MAT 135, Discussion Questions 4.18

1. Why do we do hypothesis testing?

in order to fest the endence for claims

2. The null hypothesis the default assumption we make in the absence of evidence or based on previous information. Why 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.)

we can control the chance of a serious mistake
more lasely. We want to be seene it seefe
So its better to start who an assumption its not than
to assume its safe and miss when its wrong

3. What is another name for the alternative hypothesis?

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?

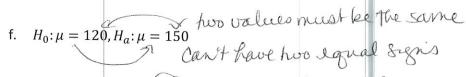
a.
$$H_0$$
: $\mu = 100$, H_a : $\mu > 100$

b. $H_0: p = 20, H_a: p \le 20$ ho equality in Ha

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

d.
$$H_0: \mu = 25, H_a: \mu = 100$$
3 2 Values must be the same

e.
$$H_0: p = 0.6, H_a: p \neq 0.6$$



g.
$$H_0: p = 31, H_a: p \neq 31$$
 vota proportion value

h.
$$H_0: \mu = 0, H_a: \mu < 10$$
 values must be the same

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.

6. How is the level of significance related to confidence level?

$$\alpha = \text{significance}$$
 $1-\alpha = \text{confidence}$

7. What is a Type I error? Under what circumstances does it occur?

8. What is a Type II error? Under what circumstances does it occur?

9. In the context of a legal analogy, the following table illustrates the relationship between correct decisions and Type I and Type II errors.

		True State of Nature	
		H ₀ (Innocent)	H ₁ (Guilty)
Conclusion Drawn	H ₀ (Innocent)	Correct	Type II Error
	H₁(Guilty)	Type I Error	Correct

Create a similar table for the problem scenario in #5 above.

The State of Nature

Ho \$1240 | Ha \$1640

Cornect Type II ever

Ha \$1640 | Type I ever Correct