You may submit your report on each of the following questions:

1. (50 points) Size of trees in the northern and southern halves.

   The study of 584 longleaf pine trees in the Wade Tract in Thomas County, Georgia, had several purposes. Are trees in one part of the tract more or less like trees in any other part of the tract or are there differences? In this exercise we will examine the sizes of the trees. Here we divide the tract into northern and southern halves and take random samples of 30 trees from each half. Here are the diameters in centimeters (cm) of the sampled trees:

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   diameters in centimeters (cm) of the sampled trees:
   27.8 14.5 39.1 3.2 58.8 55.5 25.0 5.4 19.0 30.6
   North    15.1 3.6 28.4 15.0 2.2 14.2 44.2 25.7 11.2 46.8
   36.9 54.1 10.2 2.5 13.8 43.5 13.8 39.7 6.4 4.8

   44.4 26.1 50.4 23.3 39.5 51.0 48.1 47.2 40.3 37.4
   South    36.8 21.7 35.7 32.0 40.4 12.8 5.6 44.3 52.9 38.0
   2.6 44.6 45.5 29.1 18.7 7.0 43.8 28.3 36.9 51.6
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   (a) (10 points) Use a back-to-back side-by-side boxplots to examine the data graphically. Describe the patterns in the data.

   (b) (10 points) Is it appropriate to use the methods of this section to compare the mean DBH of the trees in the north half of the tract with the mean DBH of trees in the south half? Give reasons for your answer.

   (c) (10 points) What are appropriate null and alternative hypotheses for comparing the two samples of tree DBHs? Give reasons for your choices.

   (d) (10 points) Perform the significance test. Report the test statistic, the degrees of freedom, and the P-value. Summarize your conclusion.

   (e) (10 points) Find a 95% confidence interval for the difference in mean DBHs. Explain how this interval provides additional information about this problem.