A group of 3 people taste regular fat Tillamook Ice Cream, and a separate group of 3 people taste low-fat Tillamook Ice Cream. Both are vanilla flavor. Each person scores the ice cream s/he tastes on a scale from 1 – 10. The scores for regular are 9, 7, 10. The scores for low-fat ice cream are 8, 9, 10. Use an appropriate test to determine if the distribution of scores is the same for the two types of ice cream.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3.5 | 3.5 | 5.5 | 5.5 | t |
| x | X | X |  |  |  | 6.5 |
| X | X |  | X |  |  | 6.5 |
| X | X |  |  | X |  | 8.5 |
| X | X |  |  |  | X | 8.5 |
| X |  | X | X |  |  | 8 |
| X |  | X |  | x |  | 10 |
| x |  | X |  |  | X | 10 |
| X |  |  | x | X |  | 10 |
| X |  |  | x |  | X | 10 |
| X |  |  |  | x | x | 12 |
|  | X | X | X |  |  | 9 |
|  | X | X |  | X |  | 11 |
|  | X | X |  |  | X | 11 |
|  | X |  | x | X |  | 11 |
|  | X |  | x |  | X | 11 |
|  | X |  |  | x | X | 13 |
|  |  | X | x | X |  | 12.5 |
|  |  | X | x |  | X | 12.5 |
|  |  |  | x | x | x | 14.5 |
|  |  | x |  | x | x | 14.5 |

For alternative that regular fat is better, p = 14/20.

For alternative that low fat is better, p = 10/20.

For two-sided alternative, p = 1.

When my son was in 6th grade, his science projects was the following: 20 people taste both regular fat Tillamook Ice Cream and low-fat Tillamook Ice Cream sequentially. Each person declares which s/he prefers. 13 prefer regular fat ice cream. 7 prefer low-fat ice cream. Test the null hypothesis that preference is equal between the two types of ice cream against the alternative that people tend to prefer regular fat ice cream. I didn’t realize until this experiment that p-values really aren’t intuitive.

For the alternative that regular fat is better, p = pbinom(7 , size = 20, prob = ½)

For the alternative that regular fat is worse, p = pbinom(13 , size = 20, prob = ½)

For the two-sided alternative, p = 2\*pbinom(7 , size = 20, prob = ½)

In children receiving cardiopulmonary resuscitation, test whether illness category is associated with return of spontaneous circulation.

|  |  |
| --- | --- |
|  | Return of spontaneous circulation |
| Illness Category | Yes | No |
| Cardiac | 2 | 5 |
| Non-cardiac | 3 | 4 |

R code:

x = 0:5

TableProbabilities = choose(5,x)\*choose(9,7-x)/choose(14,7)

Output

0.01048951 0.12237762 0.36713287 0.36713287 0.12237762 0.01048951

p-value for 2-sided alternative = 1

Test whether the following numbers come from a N(0,1) distribution. The 25th percentile of a standard normal is -0.6744898.



Bins: (-∞, -.674] (-0.674, 0] (0, 0.674] (0.674, ∞)

Expected count in each bin is 5.

Observed counts are:

(-∞, -.674]: 7

(-0.674, 0]: 6

(0, 0.674]: 2

(0.674, ∞): 5

Outcome of test statistic = 1/5\*(4+1+9+0) = 2.8

p-value = 1-pchisq(2.8,df=3) = 0.42345

Test whether they come from a N(μ,1) distribution. The outcome of the sample mean is -0.166.

Add 0.166 to each observed value, and repeat the process above, using 2 degrees of freedom.