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.