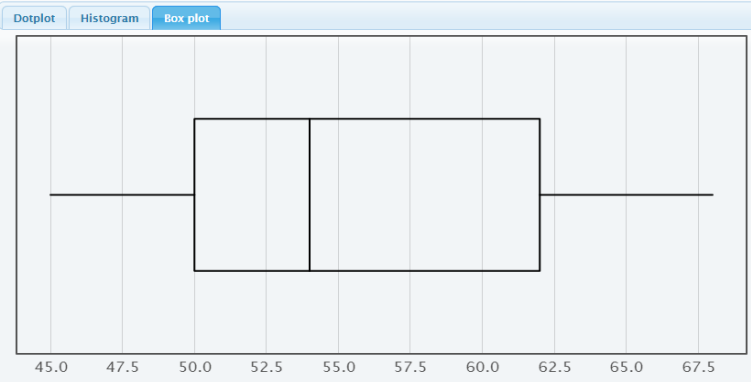
Exam Practice 9

Section: 014 Name: _____

Print off this assignment and write in your answers. Turn Wednesday, April 29th at the beginning of class. Each answer is one point unless noted differently.

Every year, New York City hosts Nathan's Famous Hot Dog Eating Contest on the 4th of July. Contestants are given 10 minutes to eat as many hot dogs as possible. For each of the last 10 years, the winning number of hot dogs eaten was recorded. The data is pictured below in a box plot with summary measures to the right. Assume this sample of years is representative of all years the contest has been running.



Summary Statistics

Statistic	Value
Sample Size	10
Mean	56.100
Standard Deviation	7.505
Minimum	45
Q_1	50.000
Median	54.000
Q_3	62.000
Maximum	68

1) Identify the parameter of interest in words and notation.
   a) p represents the true proportion of years during which more than 50 hot dogs are eaten by the winners.
   b) μ represents the true mean number of hot dogs eaten by the winners of this contest.
   c) μ represents the true mean number of hot dogs eaten over these 10 years.
   d) p represents the true proportion of hot dogs which were eaten by the winners of this contest.

2) What is the point estimate?
   a) 10 b) 56.1 c) 7.505 d) 54

3) What is the standard error of the estimate?
   a) $\frac{7.505}{\sqrt{10}}$ b) $\frac{7.505}{\sqrt{9}}$ c) $\frac{56.1}{\sqrt{10}}$ d) $\frac{56.1}{\sqrt{9}}$

4) Which t* value should be used to create a 90% confidence interval for this data? (Hint: draw the picture you would want to see in the applet!)
   a) t^*_{10} with area .10 to the right = 1.372
   b) t^*_{10} with area .05 to the right = 1.812
   c) t^*_{9} with area .10 to the right = 1.383
   d) t^*_{9} with area .05 to the right = 1.833

5) Should the t-distribution be used to analyze this data? Explain.
   a) Yes, for roughly symmetric data with no outliers, this is a large enough sample size.
   b) No, the normal distribution should be used instead.
   c) No, because this is not a random sample.
   d) Yes, because we can always use the t-distribution to analyze means.

On EP5 we looked at growth of Sitka spruce trees to see if mean growth was different in an ozone rich environment. As a reminder, trees not picked at random were randomly assigned to either the ozone or control group and their growth was measured. The data in both groups was roughly symmetric and unimodal with no outliers. Here is the data summary:

Control n = 25 mean = 1.49 s = 0.33
Ozone n = 54 mean = 1.25 s = 0.34

6) What is the observed result?
a) 1.49 b) 1.25 c) 29 d) 0.24

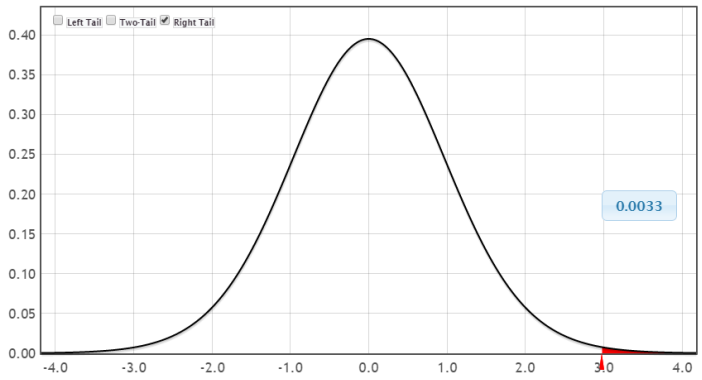
7) What is the standard error of the statistic?
a) 0.0195 b) 0.0065 c) 0.0806 d) 0.1396

8) What alternative hypothesis should be used?
a) $\mu_c = \mu_o$ b) $\mu_c \neq \mu_o$ c) $\mu_c < \mu_o$ d) $\mu_c > \mu_o$

9) Calculate the test statistic. Show your work.

10) What distribution should be used to analyze this data?
a) t_{24}
b) t_{53}
c) t_{78}
d) Normal

11) StatKey output is shown below. Assume the line is at your test statistic and that the correct distribution was selected. What is the p-value for your test?
a) 0.0033
b) 0.0066
c) 0.00165
d) 0.9967



12) What is the appropriate conclusion to draw which includes the scope of inference for this problem?
a) We have very strong evidence the true average growth of spruce trees is different between ozone enriched and control environments.
b) We have very strong evidence that ozone has an effect on the true average true growth of spruce trees.
c) We have little to no evidence that there is a difference in the average tree growth between ozone and control environments for this sample of spruce trees.
d) We have very strong evidence that ozone has an effect on the true mean growth of these spruce trees.