

MAT 223, Discussion Questions 11.18

1. Why do we do hypothesis testing?

Since we don't expect samples to be exactly any particular value even true population value, we want to know if we have good reason to think the results we obtain are different from expectations & the result

2. The null hypothesis the default assumption we make in the absence of evidence or based on previous information. What do we want to set up our test to make these assumptions difficult to reject? (Consider: we presume innocence (the null hypothesis) in legal proceedings. Why would presuming guilt be a bad idea? Apply your answer to the more general case.)

random here

the chance of rejecting null hypothesis is easier to control; in the legal framework we don't want to be routinely sending innocent people to prison

3. What is another name for the alternative hypothesis?

there are a number, but one is The experimental hypothesis

4. Which of the following hypothesis tests are set up correctly? If they are set up correctly, are they for a mean or a proportion? And which test in the calculator would you use for them? If they are not set up correctly, what is wrong with them?

a. $H_0: \mu = 100, H_a: \mu > 100$ good \rightarrow T-Test or T-Test

b. $H_0: p = 20, H_a: p \leq 20$ no, bad $H_0: p = 20, H_a: p \leq 20$ okay
no \neq, \geq or \leq on H_a 1 Prop Z Test

c. $H_0: p \neq 0.25, H_a: p = 0.25$ bad
Switch

d. $H_0: \mu = 25, H_a: \mu = 100$ must match bad $H_a: \mu > 25$ Can't test for a specific value
change = \neq to $>$

e. $H_0: p = 0.6, H_a: p \neq 0.6$ good
1 Prop Z Test

- f. $H_0: \mu = 120, H_a: \mu \neq 150$ $\mu > 120$ bad
 can't test for specific value #s in H_0 & H_a must match
- g. $H_0: p = 31, H_a: p \neq 31$ bad
 not a proportion case = 31
- h. $H_0: \mu = 0, H_a: \mu < 10$ bad
 must match #s in H_0

5. A large company that produces allergy medications claims that Americans lose an average of 40 hours of work to problems related to seasonal allergies. A consumer advocacy group believes that this claim is actually just "hype" intended to sell more medication. The advocacy group would like to obtain statistical evidence about this issue and takes a random sample of 100 American workers. They find that these 100 people lost an average of 38 hours with a standard deviation of 9.5 hours. What are the null and alternative hypotheses in this situation? State them in correct notation.

T-Test (Stats)

$$\mu_0 = 40$$

$$\bar{x} = 38$$

$$s_x = 9.5$$

$$n = 100$$

$$\mu < \mu_0$$

$$\begin{array}{l} H_0: \mu = 40 \\ H_a: \mu < 40 \end{array}$$

$$t = -2.1052...$$

$$p = .01889... < .05$$

reject H_0

6. Comment on the article at <http://www.sciencedaily.com/releases/2015/08/150825103111.htm>.