Interval Estimation

1. **A random sample** of size 36 is taken from a normal population with a known variance $\sigma^2=25$. If the mean of the sample is 42.6, find 95% confidence limits for the population mean.
2. **Suppose that the** weights of 100 male students of a university represent a random sample of weights of 1546 students of the university. Find 99% confidence intervals for the mean weight of the students, given $\bar{x} = 67.45$ and $\hat{s} = 2.93$.
3. **A random sample** of seven independent observations of a normal variable gave $\sum x = 35.9$, $\sum x^2 = 186.19$. Calculate a 90% confidence interval for the population mean.
4. **In 40 tosses of** a coin, 24 heads were obtained. Find 95% confidence limit for the proportion of heads which would be obtained in an unlimited number of tosses of the coin.
5. **A test in statistics** was given to 50 girls and 75 boys. The girls made an average grade of 76 with a standard deviation of 6, while the boys made an average grade of 82 with a standard deviation of 8. Find a 96% confidence interval for the difference $\mu_1 - \mu_2$ where μ_1 is the mean score of all boys and μ_2 is the mean score of all girls who might take this test.
6. **Let two independent** random samples, each of size 100, from independent normal distributions $N(\mu_1, \sigma_1^2)$ and $N(\mu_2, \sigma_2^2)$ yield $\bar{x}_1 = 4.8$, $\hat{s}_1^2 = 8.64$, $\bar{x}_2 = 5.6$, $\hat{s}_2^2 = 7$. Find a 95% confidence interval for $(\mu_2 - \mu_1)$.
7. **Given that**

$\bar{x}_1 = 75$	$n_1 = 9$	$\sum (x_1 - \bar{x}_1)^2 = 1482$
$\bar{x}_2 = 60$	$n_2 = 16$	$\sum (x_2 - \bar{x}_2)^2 = 1830$

And assuming that the two samples were randomly selected from two normal populations in which $\sigma_1^2 = \sigma_2^2$ (but unknown), calculate an 80% confidence interval for the difference between the two population means.

8. **The population of** interest are the voting preferences of all registered voters in Punjab and Sindh. Two independent random samples were taken from these populations and the values $n_1 = n_2 = 1000$, $p_1 = 0.54$ and $p_2 = 0.47$. Find a 95% confidence interval for $\pi_1 - \pi_2$.