Chapter 8 Confidence Interval Estimation: Further Topics
Practice Questions

1. A dependent random sample from two normally distributed populations gives the following results:

n = 15	$\bar{d} = 25.4$	$s_d = 2.8$

Find the 95% confidence interval for the difference in the means of the two populations.

2. A random sample of six sales persons that attended a motivational course on sales techniques was monitored in the three months before and the three months after the course. The table shows the values of sales (in thousands of dollars) generated by these six salespersons in the two periods. Assume that the population distributions are normal. Find an 80% confidence interval for the difference between the two population means.

Salesperson	Before Course	After Course
1	212	237
2	282	291
3	203	191
4	327	341
5	165	192
6	198	180

3. Independent random sampling from two normally distributed populations gives the following results:

$n_x = 64$	$\bar{x} = 400$	$\sigma_x = 20$
$n_y = 36$	$\bar{y} = 360$	$\sigma_y = 25$

Find a 90% confidence interval estimate of the difference in the means of the two populations.

4. A manufacturer knows that the numbers of items produced per hour by machine A and by machine B are normally distributed with a standard deviation of 8.4 items for machine A and a standard deviation of 11.3 items for machine B. The mean hourly amount produced by machine A for a random sample of 40 hours was 130 units; the mean hourly amount produced by machine B for a random sample of 36 hours was 120 units. Find the 95% confidence interval for the difference in mean parts produced per hour by these two machines.

5. Assuming equal population variances and $\bar{x} = 120, \bar{y} = 100$, determine (i) t-value and (ii) pooled sample variance (s_p^2) for the following cases.

(a)	$n_x = 12$	$s_x^2 = 30$	$n_y = 14$	$s_y^2 = 36$	90% CL
(b)	$n_x = 6$	$s_x^2 = 30$	$n_y = 7$	$s_y^2 = 36$	95% CL
(c)	$n_x = 9$	$s_x^2 = 16$	$n_y = 12$	$s_y^2 = 25$	99% CL

6. Assuming Non-equal population variances, repeat the question 5.

7. Recent business graduates currently employed in full-time positions were surveyed. Family backgrounds were self-classified as relatively high or low socioeconomic status. For a random sample of 16 high-socioeconomic-status recent business graduates, mean total compensation was $34,500 and the sample standard deviation was $8520. For an independent random sample of 9 low-socioeconomic status recent business graduates, mean total compensation was $31,499 and the sample standard deviation was $7521.

(i) Find a 90% confidence interval for the difference between the two population means by assuming equal population variances.
(ii) Find a 90% confidence interval for the difference between the two population means by not assuming equal population variances.

8. Calculate the 95% confidence interval for the difference in population proportions for each of the following.

(a)	$n_x = 370$	$\widehat{p_x} = 0.65$	$n_y = 200$	$\widehat{p_y} = 0.68$
(b)	$n_x = 220$	$\widehat{p_x} = 0.48$	$n_y = 270$	$\widehat{p_y} = 0.52$

9. In a random sample of 120 large retailers, 85 used regression as a method of forecasting. In an independent random sample of 163 small retailers, 78 used regression as a method of forecasting. Find a 98% confidence interval for the difference between the two population proportions.

10. A random sample of 100 men contained 61 in favor of nuclear power plant. An independent random sample of 100 women contained 54 in favor of nuclear power plant. The confidence interval: $0.04 < Px - Py < 0.10$ was calculated for the difference between the population proportions. What is the confidence level of this interval?