

Sample test 3

Problem 1. A cigarette manufacturer advertises that its new low-tar cigarette "contains on average no more than 4 milligrams of tar". The sample of 15 randomly picked cigarettes has average 4.1 milligrams of tar with standard deviation 0.15 milligrams. Does the sample information contradicts manufacturer claim? Use $\alpha = 0.05$.

Problem 2. A recent report stated that only 20% of all college graduates find work in the field of their undergraduate major. A random sample of 200 graduates found 50 working in the field of their undergraduate major. Does this sample provide evidence at the $\alpha = 0.01$ to indicate that the percentage given in the report is too low.

Problem 3. A department store wants to estimate the average age of all the customers shopping in the apparel department, correct to within 2 years with 90% confidence. How large a sample should be? The ages of these customers are between 15 and 45.

Problem 4. Two independent random samples were selected with samples sizes, means and standard deviations given in a table 1. Form a 90% confidence interval for $\mu_1 - \mu_2$.

Sample 1	Sample 2
$n_1=45$	$n_2 = 45$
$\bar{x}_1 = 10.5$	$\bar{x}_2 = 12.2$
$s_1 = 3.2$	$s_2 = 2.5$

Table 1:

Problem 5. Refer to table 2 and test $H_0 : \mu_1 - \mu_2 = 0$ versus $H_a : \mu_1 - \mu_2 \neq 0$ with $\alpha = 0.01$. Assume that samples are independent, random and selected from normal populations with equal variances.

Sample 1	Sample 2
$n_1=10$	$n_2 = 20$
$\bar{x}_1 = 10.5$	$\bar{x}_2 = 12.2$
$s_1 = 3.2$	$s_2 = 2.5$

Table 2: