

# Workbook



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# Confidence Intervals for Comparing Two Sample Means

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### Questions

- 1) We want to examine whether there is a difference between the scores of college students and high school students on an IQ test. Scores on this IQ test are known to follow a normal distribution with a standard deviation of 100. The average score in a sample of 16 college students was 543, and the average score in a sample of 20 high school students was 508.  
Construct a 95% confidence interval for the difference between the test score averages of college and high school students.
  
- 2) A given IQ test has a normal distribution with a standard deviation of 15. The average score in a sample of 20 Europeans was 104, and the average score in a sample of 23 Americans was 99.  
Construct a confidence interval at a 95% level of confidence for the difference in average IQ between Europeans and the US.
  
- 3) A construction engineering company wants to compare the strength of two types of nails. Nail strength is distributed normally with a standard deviation of 4 units. The average strength in a sample of 15 Type A nails was 28 units, and the average strength in a sample of 12 Type B nails was 25 units.  
At what level of certainty would it be decided that there is no difference between the average strength of these types of nails?
  
- 4) A random sample of 45 law students studies 4 hrs/week on average, with a standard deviation of 2 hrs. A random sample of 55 engineering students studies 10 hrs/week on average, with a standard deviation of 3 hrs.  
Estimate the difference in weekly study rates between law and engineering students, at a 95% level of certainty.
  
- 5) 100 people from NYC and 107 people from LA were randomly sampled: NYers watched an average of 2.7 hours, with a standard deviation of 0.7 hours. LAers watched an average of 1.8 hours, with a standard deviation of 1.1 hours.  
Find a 95% confidence interval for the difference between the cities in weekly rate of TV watching.

### Answer Key

- 1)  $(-30.74, 100.74)$
- 2)  $(-3.989, 13.989)$
- 3) 94.71%
- 4)  $(-6.998, -5.002)$  OR  $(5.002, 6.998)$ .
- 5)  $(0.6488, 1.1512)$