | Frequency |
|-----------------|-----------|
| Less than 0.100 | 12 |
| 0.100 - 0.150 | 20 |
| 0.150-0.200 | 23 |
| 0.200-0.250 | 15 |
| ≥ 0.250 | 13 |