

Instructions: Answer each question as thoroughly as possible. Round answers to 4 decimal places as needed. Exact answers are best when possible. Be sure to answer all parts of each question.

1. A certain local brewery claims that less than 30% of its customers drink another brand of beer on a regular basis. A random sample of 200 customers yielded 81 who did in fact drink another brand of beer on a regular basis. Do these sample results support the bottler's claim? (Use a level of significance of 0.05.) Clearly state your null and alternative hypothesis, check any assumptions, and clearly state your conclusion in the context of the problem.

$$H_0: p = 0.3$$

$$H_a: p < 0.3$$

$$z = 3.24 \dots$$

$$p = 0.9994 \text{ fail to reject null}$$

no, it does not support the claim

2. Previously, an organization reported that teenagers spent 4.5 hours per week, on average, on the phone. The organization thinks that, currently, the mean is higher. Fifteen randomly chosen teenagers were asked how many hours per week they spend on the phone. The sample mean was 4.75 hours with a sample standard deviation of 2.0. Conduct a hypothesis test. Clearly state your null and alternative hypothesis, check any assumptions, and clearly state your conclusion in the context of the problem.

$$H_0: \mu = 4.5$$

$$H_a: \mu > 4.5$$

$$t = 0.484$$

$$p = 0.31789 \dots \text{ fail to reject null}$$

there is not enough evidence to think it has increased.

3. Describe a Type II error in the context of the previous problem.

The mean is in fact higher than 4.5, but we are unable to show that from the data.
(we conclude it has not changed)