

Name: Key

Per:

Date:

Chapter 23 Practice Problem

Cola makers test new recipes for loss of sweetness during storage. Trained tasters rate the sweetness before and after storage. From experience, the population distribution of sweetness losses will be close to Normal. Here are the sweetness losses (sweetness before storage minus sweetness after storage) found by tasters from a random sample of 10 batches of a new cola recipe:

2.0 0.4 0.7 2.0 -0.4 2.2 -1.3 1.2 1.1 2.3

Are these data good evidence that the cola lost sweetness? Carry out a test to help you answer this question.

1 $H_0: \mu = 0$
 $H_A: \mu > 0$

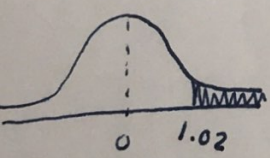
2 Random: a random sample was used

10%: 10 batches is < 10% of all sodas

Nearly Norm: "from experience the pop. distr. of sweetness losses will be close to Normal."

Conditions are met \therefore we can proceed with a t-test

3 $n = 10$
 $df = n - 1 = 9$
 $\bar{y} = 1.02$
 $s = 1.196$



$$t_{19} = \frac{\bar{y} - \mu}{SE(\bar{y})}$$

$$= \frac{1.02 - 0}{\frac{1.196}{\sqrt{10}}}$$

$$= 2.697$$

4 P-value is low \therefore we can reject H_0 and state that the cola does lose sweetness from being in storage.

4a 95% C.I.

$t^*_9 = 2.262$

$$\bar{y} \pm t^*_9 \cdot SE(\bar{y})$$

$$1.02 \pm (2.262) \left(\frac{1.196}{\sqrt{10}} \right)$$

$$(0.164, 1.876)$$

w/ 95% confidence we can claim that the true avg. loss of sweetness of the cola is between 0.164 and 1.876. 0 is not contained in the interval which supports our decision to reject H_0 .

P-value: $P(t_9 > 2.697) = 0.012$