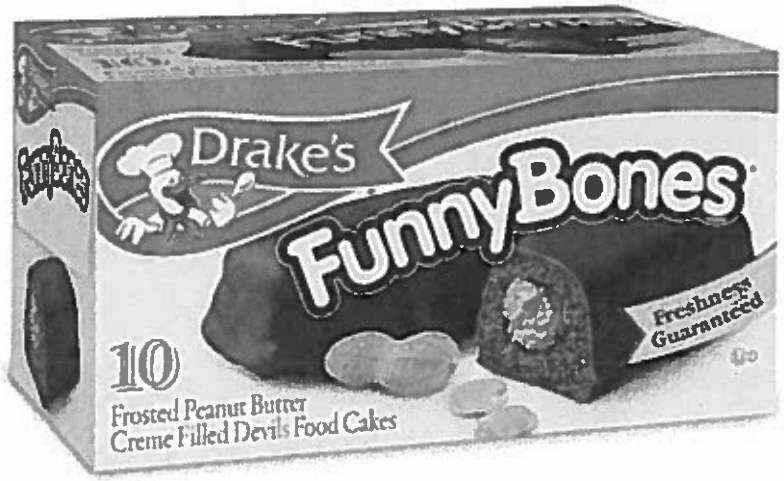
ISE 2211 • Exam IV • The Ides of March! 2019 NAME Solution

Joe Tritschler likes snacks, as evidenced by many stats exam problems over the years involving the subject. In fact, as much as he talks about tasty craft beverages made by his friends at Yellow Springs Brewery, Joe must admit that he really prefers many kinds of snacks. IN FACT, he wishes someone would have brought him a snack right now, as he prepares this week's stats exam. Anyway, Drake's Funny Bones are a northeastern classic that Joe always used to enjoy when he toured up there. A sample of $n = 26$ Funny Bones yielded the following (fictitious) data regarding the number of grams of saturated fat per Funny Bone: $\bar{x} = 10.236$ g, $s = 0.6213$ g, unknown population variance. Joe's doctor has advised him not to consume more than ten grams of saturated fat per day, or he will drop dead. (Whatever.) Test the following hypotheses on the number of grams of saturated fat in a Drake's Funny Bone using the fixed level of significance approach at $\alpha = 0.05$.

H_0: $\mu = 10$ g

H_0: $\mu > 10$ g

Roughly sketch the appropriate distribution, showing your test statistic, critical value(s), and critical region(s). Don't forget to clearly state your final conclusion regarding the null hypothesis.



Unknown σ

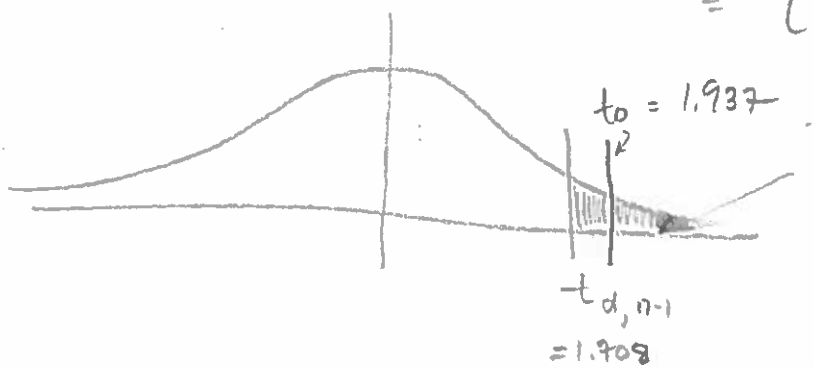
$\rightarrow T_0 = \dfrac{\bar{x} - \mu_0}{s/\sqrt{n}}$ (+1)

$= \dfrac{10.236 - 10}{0.6213/\sqrt{26}}$

$t_0 = 1.937$ (+1)

critical value (upper one-sided): $t_{\alpha, n-1}$ (+1)

$= t_{.05, 25} = 1.708$ (table) (+1)



(+3)

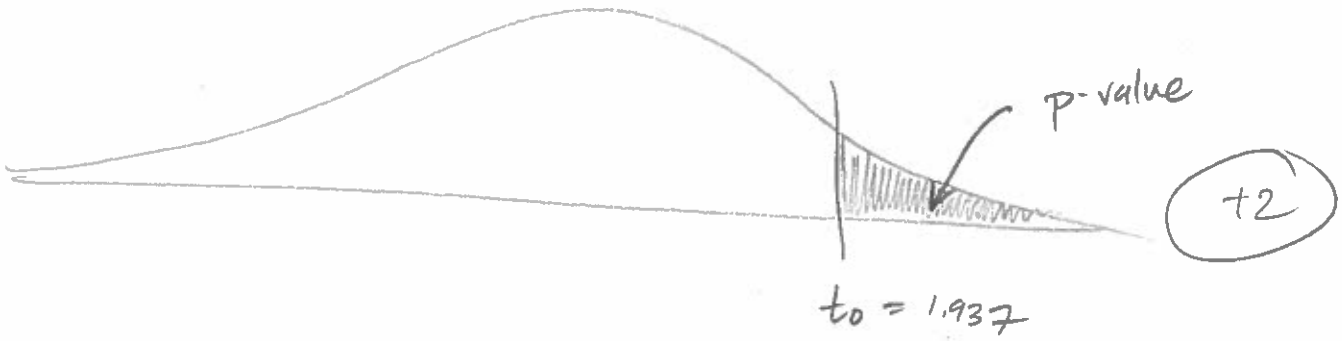
$t_0 > t_{\alpha, n-1}$ ∴ reject H_0 (+1)

Now test the same hypotheses using the *p*-value approach. Roughly sketch the appropriate distribution, showing your test statistic and region(s) corresponding to the *p*-value.

$t_{.05,25} = 1.708$

$t_{.025,25} = 2.060$ ← t_0 is between these values (+1)

∴ $0.025 < \text{p-value} < 0.05$ (+1)



(+2)

Since p-value < 0.05,

reject H_0 @ $\alpha = 0.05$ (+1)