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EXAMINATION OF HYPOTHESES IN MARKETING RESEARCH

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ABSTRACT: *Statistical data is derived based on the survey of respondents, in the following three areas of the Georgian consumer market: product prices, tuition fees in higher education, the number of people wishing to travel to the parts of Georgia. Using this marketing information, the task of examination hypotheses about the unknown average values of populations is solved.*

KEYWORDS: respondent, data, statistics, hypothesis

INTRODUCTION

In marketing research, along with marketing methods, probabilistic-statistical methods are used [1], for example, regressive analysis is used in [2], [3], [4] papers.The article solves the problems of hypothesis examination in marketing research in the following three areas: prices of thirty products, tuition fees in four higher education institutions, the number of people wishing to travel to ten regions of Georgia.Remarkably, the marketing information was obtained is a result of the survey of respondents of Tbilisi. Current and acceptable prices for products and higher education tuition fees are discussed.

Consider any X population. In our case, it is the abundance of current and user-named prices of products, the abundance of prices for higher education, the abundance of those wishing to travel. We note the unknown mean value of the symbol population. Suppose x1, ..., xn is a sample of n volumes taken from the X population - the results of n population observations. Consider the null basic hypothesis H0: a = a0 and the opposite H1: a> a0. Where a is the unknown mean value of the population X. The task of testing hypotheses is as follows: We need to use sampling to make a criterion based on which we can decide whether to accept or reject the H0 hypothesis. The following form of the criterion $t = \frac{\bar{X} - a_0}{s} \cdot \sqrt{n}$: where $\bar{X}$ is the selective mean, s is the selective standard deviation. H0 Hypothesis rejection or critical area: t> tn-1, α; Where tn-1, α is the critical point of the student distribution, and α is a definite number, for example, α = 0.05.

Population average α and dispersion σ^2 is unknown

Product 1. Rice

Table 2.3.1. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1	1	1.2	1.2	1.2	1.2	1.5	1.7	1.7	1.7	1.9	1.9

hypothesis H_0 : a= 1.6 alternative $H_1 : a > 1.6$

$n = 12, \bar{X} =$ 1.433 $S = \frac{\max x_i - \min x_i}{4} =$ 0.225 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -2.566

Decision: It is fair H_0 hypothesis

Product 1. Rice

Table 2.3.2. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.8	1	1

hypothesis H_0 : a= 0.75 alternative $H_1 : a > 0.75$

$n = 12, \bar{X} =$ 0.7 $S = \frac{\max x_i - \min x_i}{4} =$ 0.125 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.3856

Decision: It is fair H_0 hypothesis

Product 2. Buckwheat

Table 2.3.3. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.2	1.2	1.2	1.4	1.4	1.5	1.6	1.8	1.8	1.8	2	2

hypothesis H_0 : a= 1.5 alternative $H_1 : a > 1.5$

$n = 12, \bar{X} =$ 1.575 $S = \frac{\max x_i - \min x_i}{4} =$ 0.2 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 1.299

Decision: It is fair H_0 hypothesis

Product 2. Buckwheat

Table 2.3.4. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

hypothesis H_0 : a= 0.4 alternative $H_1 : a > 0.4$

$n = 12, \bar{X} =$ 0.467 $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 9.2376

Decision: It is fair H_1 hypothesis

Product 3. Pasta

Table 2.3.5. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	2	2	2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3

hypothesis H_0 : a= 2.1 alternative $H_1 : a > 2.1$

$n = 12, \bar{X} =$ 2.2 $S = \frac{\max x_i - \min x_i}{4} =$ 0.075 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 4.6188

Decision: It is fair H_1 hypothesis

Product 3. Pasta

Table 2.3.6. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1	1	1	1.2	1	1	1	1.2	1.2	1.2	1	1

hypothesis H_0 : a= 1.05 alternative $H_1 : a > 1.05$

$n = 12, \bar{X} =$ 1.067 $S = \frac{\max x_i - \min x_i}{4} =$ 0.05 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 1.1547

Decision: It is fair H_0 hypothesis

Product 4. Wheat Bread

Table 2.3.7. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.5	1.5	1.5	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9

hypothesis H_0 : a= 1.5 alternative $H_1 : a > 1.5$

$n = 12, \bar{X} =$ 1.75 $S = \frac{\max x_i - \min x_i}{4} =$ 0.1 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 8.6603

Decision: It is fair H_1 hypothesis

Product 4. Wheat Bread

Table 2.3.8. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5

hypothesis H_0 : a= 0.5 alternative $H_1 : a > 0.5$

$n = 12, \bar{X} =$ 0.533 $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 4.6188

Decision: It is fair H_1 hypothesis

Product 5. Wheat Flour

Table 2.3.9. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	2	2	2	2	1.8	1.8	1.8	2	2	2	2.2	2.2

hypothesis H_0 : a= 2 alternative $H_1 : a > 2$

$n = 12, \bar{X} = 1.983$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.1 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.5774

Decision: It is fair H_0 hypothesis

Product 5. Wheat Flour

Table 2.3.10. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.8

hypothesis H_0 : a= 0.7 alternative $H_1 : a > 1.9$

$n = 12, \bar{X} = 0.825$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 17.321

Decision: It is fair H_1 hypothesis

Product 6. Corn Flour

Table 2.3.11. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.8	1.8	1.8	1.8	2	2	2	2.2	2.2	2.2	2	1.8

hypothesis H_0 : a= 1.9 alternative $H_1 : a > 1.9$

$n = 12, \bar{X} = 1.967$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.1 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 2.3094

Decision: It is fair H_0 hypothesis

Product 6. Corn Flour

Table 2.3.12. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1	1	1	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2

hypothesis H_0 : a= 1.1 alternative $H_1 : a > 1.1$

$n = 12, \bar{X} = 1.075$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.05 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.7321

Decision: It is fair H_0 hypothesis

Product 7. Beef

Table 2.3.13. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	14	14	14	14	15	15	14	16	16	16	15	15

hypothesis H_0 : a= 15.1 alternative $H_1 : a > 15.1$

$n = 12, \bar{X} =$ 14.83 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.8475

Decision: It is fair H_0 hypothesis

Product 7. Beef

Table 2.3.14. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	7	7	7	8	7	8	8	7	7	7	8	8

hypothesis H_0 : a= 7.51 alternative $H_1 : a > 7.51$

$n = 12, \bar{X} =$ 7.417 $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.2933

Decision: It is fair H_0 hypothesis

Product 8. Pork

Table 2.3.15. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	9	9	9	10	10	10	9	9	10	10	10	11

hypothesis H_0 : a= 9.51 alternative $H_1 : a > 9.51$

$n = 12, \bar{X} =$ 9.667 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 1.0854

Decision: It is fair H_0 hypothesis

Product 8. Pork

Table 2.3.16. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	5	5	5	5	7	7	7	6	6	6	5	5

hypothesis H_0 : a= 5.51 alternative $H_1 : a > 5.51$

$n = 12, \bar{X} =$ 5.75 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 1.6628

Decision: It is fair H_0 hypothesis

Product 9. Chicken

Table 2.3.19. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	4	4	4	6	5	5	5	5	6	6	7	7

hypothesis H_0 : a= 5.51 alternative $H_1 : a > 5.51$

$n = 12, \bar{X} = 5.333$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.75 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.816

Decision: It is fair H_0 hypothesis

Product 9. Chicken

Table 2.3.2. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	3	3	3.5	3.5	4	4	3	3	3.5	3.5

hypothesis H_0 : a= 3.51 alternative $H_1 : a > 3.51$

$n = 12, \bar{X} = 3.333$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -2.448

Decision: It is fair H_0 hypothesis

Product 10. Minced Beef

Table 2.3.19. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	14	14	14	14.5	14.5	15	15	15	15	16	15	15

hypothesis H_0 : a= 13.51 alternative $H_1 : a > 13.5$

$n = 12, \bar{X} = 14.75$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 8.591

Decision: It is fair H_1 hypothesis

Product 10. Minced Beef

Table 2.3.20. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	5	5	6	5	5	6	6	6	5	5	6	5

hypothesis H_0 : a= 5.51 alternative $H_1 : a > 5.51$

$n = 12, \bar{X} = 5.417$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.2933

Decision: It is fair H_0 hypothesis

Product 11. Sausages (boiled)

Table 2.3.21. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	7	7	8	8	8	8	9	9	9	10	9	9

hypothesis H_0 : a= 8.5 alternative $H_1 : a > 8.5$

$n = 12, \bar{X} =$ 8.417 $S = \frac{\max x_i - \min x_i}{4} =$ 0.75 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.3849

Decision: It is fair H_0 hypothesis

Product 11. Sausages (boiled)

Table 2.3.22. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	4	4	3	3	3	3	4	4	3	3	4	3

hypothesis H_0 : a= 3.5 alternative $H_1 : a > 3.5$

$n = 12, \bar{X} =$ 3.417 $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.1547

Decision: It is fair H_0 hypothesis

Product 12. Sausages (smoked)

Table 2.3.23. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	10	10	12	11	11	11	11	10	12	12	13	13

hypothesis H_0 : a= 11.5 alternative $H_1 : a > 11.5$

$n = 12, \bar{X} =$ 11.33 $S = \frac{\max x_i - \min x_i}{4} =$ 0.75 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.7698

Decision: It is fair H_0 hypothesis

Product 12. Sausages (smoked)

Table 2.3.24. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	4	4	5	3	3	3	4	3	3	4	4

hypothesis H_0 : a= 3.5 alternative $H_1 : a > 3.5$

$n = 12, \bar{X} =$ 3.583 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 0.5774

Decision: It is fair H_0 hypothesis

Product 13. Sausages (regular)

Table 2.3.25. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	9	9	9	8	8	10	10	10	9	9	10	9

hypothesis H_0 : a= 9 alternative $H_1 : a > 9$

$n = 12, \bar{X} =$ 9.167 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 1.1547

Decision: It is fair H_0 hypothesis

Product 13. Sausages (regular)

Table 2.3.26. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	4	3	4	4	4	3	4	4	5	4

hypothesis H_0 : a= 4 alternative $H_1 : a > 4$

$n = 12, \bar{X} =$ 3.75 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.7321

Decision: It is fair H_0 hypothesis

Product 14. Fresh Fish

Table 2.3.27. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	13	13	13	14	15	14	14	13	14	14	15	14

hypothesis H_0 : a= 14 alternative $H_1 : a > 14$

$n = 12, \bar{X} =$ 13.83 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.1547

Decision: It is fair H_0 hypothesis

Product 14. Fresh Fish

Table 2.3.28. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	5	4	4	5	5	5	4	3	4	4	5	4

hypothesis H_0 : a= 4 alternative $H_1 : a > 4$

$n = 12, \bar{X} =$ 4.333 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 2.3094

Decision: It is fair H_0 hypothesis

Product 15. Frozen Fish

Table 2.3.29. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	7	7	7	8	7	7	8	8	8	8	7	7

hypothesis H_0 : a= 7 alternative $H_1 : a > 7$

$n = 12, \bar{X} = 7.417$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 5.7735

Decision: It is fair H_1 hypothesis

Product 15. Frozen Fish

Table 2.3.30. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	2	2	3	2	3	3	4	4	4	3	4	4

hypothesis H_0 : a= 2.7 alternative $H_1 : a > 2.7$

$n = 12, \bar{X} = 3.167$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 3.2332

Decision: It is fair H_1 hypothesis

Product 16. Milk

Table 2.3.32. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	3	4	3.5	3	4	3	3	4	4	4

hypothesis H_0 : a= 3.4 alternative $H_1 : a > 3.4$

$n = 12, \bar{X} = 3.458$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 0.8083

Decision: It is fair H_0 hypothesis

Product 16. Milk

Table 2.3.30. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1	1	1	1	1	1.2	1.2	1	1	1	1.2	1.2

hypothesis H_0 : a= 1 alternative $H_1 : a > 1$

$n = 12, \bar{X} = 1.067$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.05 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 4.6188

Decision: It is fair H_1 hypothesis

Product 17. Yoghurt

Table 2.3.33. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.2	1.2	1.2	1.4	1.4	1.2	1.2	1.2	1.2	1.2	1.4	1.4

hypothesis H_0 : a= 1 alternative $H_1 : a > 1$

$n = 12, \bar{X} = 1.267$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.05 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 18.475

Decision: It is fair H_1 hypothesis

Product 17. Yoghurt

Table 2.3.34. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.4

ჰიპოთეზა H_0 : a= 0.1 alternative $H_1 : a > 0.1$

$n = 12, \bar{X} = 0.458$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 49.652

Decision: It is fair H_1 hypothesis

Product 18. Cheese

Table 2.3.35. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	8	8	8	9	9	10	9	10	10	10	9	10

hypothesis H_0 : a= 8.2 alternative $H_1 : a > 8.2$

$n = 12, \bar{X} = 9.167$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 6.6973

Decision: It is fair H_1 hypothesis

Product 18. Cheese

Table 2.3.36. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	4	4	4	4	4.5	4.5	4	4	4	3.5	3	4

hypothesis H_0 : a= 4 alternative $H_1 : a > 4$

$n = 12, \bar{X} = 3.958$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.375 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.3849

Decision: It is fair H_0 hypothesis

Product 19. Cottage Cheese

Table 2.3.37. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	3	4	4	3.5	3.5	4	4	4	4.5	4

hypothesis H_0 : a= 4 alternative $H_1 : a > 4$

$n = 12, \bar{X} = 3.708$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.375 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -2.6943

Decision: It is fair H_0 hypothesis

Product 19. Cottage Cheese

Table 2.3.38. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1	1	1	1.5	1.5	1.5	1	1	1.2	1.2	1	1

hypothesis H_0 : a= 1 alternative $H_1 : a > 1$

$n = 12, \bar{X} = 1.158$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.125 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 4.3879

Decision: It is fair H_1 hypothesis

Product 20. Sour Cream

Table 2.3.39. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	2	2	2	2	2.2	2.2	2	2	2.5	2.5	2.5	2.5

hypothesis H_0 : a= 2 alternative $H_1 : a > 2$

$n = 12, \bar{X} =$ 2.2 $S = \frac{\max x_i - \min x_i}{4} =$ 0.125 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 5.5426

Decision: It is fair H_1 hypothesis

Product 20. Sour Cream

Table 2.3.40. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.1	0.1	0.15	0.15	0.15	0.1	0.2	0.1	0.1	0.1	0.15	0.15

hypothesis H_0 : a= 0.1 alternative $H_1 : a > 0.1$

$n = 12, \bar{X} = 0.129$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 4.0415

Decision: It is fair H_1 hypothesis

Product 21. Egg

Table 2.3.41. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.3	0.3	0.3	0.2	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3

hypothesis H_0 : a= 0.1 alternative $H_1 : a > 0.1$

$n = 12, \bar{X} = 0.317$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.05 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 15.011

Decision: It is fair H_1 hypothesis

Product 21. Egg

Table 2.3.42. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.1	0.1	0.15	0.15	0.15	0.1	0.2	0.1	0.1	0.1	0.15	0.15

hypothesis H_0 : a= 0.06 alternative $H_1 : a > 1$

$n = 12, \bar{X} = 0.129$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 9.584

Decision: It is fair H_1 hypothesis

Product 22. Butter

Table 2.3.43. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	5	5	6	5	5	5.5	6	6	5.5	6	6.5	6

hypothesis H_0 : a= 5 alternative $H_1 : a > 5$

$n = 12, \bar{X} = 5.625$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.375 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 5.7735

Decision: It is fair H_1 hypothesis

Product 22. Butter

Table 2.3.44. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	3	4	4	3	3	3	3	4	3	3

hypothesis H_0 : a= 3.2 alternative $H_1 : a > 3.2$

$n = 12, \bar{X} =$ 3.25 $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 0.6928

Decision: It is fair H_0 hypothesis

Product 23. Vegetable Oil

Table 2.3.45. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	3	3	3	3.5	3.5	3	4	4	4	4

hypothesis H_0 : a= 3 alternative $H_1 : a > 3$

$n = 12, \bar{X} = 3.417$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 5.7735

Decision: It is fair H_1 hypothesis

Product 23. Vegetable Oil

Table 2.3.46. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1	1	1	1	1	1.5	1.5	1	1	1	1.5	1.5

hypothesis H_0 : a= 1 alternative $H_1 : a > 1$

$n = 12, \bar{X} = 1.167$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.125 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 4.6188

Decision: It is fair H_1 hypothesis

Product 24. Aubergine

Table 2.3.47. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4.5	4.5

hypothesis H_0 : a= 4 alternative $H_1 : a > 4$

$n = 12, \bar{X} =$ 3.875 $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.7321

Decision: It is fair H_0 hypothesis

Product 24. Aubergine

Table 2.3.48. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.5	1.5	1.5	1.5	1.5	1.5	2	2	2	2	1.5	1.5

hypothesis H_0 : a= 1.7 ალტერნატივა $H_1 : a > 1.7$

$n = 12, \bar{X} =$ 1.667 $S = \frac{\max x_i - \min x_i}{4} =$ 0.125 α=0.05 $t_{11;0.05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.9238

Decision: It is fair H_0 hypothesis

Product 25. Potato

Table 2.3.49. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.8	1.8	1.8	1.8	1.8	2	2	2	1.8	1.8	2	2

hypothesis H_0 : a= 1.7 alternative $H_1 : a > 1.7$

$n = 12, \bar{X} = 1.883$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.05 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 12.702

Decision: It is fair H_1 hypothesis

Product 25. Potato

Table 2.3.50. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1	1	1	1	1	0.8	0.8	0.8	1	1	0.8	0.8

hypothesis H_0 : a= 0.9 alternative $H_1 : a > 0.9$

$n = 12, \bar{X} = 0.917$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.05 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 1.1547

Decision: It is fair H_0 hypothesis

Product 26. Bean

Table 2.3.51. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	4	4	4	4	4	4.5	4.5	4.5	4	4	4.5	4.5

hypothesis H_0 : a= 4 alternative $H_1 : a > 4$

$n = 12, \bar{X} = 4.208$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.125 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 5.7735

Decision: It is fair H_1 hypothesis

Product 26. Bean

Table 2.3.52. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.5	1.5	1.5	1.5	1.5	1	1	1	1	1.5	1.5	1.5

hypothesis H_0 : a= 1 ალტერნატივა $H_1 : a > 1$

$n = 12, \bar{X} = 1.333$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.125 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 9.2376

Decision: It is fair H_1 hypothesis

Product 27. Sugar

Table 2.3.53. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.4	1.4	1.4

hypothesis H_0 : a= 1 alternative $H_1 : a > 1$

$n = 12, \bar{X} = 1.433$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 60.044

Decision: It is fair H_1 hypothesis

Product 27. Sugar

Table 2.3.54. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.8	0.8	0.8	0.8	0.8	0.5	0.5	0.6	0.6	0.5	0.5	0.5

hypothesis H_0 : a= 0.7 alternative $H_1 : a > 0.7$

$n = 12, \bar{X} = 0.642$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.075 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -2.6943

Decision: It is fair H_0 hypothesis

Product 28. Wine

Table 2.3.55. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	7	7	7	7	8	8	8	8	10	10	8	8

hypothesis H_0 : a= 1 alternative $H_1 : a > 1$

$n = 12, \bar{X} =$ 8 $S = \frac{\max x_i - \min x_i}{4} =$ 0.75 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 32.332

Decision: It is fair H_1 hypothesis

Product 28. Wine

Table 2.3.56. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	3	2.5	3	2.5	2.5	3	3	2.5	2	2.5

hypothesis H_0 : a= 2.8 alternative $H_1 : a > 1$

$n = 12, \bar{X} = 2.708$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.25 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.2702

Decision: It is fair H_0 hypothesis

Product 29. Vodka

Table 2.3.57. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	8	8	8	9	10	10	10	9	8	9	10	9

hypothesis H_0 : a= 9.1 alternative $H_1 : a > 9.1$

$n = 12, \bar{X} =$ 9 $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.6928

Decision: It is fair H_0 hypothesis

Product 29. Vodka

Table 2.3.58. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	3	3	3	4	3	3	4	3	3	3	2	3

hypothesis H_0 : a= 3.2 alternative $H_1 : a > 3.2$

$n = 12, \bar{X} = 3.083$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -0.8083

Decision: It is fair H_0 hypothesis

Product 30. Beer

Table 2.3.59. Current prices

t	1	2	3	4	5	6	7	8	9	10	11	12
price	4	4	4	3	3	3	2	2	2	2	3	3

hypothesis H_0 : a= 3.2 alternative $H_1 : a > 3.2$

$n = 12, \bar{X} = 2.917$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.5 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ -1.963

Decision: It is fair H_0 hypothesis

Product 30. Beer

Table 2.3.60. Prices named by the customer

t	1	2	3	4	5	6	7	8	9	10	11	12
price	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5

hypothesis H_0 : a= 0.2 alternative $H_1 : a > 0.2$

$n = 12, \bar{X} = 0.458$ $S = \frac{\max x_i - \min x_i}{4} =$ 0.025 α=0.05 $t_{11;0,05} = 2.7$ $t = \frac{\bar{X} - a}{s/\sqrt{n}} =$ 35.796

Decision: It is fair H_1 hypothesis

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