55. Let $X_1, ..., X_n$ be a random sample from a normal distribution with mean μ and variance σ^2.

(a) If μ is unknown and σ^2 is known, show that

$$Z = \sqrt{n}\left(\frac{\bar{X} - \mu_0}{\sigma}\right)$$

is a score statistic for testing the hypothesis $H_0 : \mu = \mu_0$.

(b) If σ^2 is unknown and μ is known, find a score statistic for testing $H_0 : \sigma = \sigma_0$.