

P Values

Math Academy 1 Worksheet 8-C

1. Kate hypothesizes that people spend more at Starbucks in the fall than in the summer. She collects data from 10 people who use the Starbucks app so she can find the totals of their purchases.

a) What is her null hypothesis?

b) If her null hypothesis is true, what is the probability that she will make a type I error?

c) If her null hypothesis is false, what is the probability that she will make a type I error?

d) Calculate the p value from the data below.

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|--------------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|
| Summer 2023: | 98 | 190 | 255 | 78 | 119 | 305 | 155 | 190 | 45 | 113 |
| Fall 2023: | 116 | 180 | 346 | 124 | 106 | 275 | 209 | 244 | 63 | 171 |

e) Does she reject the null hypothesis?

f) State exactly what probability her p value represents.

g) What is her conclusion?

h) Use your answer to (e) to state the probability that she has made a type I error, if known.

i) Use your answer to (e) to state the probability that she has made a type II error, if known.

2. Walt hypothesizes that Chemistry students score higher second semester than first semester. He gets the semester percentages from 9 random students who took Chemistry last year.

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|------------------|----|----|----|----|----|----|----|----|----|
| First Semester: | 94 | 99 | 80 | 71 | 80 | 68 | 90 | 86 | 76 |
| Second Semester: | 96 | 99 | 84 | 80 | 82 | 70 | 80 | 88 | 78 |

a) Calculate his p value.

b) What is his conclusion?