

Homework Assignment Number Six

We intend to purchase a liquid as a raw material for a material we are designing. Two vendors offer us samples of their product and a statistic sheet. We run the samples in our own labs and come up with the following data:

Vendor 1			Vendor 2		
sample #	outcome		sample #	outcome	
	1	2.30		1	2.49
	2	2.49		2	1.98
	3	2.05		3	2.18
	4	2.40		4	2.36
	5	2.18		5	2.47
	6	2.12		6	2.36
	7	2.38		7	1.82
	8	2.39		8	1.88
	9	2.40		9	1.87
	10	2.46		10	1.87
	11	2.19			
	12	2.04			
	13	2.43			
	14	2.34			
	15	2.19			
	16	2.12			

Vendor Specification Claims:

Vendor 1: $\mu = 2.0$ and $\sigma^2 = 0.05$, $\sigma = 0.2236$

Vendor 2: $\mu = 2.3$ and $\sigma^2 = 0.12$, $\sigma = 0.3464$

Sample statistics

$$n_1 = 16 \quad \bar{x}_1 = \frac{1}{16} \sum_{i=1}^{16} x_i = 2.280 \quad s_1^2 = \frac{1}{16} \sum_{i=1}^{16} [(x_i - \bar{x}_1)^2] = 0.0229 \quad s_1 = 0.1513$$

$$n_2 = 10 \quad \bar{x}_2 = \frac{1}{10} \sum_{i=1}^{10} x_i = 2.128 \quad s_2^2 = \frac{1}{10} \sum_{i=1}^{10} [(x_i - \bar{x}_2)^2] = 0.0744 \quad s_2 = 0.2728$$

Problem 1.

Determine a 95% confidence interval on the mean of sample 1. Use the value of the population variance given. Is the given population mean legitimate?

Problem 2.

Determine a 95% confidence interval on the difference of means between samples 1 and 2. Use the values of the population variance given. Is the difference between the given population means legitimate?

Problem 3.

Determine a 95% confidence interval on the mean of sample 1. Assume the given values of the population variances are suspect and not to be trusted. Is the given population mean legitimate?

Problem 4.

Determine a 95% confidence interval on the difference of means between samples 1 and 2. Assume the given values of the population variances are suspect and not to be trusted. Is the difference between the given population means legitimate?

Problem 5.

Determine a 95% confidence interval on the variance of sample 1. Is the given population variance legitimate?

Problem 6.

Determine a 98% confidence interval on the ratio of variance of samples 1 & 2. Is the ratio of the given population variances legitimate?