10.11

Digital cameras have taken over the majority of the point-and-shoot camera market. One of the important features of a camera is the battery life, as measured by the number of shots taken unit the battery needs to be recharged. The file DigitalCameras contains the battery life of 29 sub-compact cameras and 16 compact cameras (data extracted from “Digital Cameras,” Consumer Reports, July 2009, pp. 28-29).  
Battery Life Camera Type Subcompact Compact  
320 Subcompact 320 520  
520 Subcompact 520 260  
160 Subcompact 160 400  
160 Subcompact 160 200  
300 Subcompact 300 300  
120 Subcompact 120 150  
520 Subcompact 520 360  
440 Subcompact 440 200  
300 Subcompact 300 260  
170 Subcompact 170 80  
150 Subcompact 150 200  
300 Subcompact 300 260  
180 Subcompact 180 400  
100 Subcompact 100 260  
150 Subcompact 150 200  
400 Subcompact 400   
170 Subcompact 170   
180 Subcompact 180   
160 Subcompact 160   
240 Subcompact 240   
320 Subcompact 320   
260 Subcompact 260   
150 Subcompact 150   
320 Subcompact 320   
180 Subcompact 180   
140 Subcompact 140   
220 Subcompact 220   
160 Subcompact 160   
340 Subcompact 340   
200 Subcompact 200   
130 Subcompact 130   
520 Compact   
260 Compact   
400 Compact   
200 Compact   
300 Compact   
150 Compact   
360 Compact   
200 Compact   
260 Compact   
80 Compact   
200 Compact   
260 Compact   
400 Compact   
260 Compact   
200 Compact   
  
a. Assuming that the population variances from both types of digital cameras are equal, is there evidence of a difference in the mean battery life between the two types of digital cameras (α=0.05)?  
Determine the p-value in (a) and interpret its meaning.

b. Determine the p-value in (a) and interpret its meaning

c. Assuming that the population variances from both types of digital cameras are equal, construct and interpret a 95% confidence interval estimate of the difference between the population mean battery life of the two types of digital cameras.

10.21

In industrial settings, alternative methods often exist for measuring variables of interest. The data in the file (coded to maintain confidentiality) represent measurements in-line that were collected from an analyzer during the production process and from an analytical lab (extracted from M. Leitnaker, “Comparing Measurement Processes: In-line Versus Analytical  
Measurements,” Quality Engineering, 13, 2000–2001, pp. 293–298).  
Sample In-Line Analytical lab  
1 8.01 8.01  
2 7.56 7.29  
3 7.47 7.54  
4 7.4 7.42  
5 7.83 7.8  
6 7.5 7.65  
7 6.86 6.93  
8 7.31 7.46  
9 7.45 7.6  
10 7.23 7.4  
11 7.37 7.5  
12 7.49 7.41  
13 6.21 6.25  
14 6.68 6.54  
15 5.12 5.2  
16 4.84 4.7  
17 4.84 4.82  
18 5.21 5.33  
19 5.35 5.3  
20 5.6 5.4  
21 5.32 5.39  
22 5.16 5.17  
23 5.66 5.5  
24 6.31 6.24

a. At the 0.05 level of significance, is there evidence of a difference in the mean measurements in-line and from and analytical lab?

b. What assumption is necessary about the population distribution in order to perform this test?

c. Use a graphical method to evaluate the validity of the assumption in (a).

d. Construct and interpret a 95% confidence interval estimate of the difference in the mean measurements in-line and from an analytical lab.

10.23

In tough economic times, magazines and other media have trouble selling advertisements. Thus, one indicator of a weak economy is a reduction in the number of magazine pages devoted to advertisements. The file Ad Pages (attached) contains the number of pages devoted to advertisements in May 2008 and May 2009 for 12 men's magazines.

a. At the 0.05 level of significance, is there evidence that the mean number of pages devoted to advertisements in men's magazines was higher in May 2008 than in May 2009?

b. What assumption is necessary about the population distribution in order to perform this?

c. Use a graphical method to evaluate the validity of the assumption in (b).

d. Construct and interpret a 95% confidence interval estimate of the difference in the mean number of pages devoted to advertisements in men’s magazines between May 2008 and May 2009.