Equitable Equations: *Hypothesis testing: errors*

Instructions

For each of the following problems,

(a) State null and alternative hypotheses appropriate to the situation

(b) Describe what a type I and type II error would look like.

Problem 1

A smart phone manufacturer claims that their devices have a mean charge time of 35 minutes. A consumer group suspects it's longer. They collect a sample of size 89 to test the claim.

Problem 2

The NBA advertises that the average length of their games is 131 minutes. A fan times 25 games to see if this claim is reasonable.

1) a) $H_0 = \mu = 35$

$H_a = \mu > 35$

b) Type I Error: Mean charging time is 35 min but the sample mean collected by the consumer group has an unusually high mean charging time that does not support H_0

Type II Error: The mean charging time is longer than 35 min but the sample mean collected by the consumer group was unusually low so it supports H_0.

2) a) $H_0 = \mu = 131$

$H_a = \mu \neq 131$

b) Type I error: The average game length is 131 minutes but the fan watches some unusually timed games and gets a mean time that does not support H_0

Type 2 Error: The mean of the times of the games the fan watched support the idea that the mean game time is 131 minutes even though it is not