Exact Test for Single Mean

1. The following data consist of the scores of 22 children with ADHD on a delay of gratification (DOG) task. Each child was tested under four dosage levels. The table shows the data for the placebo (0 mg) and highest dosage level (0.6 mg) of methylphenidate. Of particular interest here is the column labeled "Diff" that shows the difference in performance between the 0.6 mg (D60) and the 0 mg (D0) conditions. These difference scores are positive for children who performed better in the 0.6 mg condition than in the control condition and negative for those who scored better in the control condition. If methylphenidate has a positive effect, then the mean difference score in the population will be positive. Test whether the mean difference can be assumed to be 0, when
2. The population s.d. is known to be 8
3. The population s.d. is unknown.

Table 1. DOG scores as a function of dosage.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **D0** | 57 | 27 | 32 | 31 | 34 | 38 | 71 | 33 | 34 | 53 | 36 | 42 | 26 | 52 |
| **D60** | 62 | 49 | 30 | 34 | 38 | 36 | 77 | 51 | 45 | 42 | 43 | 57 | 36 | 58 |
| **Diff** | 5 | 22 | -2 | 3 | 4 | -2 | 6 | 18 | 11 | -11 | 7 | 15 | 10 | 6 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **D0** | 36 | 55 | 36 | 54 | 34 | 29 | 33 | 33 |
| **D60** | 35 | 60 | 33 | 59 | 35 | 37 | 45 | 29 |
| **Diff** | -1 | 5 | -3 | 5 | 1 | 8 | 12 | -4 |

1. Suppose an experimenter wanted to know if people are influenced by a subliminal message and performed the following experiment. Each of nine subjects is presented with a series of 100 pairs of pictures. As a pair of pictures is presented, a subliminal message is presented suggesting the picture that the subject should choose. Test whether the (population) mean number of times the suggested picture is chosen is equal to 50 for the following data

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Frequency | 45 | 48 | 49 | 49 | 51 | 52 | 53 | 55 | 57 |

1. Many doctors recommend having a total cholesterol level below 200 mg/dl. Test whether the 1952 population from which the Dixon and Massey sample was gathered is statistically different, on average, from this recommended level.
2. when the population s.d is known to be 63
3. when the population s.d. is unknown

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 209 | 209 | 173 | 165 | 239 | 270 | 274 | 254 | 223 | 209 | 219 | 281 | 251 | 208 | 227 | 269 | 299 | 238 | 285 | 325 |