ANSWERS TO ODD-NUMBERED EXERCISES

Chapter 1

Review Exercises

7. Situation A

(a) 300 households **(b)** all households in the small southern town **(c)** number of school-aged children present **(d)** all that reported one or more children **(e)** nominal (categories: 0 children, 1 child, and so on)

Situation B

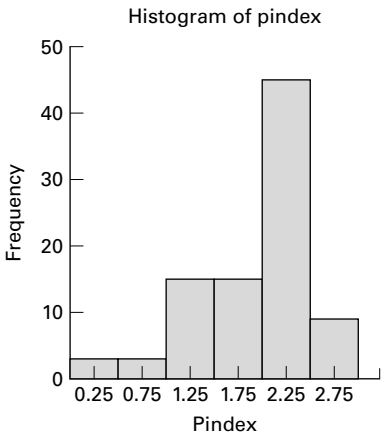
(a) 250 patients **(b)** all patients admitted to the hospital during the past year **(c)** distance patient lives from the hospital **(d)** 250 distances **(e)** ratio

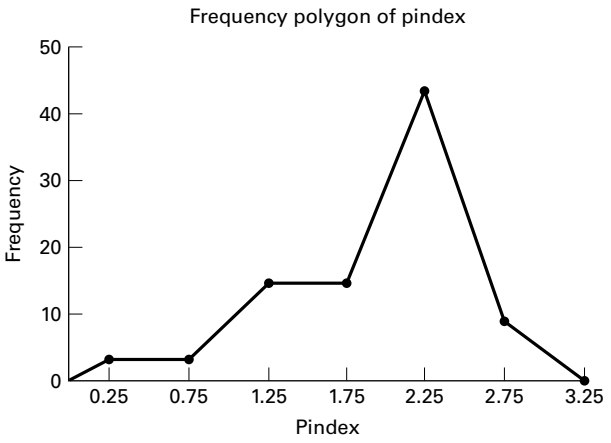
Chapter 2

2.3.1. (a)

Class Interval	Frequency	Cumulative Frequency	Relative Frequency	Cumulative Relative Frequency
0–0.49	3	3	3.33	3.33
.5–0.99	3	6	3.33	6.67
1.0–1.49	15	21	16.67	23.33

(*Continued*)



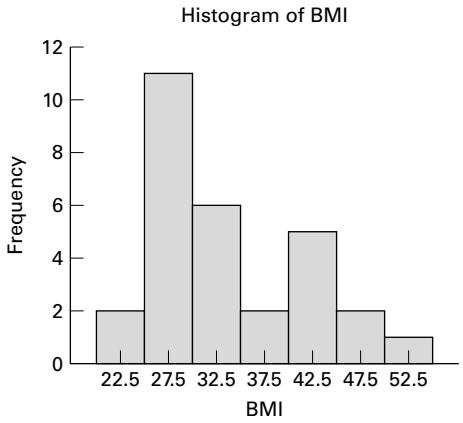


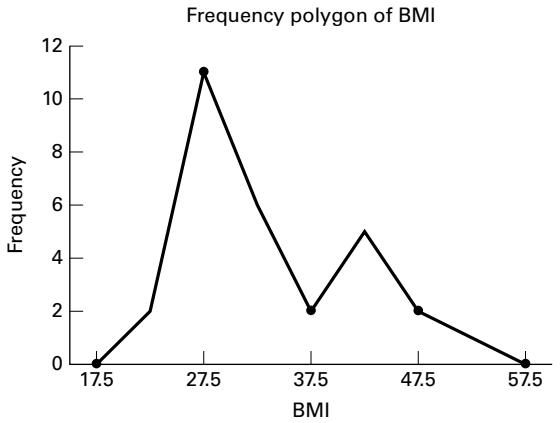
Class Interval	Frequency	Cumulative Frequency	Relative Frequency	Cumulative Relative Frequency
1.5–1.99	15	36	16.67	40.00
2.0–2.49	45	81	50.00	90.00
2.5–2.99	9	90	10.00	100.00

(b) 40.0% **(c)** .7667 **(d)** 16.67% **(e)** 9 **(f)** 16.67% **(g)** 2.17, because it composes almost 25 percent of the data and is the most frequently occurring value in the data set. **(h)** Skewed to the left.

2.3.3. (a)

Class Interval	Frequency	Cumulative Frequency	Relative Frequency	Cumulative Relative Frequency
20–24.99	2	2	0.069	6.90
25–29.99	11	13	0.3793	44.83
30–34.99	6	19	0.2069	65.52
35–39.99	2	21	0.069	72.41
40–44.99	5	26	0.1724	89.66
45–49.99	2	28	0.069	96.55
50–54.99	1	29	0.0345	100.00

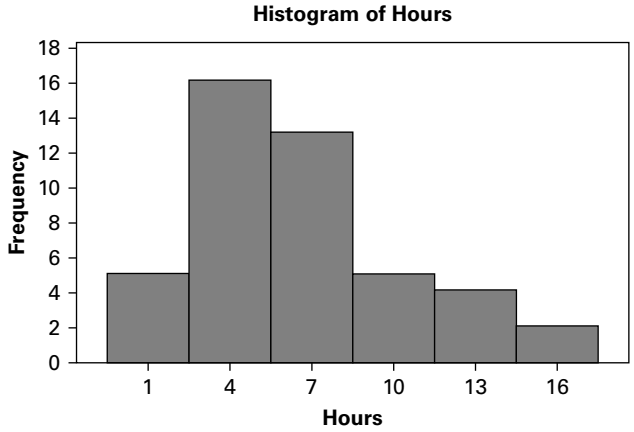


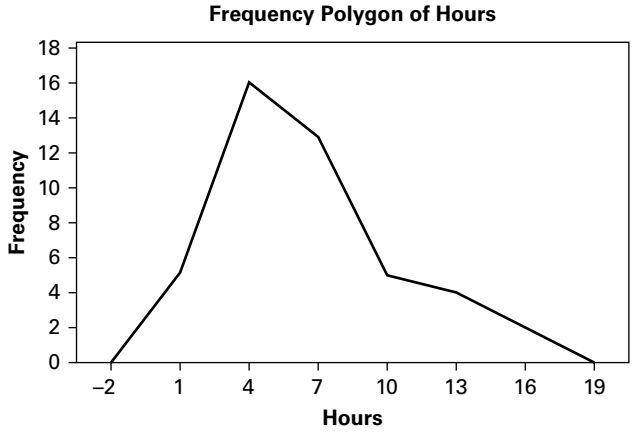


(b) 44.83% **(c)** 24.14% **(d)** 34.48% **(e)** The data are right skewed **(f)** 21

2.3.5. (a)

Class Interval	Frequency	Relative Frequency
0–2	5	0.1111
3–5	16	0.3556
6–8	13	0.2889
9–11	5	0.1111
12–14	4	0.0889
15–17	2	0.0444
	45	1.000

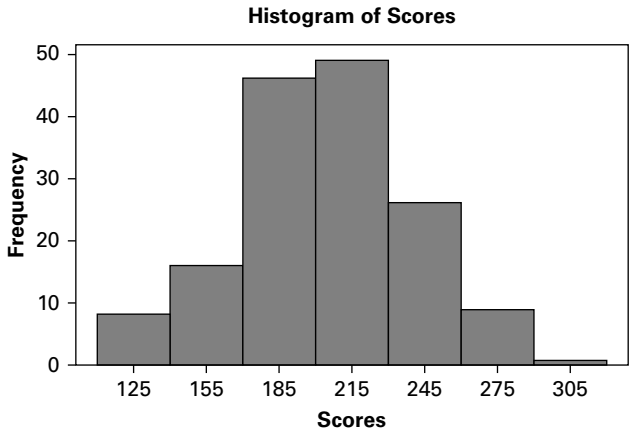


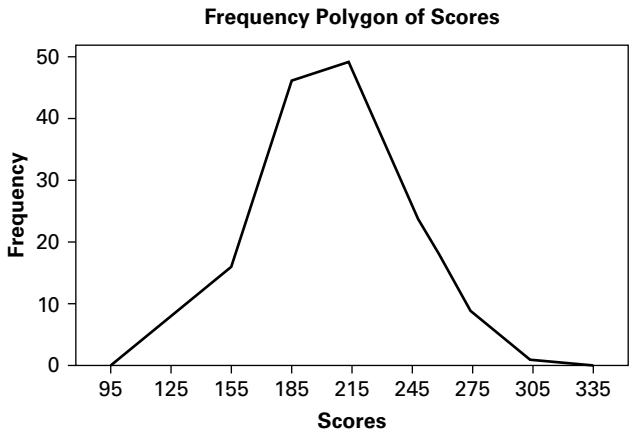


(b) Skewed right

2.3.7. (a)

Class Interval	Frequency	Cumulative Frequency	Relative Frequency	Cumulative Relative Frequency
110–139	8	8	0.0516	0.0516
140–169	16	24	0.1032	0.1548
170–199	46	70	0.2968	0.4516
200–229	49	119	0.3161	0.7677
230–259	26	145	0.1677	0.9354
260–289	9	154	0.0581	0.9935
290–319	1	155	0.0065	1.0000





(b) Not greatly skewed

2.3.9. (a)

Stem-and-Leaf Display: Hospital A

```
Stem-and-leaf of C1 N = 25
Leaf Unit = 1.0

 1   17  1
 2   18  4
 4   19  15
 9   20  11259
(6)  21  233447
10   22  2259
 6   23  389
 3   24  589
```

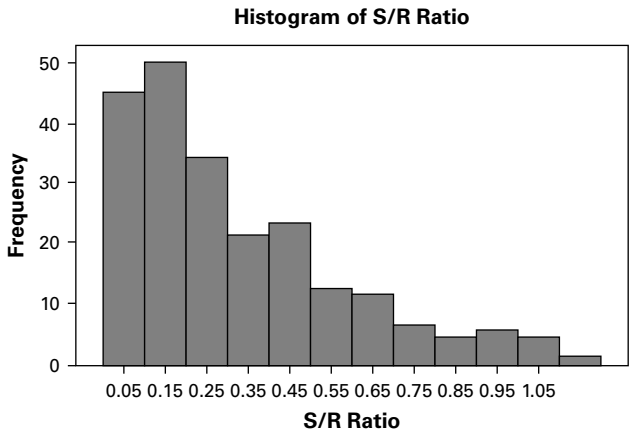
Stem-and-Leaf Display: Hospital B

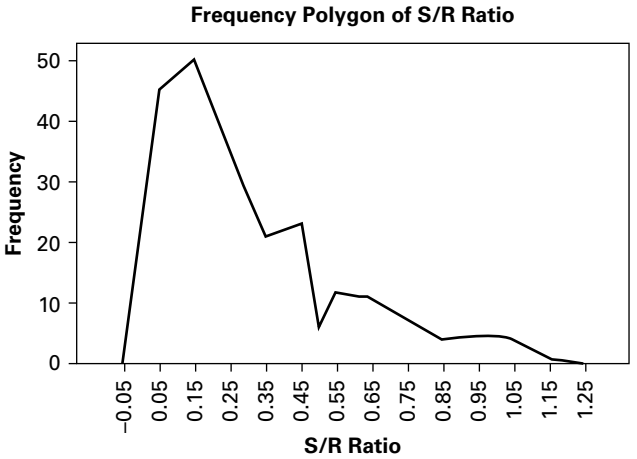
```
Stem-and-leaf of C2 N = 25
Leaf Unit = 1.0

 1   12  5
 2   13  5
 4   14  35
 9   15  02445
(4)  16  5678
12   17  38
10   18  466
 7   19  0059
 3   20  3
 2   21  24
```

(b) Both asymmetric: A is skewed left, and B is skewed right.

2.3.11. (a)

Class Interval	Frequency	Cumulative Frequency	Relative Frequency	Cumulative Relative Frequency
.0–.0999	45	45	20.83	20.83
.1–.1999	50	95	23.15	43.98
.2–.2999	34	129	15.74	59.72
.3–.3999	21	150	9.72	69.44
.4–.4999	23	173	10.65	80.09
.5–.5999	12	185	5.56	85.65
.6–.6999	11	196	5.09	90.74
.7–.7999	6	202	2.78	93.52
.8–.8999	4	206	1.85	95.37
.9–.9999	5	211	2.31	97.69
1.0–1.0999	4	215	1.85	99.54
1.1–1.1999	1	216	0.46	100.00






```
Stem-and-leaf  of  C1          N = 216
Leaf  Unit  =  0.010

 46   0   12455667778888999999999999999999999999999999999
 96   1   000000000011222333344445555566666667777778888999
(34)  2   00111112234444444556666678888999 9
 86   3   0011112444455566689 99
 65   4   000011222233334445688 99
 42   5   002334444599
 30   6   02236788999
 19   7   012289
 13   8   0237
  9   9   05588
  4   10  236
  1   11  6
```

(b) Skewed right **(c)** 10, 4.62% **(d)** 196, 90.74%; 67, 31.02%, 143, 19.91%

2.5.1. **(a)** 193.6 **(b)** 205.0 **(c)** no mode **(d)** 255 **(e)** 5568.09 **(f)** 74.62 **(g)** 38.54 **(h)** 100.5

2.5.3. **(a)** 47.42 **(b)** 46.35 **(c)** 54.0, 33.0 **(d)** 29.6 **(e)** 76.54 **(f)** 8.75 **(g)** 18.45 **(h)** 13.72

2.5.5. **(a)** 16.75 **(b)** 15 **(c)** 15 **(d)** 43 **(e)** 124.02 **(f)** 11.14 **(g)** 66.51 **(h)** 8.25

2.5.7. **(a)** 1.8172 **(b)** 2 **(c)** 2.17 **(d)** 2.83 **(e)** .3164 **(f)** .5625 **(g)** 30.95 **(h)** .6700

2.5.9. **(a)** 33.87 **(b)** 30.49 **(c)** none **(d)** 29.84 **(e)** 64.00 **(f)** 8.00 **(g)** 23.62 **(h)** 13.4

2.5.11. **(a)** 6.711 **(b)** 7.00 **(c)** 7.00 **(d)** 16 **(e)** 16.21 **(f)** 4.026 **(g)** 59.99 **(h)** 5.5

2.5.13. **(a)** 204.19 **(b)** 204 **(c)** 198, 204, 205, 212 **(d)** 196 **(e)** 1257.99 **(f)** 35.47 **(g)** 17.37 **(h)** 46

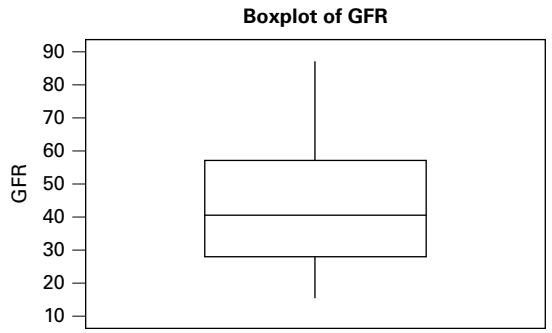
Review Exercises

13. **(a)**
```
Leaf Unit = 1.0
  2   2  55
  4   2  67
  7   2  999
 10   3  001
 17   3  2223333
(12)  3  444555555555
 21   3  66666666666666666677
```
(b) skewed **(c)** surgery is performed before birth; birth is generally around 37 weeks **(d)** $\bar{x} = 33.680$, median $= 35.00$, $s = 3.210$, $s^2 = 10.304$

15. **(a)** $\bar{x} = 43.39$, median $= 42$, $s = 17.09$, C.V. $= 39.387$, $s^2 = 292.07$

(b)
```
Stem-and-leaf of GFR   N = 28
Leaf Unit = 1.0

 1    1  8
 6    2  11377
 12   3  022267
 (7)  4  1223388
 9    5  158
 6    6  02378
 1    7
 1    8  8
```
(c) See graph on following page (A-113)

(d) 67.9%, 96.55%, 100%



17. Some examples include difference, diversity, departure, discrepancy, deviation, and entropy

19. $\bar{x} = 3.95$, Median $= 3$, $s = 3.605$, $s^2 = 12.998$

21. Answers will vary: It is not uncommon for students to score higher on exams as a semester progresses; therefore, the exam scores are likely to be left skewed, making the median, which is less affected by skew, to be the better choice.

23. Answers will vary: Using Sturges's rule, where $w = \frac{R}{k}, k = 1 + 3.322(log_{10}300) \simeq 9.23$. An estimate of sample standard deviation can be found by dividing the sample range by 4. Therefore, $s \approx \frac{R}{4}$ so that $R \approx 4s$. Using this formula, then $R = 160$ and $w = \frac{160}{9.23} = 17.33$ suggesting that (d) or (e) may be appropriate.

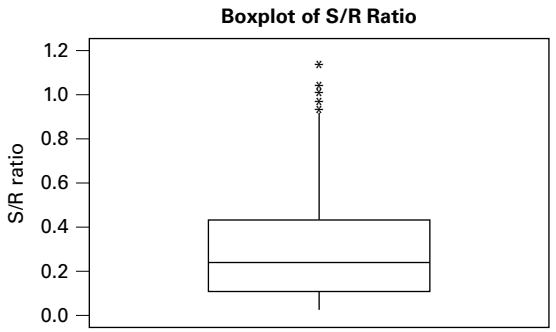
25. Answers will vary: Imagine you are examining protein intake among college students. In general most students are likely to consume the average daily protein intake, but among this population, there is likely to be a fair number of athletes who consume large amounts of protein owing to the demands of their sport. In that case, the data are likely to be positively skewed, and the median better represents the central tendency of the data.

27.

Variable	N	Mean	Median	TrMean	StDev	SE Mean
S/R	216	0.3197	0.2440	0.2959	0.2486	0.0169

Variable	Minimum	Maximum	Q1	Q3
S/R	0.0269	1.1600	0.1090	0.4367

IQR $= .3277$, Range $= 1.1331$, IQR/R $= .2892$

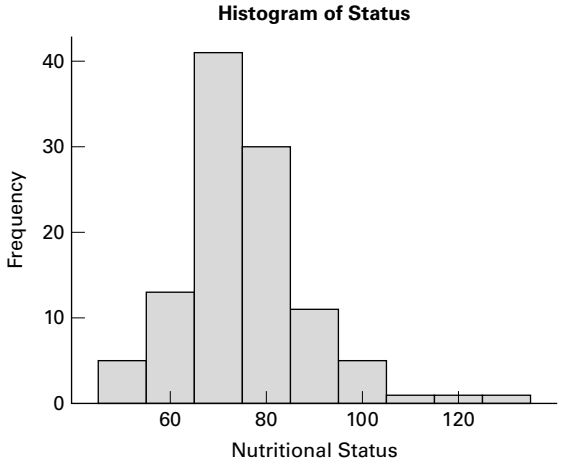


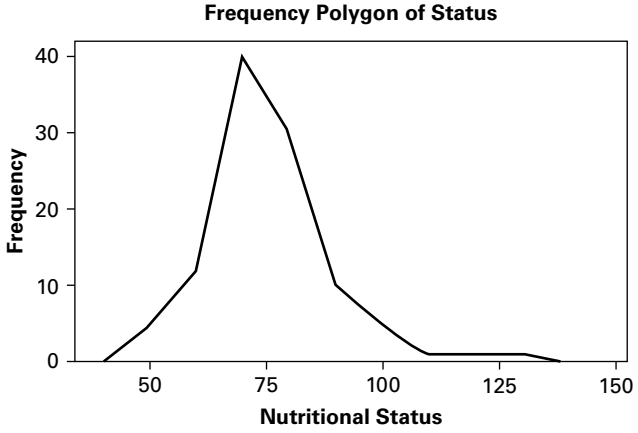
29. (a)

Variable	N	Mean	Median	TrMean	StDev	SE Mean
nutri	107	75.40	73.80	74.77	13.64	1.32

Variable	Minimum	Maximum	Q1	Q3
nutri	45.60	130.00	67.50	80.60

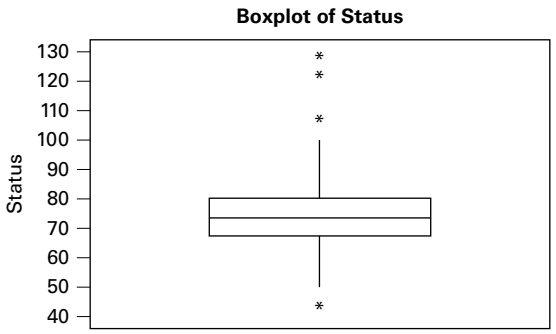
Variance = 186.0496, Range = 84.4, IQR = 13.1, IQR/R = .1552






```
Stem-and-leaf  of  C1   N = 107
Leaf Unit = 1.0
  1   4  5
  5   5  0004
 12   5  5556899
 18   6  013444
 31   6  5555666777888
(28)  7  0000011122222222333333344444
 48   7  666666666677888999
```

```
30   8  000002234444
18   8  56889
13   9  01223
 8   9  679
 5  10  00
 3  10  9
 2  11
 2  11
 2  12  3
 1  12
 1  13  0
```



(d) 75.4 ± 13.64; 61.76, 89.04; $79/107 = .7383$; $75.4 \pm 2(13.64)$; 48.12, 102.68; $103/107 = .9626$; $75.4 \pm 3(13.64)$; 34.48, 116.32; $105/107 = .9813$
(e) $102/107 = .9533$ **(f)** $1/107 = .0093$

Chapter 3

3.4.1. **(a)** .6631 **(b)** marginal **(c)** .0332 **(d)** joint **(e)** .0493 **(f)** conditional **(g)** .3701 **(h)** addition rule
3.4.3. **(a)** male and split drugs, .3418 **(b)** male or split drugs or both, .8747 **(c)** male given split drugs, .6134 **(d)** male, .6592
3.4.5. .95
3.4.7. .301
3.5.1. **(a)** A subject having the symptom (S) and not having the disease. **(b)** A subject not having S but having the disease. **(c)** .96 **(d)** .9848 **(e)** .0595 **(f)** .99996 **(g)** .00628, .999996, .3895, .9996, .8753, .9955 **(h)** predictive value increases as the hypothetical disease rate increases
3.5.3. .9999977

Review Exercises

3. **(a)** .2143 **(b)** .5519 **(c)** .1536 **(d)** .4575 **(e)** .5065
5. **(a)** .1349 **(b)** .6111 **(c)** .3333 **(d)** .5873 **(e)** .3571 **(f)** .6667 **(g)** 0 **(h)** .3269

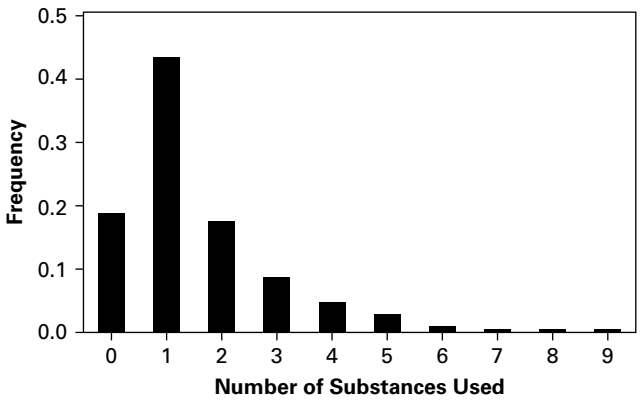
7. **(a)** **1.** .2200 **2.** .5000 **3.** .0555 **4.** .1100 **5.** .5900
(b) **1.** .3000 **2.** .3900 **3.** .3900 **4.** .1667 **5.** .0700 **6.** .6000
9. **(a)** .0432 **(b)** .0256 **(c)** .0247 **(d)** .9639 **(e)** .5713
(f) .9639 **(g)** .9810
11. .0060
13. .0625
15. mothers under the age of 24
17. null set, as events are mutually exclusive
19. **(a)** plasma lipoprotein between 10–15 or greater than or equal to 30.
(b) plasma lipoprotein between 10–15 and greater than or equal to 30.
(c) plasma lipoprotein between 10–15 and less than or equal to 20.
(d) plasma lipoprotein between 10–15 or less than or equal to 20.
21. **(a)** .7456 **(b)** .3300
23. .0125

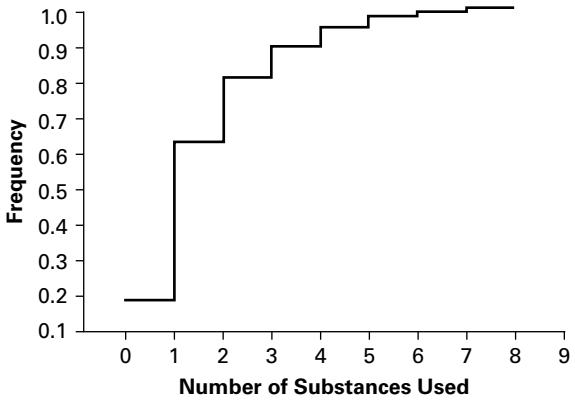
Chapter 4

4.2.1. **(a)**

Number of Substances Used	Frequency	Relative Frequency	Cumulative Frequency
0	144	.19	.19
1	342	.44	.63
2	142	.18	.81
3	72	.09	.90
4	39	.05	.95
5	20	.03	.98
6	6	.01	.99
7	9	.01	1.00
8	2	.003	1.003
9	1	.001	1.004
Total	777	1.004	

(b)





4.2.3. $\bar{x} = 1.58$, $s^2 = 2.15$, $s = 1.47$

4.3.1. **(a)** .1484 **(b)** .8915 **(c)** .1085 **(d)** .8080

4.3.3. **(a)** .2536, **(b)** .3461 **(c)** .7330 **(d)** .9067 **(e)** .0008

4.3.5. mean = 4.8, variance = 3.264

4.3.7. **(a)** .5314 **(b)** .3740 **(c)** .0946 **(d)** .9931 **(e)** .0946 **(f)** .0069

4.3.9.

Number of Successes, x	Probability, $f(x)$
0	$\frac{3!}{0!3!}(.2)^3(.8)^0 = .008$
1	$\frac{3!}{1!2!}(.2)^2(.8)^1 = .096$
2	$\frac{3!}{2!1!}(.2)^1(.8)^2 = .384$
3	$\frac{3!}{3!0!}(.2)^0(.8)^3 = .512$
Total	1

4.4.1. **(a)** .156 **(b)** .215 **(c)** .629 **(d)** .320

4.4.3. **(a)** .105 **(b)** .032 **(c)** .007 **(d)** .440

4.4.5. **(a)** .086 **(b)** .946 **(c)** .463 **(d)** .664 **(e)** .026

4.6.1. .4236

4.6.3. .2912

4.6.5. .0099

4.6.7. .95

4.6.9. .901

4.6.11. −2.54

4.6.13. 1.77

4.6.15. 1.32

4.7.1. **(a)** .6321 **(b)** .4443 **(c)** .0401 **(d)** .3064
4.7.3. **(a)** .1357 **(b)** .2389 **(c)** .6401 **(d)** .0721 **(e)** .1575
4.7.5. **(a)** .3413 **(b)** .1056 **(c)** .0062 **(d)** .3830
4.7.7. **(a)** .0630 **(b)** .0166 **(c)** .7719

Review Exercises

15. **(a)** .0212 **(b)** .0949 **(c)** .0135 **(d)** .7124
17. **(a)** .034 **(b)** .467 **(c)** .923 **(d)** .010 **(e)** .105
19. **(a)** .4967 **(b)** .5033 **(c)** .1678 **(d)** .0104 **(e)** .8218
21. **(a)** .0668 **(b)** .6247 **(c)** .6826
23. **(a)** .0013 **(b)** .0668 **(c)** .8931
25. 57.1
27. **(a)** 64.75 **(b)** 118.45 **(c)** 130.15 **(d)** 131.8
29. 14.90
31. 10.6
33. **(a)** Bernoulli assuming there is an equal probability of both genders **(b)** Not Bernoulli—more than two possible outcomes **(c)** Not Bernoulli—weight is not a binary variable

Chapter 5

5.3.1. 204, 6.2225
5.3.3. **(a)** .1841 **(b)** .7980 **(c)** .0668
5.3.5. **(a)** .0020 **(b)** .1736 **(c)** .9777 **(d)** .4041
5.3.7. **(a)** .9876 **(b)** .0668 **(c)** .0668 **(d)** .6902
5.3.9.

Sample	$\bar{x}$
6, 8, 10	8.00
6, 8, 12	8.67
6, 8, 14	9.33
6, 10, 12	9.33
6, 10, 14	10.00
6, 12, 14	10.67
8, 10, 12	10.00
8, 10, 14	10.67
8, 12, 14	11.33
10, 12, 14	12.00
$\mu_{\bar{x}} = 10, \sigma_{\bar{x}} = 1.333$	

5.4.1. .3897
5.4.3. .0038
5.4.5. .0139
5.5.1. .1131
5.5.3. .0808
5.5.5. **(a)** .1539 **(b)** .3409 **(c)** .5230
5.6.1. .1056
5.6.3. .7938

Review Exercises

11. .0003
13. .0262
15. .1335
17. .1093
19. .1292
21. 252
23. .53, .0476
25. At least approximately normally distributed
27. .9942
29. **(a)** No **(b)** Yes **(c)** No **(d)** Yes **(e)** Yes **(f)** Yes

Chapter 6

6.2.1. **(a)** 88, 92 **(b)** 87, 93 **(c)** 86, 94
6.2.3. **(a)** 7.63, 8.87 **(b)** 7.51, 8.99 **(c)** 7.28, 9.22
6.2.5. 1603.688, 1891.563; 1576.125, 1919.125; 1521.875, 1973.375
6.3.1. **(a)** 2.1448 **(b)** 2.8073 **(c)** 1.8946 **(d)** 2.0452
6.3.3. **(a)** 1.549, .387 **(b)** 2.64, 4.36; .49, .91 **(c)** Nitric oxide diffusion rates are normally distributed in the population from which the sample was drawn. **(d)** narrower **(e)** wider
6.3.5. 66.2, 76.8; 65.1, 77.9; 62.7, 80.3
6.4.1. −549.82, −340.17; −571.28, −318.72; −615.52, −274.48
6.4.3. −5.90, 17.70; − 8.15, 19.95; − 12.60, 24.40
6.4.5. 64.09, 479.91; 19.19, 524.81; −77.49, 621.49
6.4.7. 2.1, 4.5; 1.8, 4.8; 1.3, 5.3
6.4.9. −32.58, −25.42; −33.33, −24.67, −34.87, −23.13
6.5.1. .1028, .1642
6.5.3. .4415, .6615
6.6.1. .0268, .1076
6.6.3. −.0843, .2667
6.7.1. 27, 16
6.7.3. 19
6.8.1. 683, 1068
6.8.3. 385, 289
6.9.1. 6.334, 44.63
6.9.3. 793.92, 1370.41
6.9.5. 1.17, 2.09
6.9.7. $170.98503 \leq \sigma^2 \leq 630.65006$
6.10.1. .44, 17.37
6.10.3. .49, 2.95
6.10.5. .9, 3.52
6.10.7. 5.13, 60.30

Review Exercises

13. $\bar{x} = 79.87$, $s^2 = 28.1238$, $s = 5.3$; 76.93, 82.81
15. $\hat{p} = .30$; .19, .41

17. $\hat{p}_1 = .20; \hat{p}_2 = .54, .26, .42$
19. $\hat{p} = .90; .87, .93$
21. $\bar{x} = 19.23, s^2 = 20.2268; 16.01, 22.45$
23. $-2.18, 2.82$
25. 362.73, 507.27
27. .44, .74
29. $-.416, .188$
31. Level of confidence decreases. The interval would have no width. The level of confidence would be zero.
33. z, 8.1, 8.1
35. All drivers ages 55 and older. Drivers 55 and older participating in the vision study.
37. .2865, .3529 (Use z since $n > 30$)

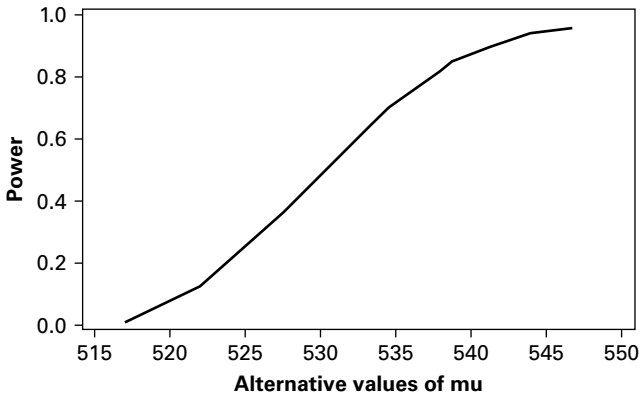
Chapter 7

7.2.1. Reject H_0 because $-2.57 < -2.33, p = .0051 < .01$
7.2.3. Fail to reject H_0 because $.76 < 1.333. p > .10$
7.2.5. Yes, reject $H_0, z = -5.73 < -1.645. p < .0001$
7.2.7. No, fail to reject $H_0. t = -1.5 > -1.709. .05 < p < .10$
7.2.9. Yes, reject $H_0, z = 3.08. p = .0010$
7.2.11. $z = 4$, reject $H_0, p < .0001$
7.2.13. $t = .1271$, fail to reject $H_0. p > .2$
7.2.15. $z = -4.18$, reject $H_0. p < .0001$
7.2.17. $z = 1.67$, fail to reject $H_0. p = 2(.0475) = .095$
7.2.19. Reject H_0 since $z = -4.00. p < .0001$
7.3.1. Reject H_0 because $-10.9 < -2.388, p < .005$
7.3.3. Reject H_0 because $-9.60 < -2.6591, p < 2(.005)$
7.3.5. Reject H_0 because $z = 3.39 > 1.96. p = 2(.0003)$
7.3.7. $s_p^2 = 5421.25, t = -6.66$. Reject $H_0. p < 2(.005) = .010$
7.3.9. $z = 3.39$. Reject $H_0. p = 2(1 - .9997) = .0006$
7.3.11. $t = -3.3567$. Reject $H_0. p < .01$
7.4.1. Reject H_0 because $3.17 > 2.624, p < .005$
7.4.3. Reject $H_0 - 3.1553 < -1.8125, .005 < p < .01$
7.4.5. Reject H_0 since $-4.4580 < -2.4469, p < .01$
7.5.1. Reject H_0 since $-1.62 > -1.645. p = .0526$
7.5.3. Reject H_0 because $-1.77 < -1.645, p = .0384$
7.5.5. Reject H_0 because $z = -2.21, p = .0136$
7.6.1. Reject H_0 because $-2.86 < -2.58, p = .0042$
7.6.3. Fail to reject H_0 because $z = 1.70 < 1.96, p = .088$
7.7.1. Do not reject H_0 since $5.142 < 20.723 < 34.267, p > .01$ (two-sided test).
7.7.3. $\chi^2 = 6.75$. Do not reject $H_0. p > .05$ (two-sided test)
7.7.5. $\chi^2 = 28.8$. Do not reject $H_0. p > .10$
7.7.7. $\chi^2 = 22.036, .10 > p > .05$
7.8.1. Fail to reject because V.R. $= 1.226 < 1.74 p > .10$
7.8.3. No, V.R. $= 1.83, p > .10$
7.8.5. Reject H_0. V.R. $= 4, .02 < p < .05$
7.8.7. V.R. $= 2.1417, p > .10$

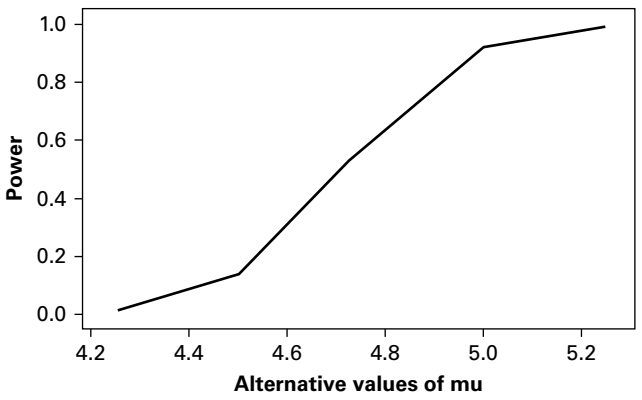
7.9.1.

Alternative Value of μ	β	Value of Power Function $1 - \beta$
516	0.9500	0.0500
521	0.8461	0.1539
528	0.5596	0.4404
533	0.3156	0.6844
539	0.1093	0.8907
544	0.0314	0.9686
547	0.0129	0.9871

7.9.3.



Alternative Value of μ	β	Value of Power Function $1 - \beta$
4.25	0.9900	0.0100
4.50	0.8599	0.1401
4.75	0.4325	0.5675
5.00	0.0778	0.9222
5.25	0.0038	0.9962



7.10.1. $n = 548$; $C = 518.25$. Select a sample of size 548 and compute $\bar{x}$. If $\bar{x} \geq 518.25$, reject H_0. If $\bar{x} < 518.25$ do not reject H_0.

7.10.3. $n = 103$; $C = 4.66$. Select a sample of size 103 and compute $\bar{x}$ If $\bar{x} \geq 4.66$, reject H_0. If $\bar{x} < 4.66$, do not reject H_0.

Review Exercises

19. Reject H_0 since $29.49 > 2.33$. $p < .0001$

21. Fail to reject the null because $z = 1.48 < 1.96$. $p = .1388$

23. Reject H_0 since $12.79 > 2.58$. $p < .0001$

25. Fail to reject H_0 because $1.10 < 1.645$, $p = .1357$

27. $t = 3.873$, $p < .005$

29. $\bar{d} = 11.49$, $s_d^2 = 256.679$, $s_d = 16.02$, $t = 2.485$, $.025 > p > .01$

31. Reject H_0 since $-2.286 < 1.7530$, $.025 > p > .01$

Answers to Exercises 41–55 *obtained by MINITAB*

41. 95.0% C.I.
(456.8, 875.9)

t	p value
7.09	0.0000

Test of $\mu = 0$ vs. μ not $= 0$

43. 95.0% C.I.
(0.224, 0.796)

t	p value
3.65	0.0010

Test of $\mu = 0$ vs. μ not $= 0$

45. Leg press: 95.0% C.I.
(32.22, 56.45)

t	p value
7.85	0.0000

Test of $\mu = 0$ vs. μ not $= 0$

Hip flexor: 95.0% C.I.
(3.079, 6.388)

t	p value
6.14	0.0000

Test of $\mu = 0$ vs. μ not $= 0$

Hip extensor: 95.0% C.I.
(6.031, 10.236)

t	p value
8.30	0.0000

Test of $\mu = 0$ vs. μ not $= 0$

Arm abductor: 95.0% C.I.
(3.717, 7.217)

t	p value
6.70	0.0000

Test of $\mu = 0$ vs. μ not $= 0$

Arm abductor: 95.0% C.I.
(4.597, 7.670)

t	p value
8.56	0.0000

Test of $\mu = 0$ vs. μ not $= 0$

47. 95.0% C.I.
$(-71.9, -26.5)$

t	p value
-4.34	0.0001

Test of $\mu = 0$ vs. μ not $= 0$

49. 95.0% C.I. for $\mu_1 - \mu_2$: $(-83.8, -20)$
t test $\mu_1 - \mu_2$(vs. not =) : $t = -3.30\, p = .0021$ d.f. $= 42$
t test $\mu_1 - \mu_2$(vs. <) : $t = -3.30\, p = .0011$ d.f. $= 42$

51. 95.0% C.I. for μ GROUP 1–μ GROUP 2 (.5, 26.4)
t test μ GROUP 1 $= \mu$ GROUP 2 (vs. not =) : $t = 2.88\, p = .045$ d.f. $= 4$

53. 95.0% C.I. for $\mu_1 - \mu_2$: $(-3.00, 22)$
t test $\mu_1 = \mu_2$(vs. not =) : $t = -.29\, p = .77$ d.f. $= 53$
Both use Pooled StDev $= 4.84$

55. 95.0% C.I. for $\mu_{\text{PT}} - \mu_{\text{C}}$: (7.6, 18.8)
t test $\mu_{\text{PT}} = \mu_{\text{C}}$(vs. not =) : $t = 4.78\, p = 0.0000$ d.f. $= 31$

Chapter 8

Answers for 8.2.1–8.2.7 obtained by SAS®

8.2.1.

```
F = 6.24
p = .0004
Alpha                                          0.05
Error Degrees of Freedom                        325
Error Mean Square                          1.068347
Critical Value of Studentized Range         3.65207

Comparisons significant at the 0.05 level are indicated
by ***.

                 Difference                 Simultaneous
Group               Between                95% Confidence
Comparison          Means                        Limits
 90 - 30           0.1911              -0.1831   0.5652
 90 - 120          0.6346               0.1320   1.1372 ***
 90 - 60           0.6386               0.1360   1.1413 ***
 30 - 90          -0.1911              -0.5652   0.1831
 30 - 120          0.4436              -0.1214   1.0085
 30 - 60           0.4476              -0.1173   1.0125
120 - 90          -0.6346              -1.1372  -0.1320 ***
120 - 30          -0.4436              -1.0085   0.1214
120 - 60           0.0040              -0.6531   0.6611
 60 - 90          -0.6386              -1.1413  -0.1320 ***
 60 - 30          -0.4476              -1.0125   0.1173
 60 - 120         -0.0040              -0.6611   0.6531
```

8.2.3.

```
F = 9.36
p = < .0001
Alpha                                          0.05
Error Degrees of Freedom                        109
```

```
     Error Mean Square                          211252.3
     Critical Value of Studentized Range         3.68984

Comparisons significant at the 0.05 level are indicated
by ***.

                Difference              Simultaneous
Group              Between              95% Confidence
Comparison          Means                    Limits
A - B              455.72          45.73     865.71 ***
A - C              574.54         235.48     913.59 ***
A - D              596.63         287.88     905.39 ***
B - A             -455.72        -865.71     -45.73 ***
B - C              118.82        -271.45     509.09
B - D              140.91        -223.34     505.17
C - A             -574.54        -913.59    -235.48 ***
C - B             -118.82         -509.0     271.45
C - D               22.10        -259.95     304.14
D - A             -596.63        -905.39    -287.88 ***
D - B             -140.91        -505.17     223.34
D - C              -22.10        -304.14     259.95
```

8.2.5.

```
     F = 9.26
     p = .0009
     Alpha                                        0.05
     Error Degrees of Freedom                       26
     Error Mean Square                          637.384
     Critical Value of Studentized Range        3.51417

Comparisons significant at the 0.05 level are indicated
by ***.

                Difference              Simultaneous
Group              Between              95% Confidence
Comparison          Means                    Limits
 Y - MA             18.16         -10.67      46.98
 Y - E              48.13          20.07      76.19 ***
MA - Y             -18.16         -46.98      10.67
MA - E              29.97           1.15      58.80 ***
 E - Y             -48.13         -76.19     -20.07 ***
 E - MA            -29.97         -58.80      -1.15 ***
```

8.2.7.

```
     F = 4.94
     p = .0026
     Alpha                                        0.05
     Error Degrees of Freedom                      174
     Error Mean Square                          0.17783
     Critical Value of Studentized Range        3.66853
```

```
Comparisons significant at the 0.05 level are indicated
by ***.

                Difference              Simultaneous
Group              Between              95% Confidence
Comparison           Means                     Limits
0 - 1             0.10165          -0.13866  0.34196
0 - 2             0.17817          -0.2188   0.37822
                Difference              Simultaneous
Group              Between              95% Confidence
Comparison           Means                     Limits
0 - 3             0.35447           0.10511  0.60383 ***
1 - 0            -0.10165          -0.34196  0.13866
1 - 2             0.07652          -0.17257  0.32561
1 - 3             0.25281          -0.03737  0.54300
2 - 0            -0.17817          -0.37822  0.02188
2 - 1            -0.07652          -0.32561  0.17257
2 - 3             0.17630          -0.08154  0.43413
3 - 0            -0.35447          -0.60383 -0.10511 ***
3 - 1            -0.25281          -0.54300  0.03737
3 - 2            -0.17630          -0.43413  0.08154
```

8.3.1. V.R. $= 19.79$, $p < .005$

8.3.3. V.R. $= 30.22$, $p < .005$

8.3.5. V.R. $= 7.37$, $.025 > p > .01$

8.3.7. Total $d.f. = 41$ Block (Dogs) $d.f. = 5$ Treatments (Times) $d.f. = 6$, Error $d.f. = 30$

8.4.1. V.R. $= 48.78$, $p < .005$

8.4.3. V.R. $= 16.45$, $p < .005$

8.4.5. Total $d.f. = 29$, Block (Subject) $d.f. = 9$, Treatment (Time) $d.f. = 2$, Error $d.f. = 18$

8.5.1. Ion V.R. $= 6.18$, $p = .023$; dose V.R. $= 74.59$, $p = .000$; inter V.R. $= .89\, p = .427$

8.5.3. Migraine V.R. $= 19.98$, $p < .0001$; treat V.R. $= 2.13$, $p = .1522$; interaction V.R. $= 1.42$, $p = .2404$

Review Exercises

13. V.R. $= 7.04$, $p = .000$. The sample mean for the healthy subjects is significantly different from the means of categories B, C, and D. No other differences between sample means are significant.

15. V.R. $= 1.35$, $p = .274$. Do not reject H_0.

17. Smoking status V.R. $= 3.16$, $p = .052$, Vital Exhaustion Group V.R. $= 6.84$, $p = .003$, Interaction V.R. $= 2.91$, $p = .032$

19. V.R. $= 4.23$, $p < .001$

21. V.R. $= 6.320$, $p = .008$

23. V.R. $= 3.1187$, $p = .043$. The sample D mean is significantly different from the sample B mean. No other differences between sample means are significant.

25. V.R. (Age) = 29.38, $p < .001$; Occupation V.R. = 31.47, $p < .001$; Interaction V.R. = 7.12, $p < .001$

27. 499.5, 9, 166.5, 61.1667, 2.8889, 57.6346, < .005

29. **(a)** Completely randomized, **(b)** 3, **(c)** 30, **(d)** No, because $1.0438 < 3.35$

31. V.R. = 26.06, $p < .001$. HSD = 2.4533. All differences significant except $\mu_{\text{Light}} - \mu_{\text{Moderate}}$

33. V.R. = 2.37, $p = .117$, Tukey HSD not necessary.

35. **(a)** One-way ANOVA
(b) Response: post-pre training score
(c) Factors: Groups of years of experience (with 4 levels)
(d) surgical experience and interest in obstetrics
(e) no carryover effects
(f) treatment is years of experience d.f. = 3, total d.f. = 29, error d.f. = 26.

37. **(a)** repeated measures
(b) Response: BMD
(c) Factors: time periods (with six levels)
(d) diet, exercise, and calcium intake
(e) no carryover effects
(f) time factor d.f. = 5, subject factor d.f. = 25, total, error d.f. = 125.

39.

Analysis of Variance for bilirubi

Source	DF	SS	MS	F	P
subject	17	2480.83	145.93	45.57	0.000
time	6	89.09	14.85	4.64	0.000
Error	102	326.65	3.20		
Total	125	2896.57			

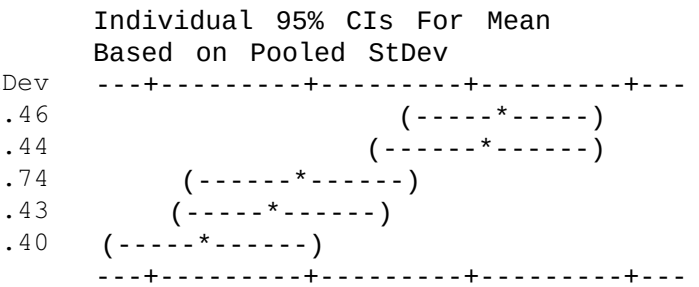
41. CR = Compression Ratio

Analysis of Variance for C.R.

Source	DF	SS	MS	F	P
Group	4	9092	2273	8.12	0.001
Error	19	5319	280		
Total	23	14411			

Level	N	Mean	StDev
Control	6	79.96	5.46
I	4	78.69	21.44
II	4	47.84	23.74
III	5	43.51	10.43
IV	5	33.32	20.40

Pooled StDev = 16.73



Tukey's pairwise comparisons

```
    Family error rate = 0.0500
Individual error rate = 0.00728

Critical Value = 4.25

Intervals for (column level mean) - (row level mean)
      Control          I       II      III
I      -31.19
        33.72

II      -0.34      -4.70
        64.58      66.41

III      6.00       1.45   -29.41
        66.89      68.91    38.05

IV      16.19      11.64   -19.21   -21.61
        77.08      79.10    48.24    41.99
```

43. Two-way ANOVA: BC versus heat, chromo

```
Analysis of Variance for BC
Source         DF        SS        MS        F        P
heat            1    0.1602    0.1602     3.95    0.061
chromo          1    0.6717    0.6717    16.55    0.001
Interaction     1    0.0000    0.0000     0.00    0.994
Error          20    0.8119    0.0406
Total          23    1.6438

Analysis of Variance for AC
Source         DF        SS        MS        F        P
heat            1    0.0468    0.0468     1.99    0.174
chromo          1    0.4554    0.4554    19.34    0.000
Interaction     1    0.0039    0.0039     0.16    0.690
Error          20    0.4709    0.0235
Total          23    0.9769

Analysis of Variance for AC/BC
Source         DF        SS        MS        F        P
heat            1   0.04524   0.04524    15.62    0.001
chromo          1   0.00000   0.00000     0.00    1.000
Interaction     1   0.00385   0.00385     1.33    0.262
Error          20   0.05793   0.00290
Total          23   0.10702
```

45. C.A. = Congruence angle

```
Analysis of Variance for C.A.
Source         DF        SS        MS        F        P
Group           3      7598      2533    14.83    0.000
Error          86     14690       171
Total          89     22288
```

```
                                  Individual 95% CIs For Mean
                                  Based on Pooled StDev
Level     N    Mean  StDev  -----+---------+---------+---------+-
Lateral  27    6.78  15.10                             (----*----)
Medial   26  -10.81  10.80            (----*----)
Multi    17  -18.29  15.09   (------*-----)
Normal   20   -7.00  10.76              (-----*-----)
                                  -----+---------+---------+---------+-
Pooled StDev = 13.07                 -20       -10         0        10
Tukey's pairwise comparisons

    Family error rate = 0.0500
Individual error rate = 0.0103

Critical value = 3.71

Intervals for (column level mean) - (row level mean)
          Lateral    Medial     Multi
Medial      8.16
           27.01
Multi      14.46     -3.21
           35.69     18.18
Normal      3.66    -14.01    -22.60
           23.89      6.39      0.02
```

47.

```
Analysis of Variance for response
Source     DF        SS       MS        F       P
subject     5     25.78     5.16     4.72   0.018
temp        2     30.34    15.17    13.87   0.001
Error      10     10.93     1.09
Total      17     67.06
```

49. G.C. = glucose concentration

```
Analysis of Variance for G.C.
Source     DF        SS       MS        F       P
group       3     8.341    2.780    10.18   0.001
subject     5     8.774    1.755     6.43   0.002
Error      15     4.096    0.273
Total      23    21.210
```

51.

```
Analysis of Variance for T3
Source     DF        SS       MS        F       P
subject    11      8967      815     2.55   0.030
day         2     12466     6233    19.50   0.000
Error      22      7033      320
Total      35     28467
```

53. BBL = blood bilirubin levels

```
Analysis of Variance for BBL
Source     DF        SS      MS       F      P
Group       2      4077    2039    3.31  0.090
Error       8      4931     616
Total      10      9008
```

```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level     N   Mean  StDev   ---+---------+---------+---------+---
Control   4  63.50  28.25       (--------*---------)
Hypercar  4  50.00  22.69   (---------*--------)
Hyperosm  3  98.00  22.27                (----------*----------)
                          ---+---------+---------+---------+---
Pooled StDev = 24.83        30        60        90       120
```

```
Tukey's pairwise comparisons

    Family error rate = 0.0500
Individual error rate = 0.0213
Critical value = 4.04

Intervals for (column level mean) - (row level mean)

                 Control    Hypercar

     Hypercar      -36.7
                    63.7

     Hyperosm      -88.7      -102.2
                    19.7         6.2
```

55.

```
Analysis of Variance for breathing scores
Source     DF        SS      MS       F      P
group       2    244.17  122.08   14.50  0.000
Error      38    319.88    8.42
Total      40    564.05
```

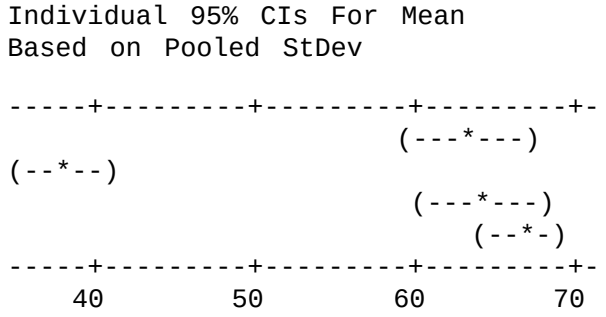
```
                          Individual 95% CIs For Mean
                          Based on Pooled StDev
Level  N     Mean  StDev   ----+---------+---------+---------+--
1     13   13.231  1.739   (------*-----)
2     14   13.786  2.833      (-----*-----)
3     14   18.643  3.713                        (------*-----)
                          ----+---------+---------+---------+--
Pooled StDev = 2.901       12.5      15.0      17.5      20.0
```

```
Tukey's pairwise comparisons

         Family error rate = 0.0500
Individual error rate = 0.0195
Critical value = 3.45
```

```
Intervals for (column level mean) - (row level mean)

            1           2
2      -3.281
        2.171

3      -8.138      -7.532
       -2.686      -2.182
```

57. PSWQ = PSWQ score

```
Analysis of Variance for PSWQ
Source     DF        SS      MS       F      P
Group       3   16654.9  5551.6   74.11  0.000
Error     115    8614.6    74.9
Total     118   25269.5
```




```
Tukey's pairwise comparisons

        Family error rate = 0.0500
Individual error rate = 0.0103

Critical value = 3.69

Intervals for (column level mean) - (row level mean)

               1           2           3

2      17.459
        31.741

3      -9.025     -32.446
         6.575     -19.203

4     -10.181     -33.329      -8.388
         2.975     -23.077       3.631
```

59.

```
Analysis of Variance for Age
Source     DF        SS      MS       F      P
Group       2   16323.2  8161.6  139.79  0.000
Error     189   11034.7    58.4
Total     191   27357.9
```

```
                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level     N    Mean  StDev   -+---------+---------+---------+-----
Daughter 50  49.420  7.508   (--*-)
Husband  65  71.985  7.516                                 (-*-)
Wife     77  68.649  7.828                           (-*-)
                             -+---------+---------+---------+-----
Pooled StDev = 7.641        48.0      56.0      64.0      72.0
```

```
Tukey's pairwise comparisons

    Family error rate = 0.0500
Individual error rate = 0.0192

Critical value = 3.34

Intervals for (column level mean) - (row level mean)

                Daughter     Husband

Husband       -25.959
              -19.170

Wife          -22.507       0.296
              -15.952       6.375
```

61. SAP = serum alkaline phosphatase level

```
Analysis of Variance for SAP
Source     DF        SS      MS       F      P
Grade       2     36181   18091    5.55  0.009
Error      29     94560    3261
Total      31    130742
```

```
                                  Individual 95% CIs For Mean
                                  Based on Pooled StDev
Level   N    Mean   StDev     -+---------+---------+---------+-----
I       9  118.00   61.85      (---------*--------)
II      8  143.63   55.90            (---------*---------)
III    15  194.80   54.82                          (-------*------)
                                  -+---------+---------+---------+-----
Pooled StDev = 57.10              80        120       160       200

Tukey's pairwise comparisons

  Family error rate = 0.0500
Individual error rate = 0.0197

Critical value = 3.49

Intervals for (column level mean) - (row level mean)

                    I          II

     II        -94.1
                42.8

     III      -136.2      -112.9
               -17.4        10.5
```

63.

```
Analysis of Variance for Hematocrit
Source     DF        SS      MS       F      P
Group       2     817.5   408.8   20.26  0.000
Error      27     544.8    20.2
Total      29    1362.3

                                  Individual 95% CIs For Mean
                                  Based on Pooled StDev
Level       N    Mean  StDev  --+---------+---------+---------+----
Sham       10  38.200  2.573  (----*----)
Treated    15  40.200  5.348       (---*---)
Untreated   5  53.200  4.604                        (------*------)
                                --+---------+---------+---------+----
Pooled StDev = 4.492          36.0      42.0      48.0      54.0

Tukey's pairwise comparisons

    Family error rate = 0.0500
Individual error rate = 0.0196
```

```
Critical value = 3.51

Intervals for (column level mean) - (row level mean)

               Sham    Treated

Treated      -6.551
              2.551

Untreated   -21.106   -18.757
             -8.894    -7.243
```

65. Both = rhIGF-I + rhGH

```
Analysis of Variance for Response
Source    DF        SS        MS        F        P
Group      3     4.148     1.383     1.39    0.282
Error     16    15.898     0.994
Total     19    20.046

                                Individual 95% CIs For Mean
                                Based on Pooled StDev
Level      N    Mean  StDev  ---------+---------+---------+-------
Both       5  11.520  0.653                (--------*---------)
rhGH       5  11.250  0.570             (--------*---------)
rhIGF-I    6  10.800  1.418          (---------*--------)
Saline     4  10.250  0.971    (---------*----------)
                                ---------+---------+---------+-------
Pooled StDev = 0.997                  10.0      11.0      12.0

Tukey's pairwise comparisons

    Family error rate = 0.0500
Individual error rate = 0.0113

Critical value = 4.05

Intervals for (column level mean) - (row level mean)

               Both       rhGH     rhIGF-I

rhGH        -1.5354
             2.0754

rhIGF-I     -1.0086   -1.2786
             2.4486    2.1786

Saline      -0.6450   -0.9150    -1.2927
             3.1850    2.9150     2.3927
```

Chapter 9

9.3.1. **(a)** Direct, **(b)** Direct, **(c)** Inverse

9.3.3. $\hat{y} = 560 + 0.140x$

9.3.5. $\hat{y} = 68.6 - 19.5x$

9.3.7. $\hat{y} = 0.193 + 0.00628x$

9.4.1

Predictor	Coef	SE Coef	T	P
Constant	559.90	29.13	19.22	0.000
Meth Dos	0.13989	0.06033	2.32	0.035

S = 68.28 R-Sq = 26.4% R-Sq(adj) = 21.5%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	25063	25063	5.38	0.035
Residual Error	15	69923	4662		
Total	16	94986			

Confidence interval for $\hat{\beta}_1$ .011, .268

9.4.3.

Predictor	Coef	SE Coef	T	P
Constant	68.64	16.68	4.12	0.006
Cmax w/	-19.529	4.375	-4.46	0.004

S = 18.87 R-Sq = 76.9% R-Sq(adj) = 73.0%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	7098.4	7098.4	19.93	0.004
Residual Error	6	2137.4	356.2		
Total	7	9235.9			

Confidence interval for $\hat{\beta}_1$ -30.23, -8.82

9.4.5.

Predictor	Coef	SE Coef	T	P
Constant	0.19290	0.04849	3.98	0.001
DTPA GFR	0.006279	0.001059	5.93	0.000

S = 0.09159 R-Sq = 58.5% R-Sq(adj) = 56.8%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	0.29509	0.29509	35.18	0.000
Residual Error	25	0.20972	0.00839		
Total	26	0.50481			

Confidence interval for $\hat{\beta}_1$ 0.0041, 0.0085

9.5.1. **(a)** 580.6, 651.2 **(b)** 466.1, 765.6
9.5.3. **(a)** −30.42, 5.22 **(b)** −62.11, 36.92
9.5.5. **(a)** 0.3727, 0.4526 **(b)** 0.2199, 0.6055
9.7.1. $r = .466$, $t = 2.23$, $p = .038$, $.030 < \rho < .775$
9.7.3. $r = -.812$, $t = -3.11$, $p = .027$, $-1 < \rho < -.152$
9.7.5. $r = -.531$, $t = -3.31$, $p = .003$, $-.770 < \rho < -.211$

Review Exercises

17. BOARD $= -191 + 4.68$ AVG, $r^2 = .772$, $t = 17.163$, $p < .001$
19. y-hat = 12.6 + 1.80x

Predictor	Coef	SE Coef	T	P
Constant	12.641	2.133	5.93	0.000
no. of p	1.8045	0.5585	3.23	0.005

S = 7.081 R-Sq = 38.0% R-Sq(adj) = 34.4%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	523.41	523.41	10.44	0.005
Residual Error	17	852.38	50.14		
Total	18	1375.79			

21. The regression equation is
B = 1.28 + 0.851 A

Predictor	Coef	SE Coef	T	P
Constant	1.2763	0.3935	3.24	0.006
A	0.8513	0.1601	5.32	0.000

S = 0.2409 R-Sq = 68.5% R-Sq(adj) = 66.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	1.6418	1.6418	28.29	0.000
Residual Error	13	0.7545	0.0580		
Total	14	2.3963			

23. $\hat{y} = 61.8819 + .509687x$; V.R. $= 4.285$; $.10 > p > .05$; $t = 2.07$; 95% C.I. for p : −.03,.79; 110.3022; 87.7773, 132.8271

25. $\hat{y} = 37.4564 + .0798x$; V.R. $= 77.13$; $p < .005$; $t = 8.78$; 95% C.I. for ρ: .91, 1; 40.63, 42.27.

29.
```
The regression equation is
A = 570 + 0.429 B

Predictor       Coef      SE Coef         T         P
Constant       569.8        141.2      4.03     0.000
B            0.42927      0.04353      9.86     0.000

S = 941.6      R-Sq = 54.0%              R-Sq(adj) = 53.4%

Pearson correlation of B and A = 0.735
P-Value = 0.000
```

31.
```
The regression equation is
y = 45.0 + 0.867 x

Predictor       Coef      SE Coef         T         P
Constant       44.99        33.54      1.34     0.193
x            0.86738      0.07644     11.35     0.000

S = 102.9      R-Sq = 84.8%              R-Sq(adj) = 84.2%

Pearson correlation of x and y = 0.921
P-Value = 0.000
```

33.
```
The regression equation is
S = -1.26 + 2.10 DBS

Predictor       Coef      SE Coef         T         P
Constant      -1.263        3.019     -0.42     0.680
DBS           2.0970       0.1435     14.62     0.000

S = 8.316      R-Sq = 90.3%              R-Sq(adj) = 89.9%

Pearson correlation of S and DBS = 0.950
P-Value = 0.000
```

35.
```
The regression equation is
log y = 2.06 + 0.0559 PCu

Predictor       Coef      SE Coef         T         P
Constant      2.0603       0.3007      6.85     0.000
PCu          0.05593      0.01631      3.43     0.001
```

```
S = 0.3873     R-Sq = 16.4%              R-Sq(adj) = 15.0%

Pearson correlation of PCu and log y = 0.405
P-Value = 0.001
```

37.
```
The regression equation is
C6 = -0.141 - 1.33 C5

Predictor       Coef      SE Coef         T          P
Constant     -0.1413       0.2267     -0.62      0.540
C5           -1.3286       0.1242    -10.69      0.000

S = 1.086      R-Sq = 84.5%            R-Sq(adj) = 83.7%

Pearson correlation of IGELogE and SkinLogE = -0.919
P-Value = 0.000
```

39. Normotensive $C6 = C4 - C5$, $C7 = (C4 + C5)/2$, $C8 = C2 - C3$, $C9 = (C2 + C3)/2$

```
The regression equation is
C6 = 4.2 + 0.106 C7

Predictor       Coef      SE Coef         T          P
Constant         4.19        17.30      0.24      0.811
C7             0.1060       0.1590      0.67      0.512

S = 5.251       R-Sq = 2.0%            R-Sq(adj) = 0.0%

Pearson correlation of C6 and C7 = 0.141
P-Value = 0.512

The regression equation is
C8 = 0.2 + 0.268 C9

Predictor       Coef      SE Coef         T          P
Constant         0.25        18.53      0.01      0.989
C9             0.2682       0.2932      0.91      0.370

S = 5.736      R-Sq = 3.7%             R-Sq(adj) = 0.0%

Pearson correlation of C8 and C9 = 0.191
P-Value = 0.370
```

Preeclamptic

```
The regression equation is
C6 = 57.9 - 0.363 C7
```

```
Predictor       Coef     SE Coef        T        P
Constant       57.89       17.10     3.39    0.003
C7           -0.3625      0.1273    -2.85    0.009

S = 7.109      R-Sq = 26.9%          R-Sq(adj) = 23.6%

Pearson correlation of C6 and C7 = -0.519
P-Value = 0.009

The regression equation is
C8 = 54.4 - 0.540 C9

Predictor       Coef     SE Coef        T        P
Constant      54.377       9.771     5.56    0.000
C9           -0.5403      0.1154    -4.68    0.000

S = 5.787      R-Sq = 49.9%          R-Sq(adj) = 47.6%

Pearson correlation of C8 and C9 = -0.707
P-Value = 0.000
```

41. The regression equation is
LBMD = 0.131 + 0.511 ABMD

```
Predictor       Coef     SE Coef        T        P
Constant     0.13097     0.05413     2.42    0.018
ABMD         0.51056     0.05935     8.60    0.000

S = 0.09188    R-Sq = 53.6%          R-Sq(adj) = 52.9%

Pearson correlation of ABMD and LBMD = 0.732
P-Value = 0.000
```

43. WL, VO_2

```
The regression equation is
WL = 0.01 + 0.262 VO2

Predictor       Coef     SE Coef        T        P
Constant       0.013       1.308     0.01    0.992
VO2          0.26237     0.07233     3.63    0.003

S = 1.835      R-Sq = 52.3%          R-Sq(adj) = 48.3%

Pearson correlation of WL and VO2 = 0.723
P-Value = 0.003
```

WL, AT

```
The regression equation is
WL = 0.75 + 0.367 AT

Predictor        Coef      SE Coef          T          P
Constant        0.752        1.761       0.43      0.677
AT             0.3668       0.1660       2.21      0.047

S = 2.241      R-Sq = 28.9%              R-Sq(adj) = 23.0%

Pearson correlation of WL and AT = 0.538
P-Value = 0.047
```

WL, ET

```
The regression equation is
WL = 0.74 + 0.00637 ET

Predictor        Coef      SE Coef          T          P
Constant        0.739        1.173       0.63      0.541
ET           0.006375     0.001840       3.46      0.005

S = 1.879      R-Sq = 50.0%              R-Sq(adj) = 45.8%

Pearson correlation of WL and ET = 0.707
P-Value = 0.005
```

45.
```
The regression equation is
CL/F = 19.4 + 0.893 CLer

Predictor        Coef      SE Coef          T          P
Constant       19.393        4.496       4.31      0.000
CLer          0.89250      0.05671      15.74      0.000

S = 28.20      R-Sq = 59.3%              R-Sq(adj) = 59.1%

Pearson correlation of CL/F and CLer = 0.770
P-Value = 0.000
```

Chapter 10

10.3.1. $\hat{y} = -31.4 + 0.473x_1 + 1.07x_2$
10.3.3. $\hat{y} = 13.45 + 4.02x_1 + 281x_2$
10.3.5. $\hat{y} = -422.00 + 11.17x_1 - .63x_2$

10.4.1.

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	2	1576.99011	788.49506	185.13	<.0001
Error	32	136.29516	4.25922		
Corrected Total	34	1713.28527			

Root MSE	2.06379	R-Square	0.9204
Dependent Mean	51.25086	Adj R-Sq	0.9155
Coeff Var	4.02684		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	95% Confidence	Limits
Intercept	1	-31.42480	6.14747	-5.11	<.0001	-43.94678	-18.90282
X1	1	0.47317	0.06117	7.74	<.0001	0.34858	0.59776
X2	1	1.07117	0.06280	17.06	<.0001	0.94326	1.19909

(a) .9204 **(c)** X_1 p-value $< .0001$, X_2 p-value $< .0001$ **(d)** 95% C.I. for slope for X_1: $(0.34858 - 0.59776)$, 95% C.I. for slope for X_2: $(0.94326 - 1.19909)$

10.4.3.

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	2	452.56375	226.28188	7.05	0.0210
Error	7	224.70025	32.10004		
Corrected Total	9	677.26400			

Root MSE	5.66569	R-Square	0.6682
Dependent Mean	57.16000	Adj R-Sq	0.5734
Coeff Var	9.91198		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	95% Confidence	Limits
Intercept	1	13.44923	13.23156	1.02	0.3433	-17.83843	44.73689
X1	1	4.01680	1.07136	3.75	0.0072	1.48344	6.55016
X2	1	2.81175	1.37859	2.04	0.0808	-0.44809	6.07160

(a) .6682 **(c)** X_1 p-value $= .0072$, X_2 p-value $= .0808$ **(d)** 95% C.I. for slope for X_1: $(1.48344 - 6.55016)$

10.4.5.

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	2	17018	8508.89242	4.89	0.0175
Error	22	38282	1740.10069		
Corrected Total	24	55300			

Root MSE	41.71451	R-Square	0.3077
Dependent Mean	537.00000	Adj R-Sq	0.2448
Coeff Var	7.76807		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|	95% Confidence	Limits
Intercept	1	-421.99671	339.76199	-1.24	0.2273	-1126.61995	282.62653
X1	1	11.16613	3.65523	3.05	0.0058	3.58564	18.74663
X2	1	-0.63032	0.93826	-0.67	0.5087	-2.57615	1.31552

(a) .3077 **(c)** X_1 p-value = .0058, X_2 p-value = .5807 **(d)** 95% C.I. for slope for X_1 : (3.58564 − 18.74663)

10.5.1. C.I.: 50.289, 51.747. P.I.: 46.751, 55.284

10.5.3. C.I.: 44.22, 56.59; P.I.: 35.64, 65.17

10.5.5. C.I.: 514.31, 550.75; P.I.: 444.12, 620.94

10.6.1. **(a)** Pairwise correlations:

	DNA-Bloo	Co-cult	DNA-Rect
Co-cult	0.360		
DNA-Rect	0.532	0.303	
RNA-Rect	0.202	0.674	0.430

(b) $R = .370$, $F = 7.06$, $p = .001$

(c) $r_{y1.23} = .3472$, $r_{y2.13} = .5232$, $r_{y3.12} = -.2538$

(d) $r_{12.y3} = -.1660$

(e) $r_{13.y2} = .6615$

(f) $r_{23.y1} = .3969$

10.6.3. **(a)** $R = .9517$, $F = 57.638$, $p < .005$

(b), (c)

$r_{y1.2} = .9268$, $t = 8.549$, $p < .01$; $r_{y2.1} = .3785$, $t = 1.417$, $.20 > p > .10$;

$r_{12.y} = -.1789$, $t = -.630$, $p > .20$

Review Exercises

7. $R = .3496\, F = .83\, (p > .10)$

9. **(a)** $\hat{y} = 11.419 + 1.2598x_1 + 3.1067x_2$ **(b)** $R^2 = .92$

(c)

Source	SS	*d.f.*	MS	V.R.	*p*
Regression	1827.004659	2	913.50	69.048	$<.005$
Residual	158.728641	12	13.23		
	1985.7333	14			

(d) $\hat{y} = 11.419 + 1.2598(10) + 3.1067(5) = 39.55$

11. **(a)** $\hat{y} = -126.505 + .176x_1 - 1.563x_2 + 1.575x_3 + 1.6292x_4$

(b)

Source	SS	*d.f.*	MS	V.R.	*p*
Regression	30873.47	4	7718.367	13.37	$<.005$
Residual	5774.93	10	577.493		
	36648.40	14			

(c) $t_1 = 4.40$; $t_2 = -.78$; $t_3 = 3.53$; $t_4 = 2.59$

(d) $R^2_y.1234 = .842423$; $R_{y.1234} = .91784$

13. **(a)** correlation
(b) log plasma adiponectin levels
(c) age and glomerular filtration rate
(d) both correlations were not significant
(e) subjects with end-stage renal disease

15. **(a)** correlation
(b) static inspiratory mouth pressure
(c) forced expiratory volume, peak expiratory flow, and maximal inspiratroy flow
(d) both correlations were not significant
(e) boys and girls ages 7–14

17.

	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	x12	x13
X1	1												
X2	.737(**)	1											
X3	−.109	.244	1										
X4	.760(**)	.698(**)	.316	1									
X5	.556(**)	.608(**)	.273	.760(**)	1								
X6	.040	−.213	−.136	−.101	−.647(**)	1							
X7	−.291	−.289	−.093	−.293	−.412(*)	.231	1						
X8	.570(**)	.659(**)	.227	.568(**)	.763(**)	−.481(*)	−.555(**)	1					
X9	.555(**)	.566(**)	.146	.454(*)	.717(**)	−.503(**)	−.650(**)	.922(**)	1				
X10	.345	.508(**)	.419(*)	.455(*)	.640(**)	−.377	−.480(*)	.905(**)	.788(**)	1			
X11	−.467(*)	−.400(*)	−.224	−.621(**)	−.702(**)	.388(*)	.732(**)	−.652(**)	−.646(**)	−.582(**)	1		
X12	−.250	−.260	−.178	−.228	−.448(*)	.390(*)	.778(**)	−.641(**)	−.717(**)	−.667(**)	.796(**)	1	
X13	−.271	−.305	−.380	−.346	−.518(**)	.348	.524(**)	−.645(**)	−.707(**)	−.729(**)	.744(**)	.864(**)	1

** correlation is significant at the 0.01 level (2-tailed).
* correlation is significant at the 0.05 level (2-tailed).

19.

	v1	v2	v3	v4	v5	v6	v7	v8
v1	1							
v2	.123	1						
v3	.115	.963(**)	1					
v4	.417(**)	−.063	−.041	1				
v5	.005	−.102	−.103	−.059	1			
v6	.001	.270(**)	.295(**)	−.036	.137	1		
v7	−.113	−.074	−.076	.052	.134	.061	1	
v8	.077	−.002	−.023	.146	.165	−.202	−.032	1

** Correlation is significant at the 0.01 level (2-tailed).

Chapter 11

11.2.1. mobilizer: 0 G-CSF, 1-Etoposide

```
The regression equation is
conc = 12.9 - 0.0757 age - 5.48 mobilizer

Predictor       Coef     SE Coef        T          P
Constant      12.933       2.787     4.64      0.000
age         -0.07566     0.04388    -1.72      0.092
mobilize      -5.480       1.429    -3.83      0.000

S = 3.965      R-Sq = 27.1%          R-Sq(adj) = 23.6%

Analysis of Variance

Source           DF       SS        MS       F       P
Regression        2   240.02    120.01    7.63   0.002
Residual Error   41   644.60     15.72
Total            43   884.62
```

11.2.3.

```
The regression equation is
QTc = 23.0 + 39.4 sex + 0.825 dose

Predictor       Coef     SE Coef        T          P
Constant       22.98       46.92     0.49      0.632
sex            39.40       42.14     0.93      0.366
dose         0.82456     0.07556    10.91      0.000

S = 84.10      R-Sq = 89.6%          R-Sq(adj) = 88.1%
```

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	850164	425082	60.10	0.000
Residual Error	14	99018	7073		
Total	16	949182			

11.3.1.

Step	1	2	3
Constant	51.93	116.07	115.54
MEM	0.66	0.60	0.57
T-Value	5.75	5.87	5.53
P-Value	0.000	0.000	0.000
SOCIALSU		-0.476	-0.492
T-Value		-5.28	-5.51
P-Value		0.000	0.000
CGDUR			0.122
T-Value			1.88
P-Value			0.064
S	17.4	15.4	15.2
R-Sq	25.20	41.92	43.97
R-Sq(adj)	24.44	40.72	42.22

11.3.3.

Alpha-to-Enter: 0.15 Alpha-to-Remove: 0.15

Response is REACTIVE on 6 predictors, with N = 68

Step	1	2	3
Constant	3.374	5.476	5.418
AGEABUSE	-0.38	-0.45	-0.42
T-Value	-2.49	-3.00	-2.91
P-Value	0.015	0.004	0.005
VERBALIQ		-0.0219	-0.0228
T-Value		-2.75	-2.93
P-Value		0.008	0.005
STIM			0.61
T-Value			2.05
P-Value			0.044

```
S              1.06       1.01      0.990
R-Sq           8.57      18.10      23.15
R-Sq(adj)      7.19      15.58      19.55
C-p            10.4        4.6        2.5
```

11.4.1.

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	2.1192	0.1740	148.3439	<.0001
sex	1	0.0764	0.2159	0.1252	0.7234

Odds Ratio Estimates

Effect	Point Estimate	95% Wald Confidence Limits
sex	1.079	0.707 1.648

Review Exercises

15. $\hat{y} = 1.87 + 6.3772x_1 + 1.9251x_2$

Coefficient	Standard Error	t
1.867	.3182	5.87
6.3772	.3972	16.06
1.9251	.3387	5.68
$R^2 = .942$		

Source	SS	*d.f.*	MS	V.R.
Regression	284.6529	2	142.3265	202.36954
Residual	17.5813	25	.7033	
	302.2342	27		

17. $\hat{y} = -1.1361 + .07648x_1 + .7433x_2 - .8239x_3 - .02772x_1x_2 + .03204x_1x_3$

Coefficient	Standard Deviation	t	p^a
−1.1361	.4904	−2.32	$.05 > p > .02$
.07648	.01523	5.02	$< .01$
.7433	.6388	1.16	$> .20$
−.8239	.6298	−1.31	$.20 > p > .10$
−.02772	.02039	−1.36	$.20 > p > .10$
.03204	.01974	1.62	$.20 > p > .10$

[a] Approximate. Obtained by using 35 d.f.
$R^2 = .834$.

Source	SS	*d.f.*	MS	V.R.
Regression	3.03754	5	.60751	34.04325
Residual	.60646	34		
	3.64400	39	.01784	

$$x_2 = \begin{cases} 1 \text{ if } A \\ 0 \text{ if otherwise} \end{cases} \qquad x_3 = \begin{cases} 1 \text{ if } B \\ 0 \text{ if otherwise} \end{cases}$$

For A: $\hat{y} = (-1.1361 + .7433) + (.07648 - .02772)x_1 = -.3928 + .04875x_1$
For B: $\hat{y} = (-1.1361 + .8239) + (.07648 + .03204)x_1 = -1.96 + .10852x_1$
For C: $\hat{y} = 1.1361 + .07648x_1$

23.

Response = V, Dummy1 = 1 if infant, 0 otherwise, Dummy2 = 1 if Child, 0 otherwise

```
The regression equation is
V = 11.7 + 0.137 W - 11.4 DUMMY1 -11.7 DUMMY2 + 0.226 INTER1 + 0.223
    INTER2

Predictor        Coef       SE Coef       T        P
Constant       11.750         3.822    3.07    0.004
W             0.13738       0.05107    2.69    0.010
DUMMY1        −11.421         4.336   −2.63    0.012
DUMMY2        −11.731         3.966   −2.96    0.005
INTER1         0.2264        0.2208    1.03    0.311
INTER2        0.22332       0.06714    3.33    0.002

S = 1.73234     R=sq = 94.9%     R=sq(adj) = 94.3%

Analysis of Variance

Source           DF         SS         MS        F        P
Regression        5    2304.47     460.89   153.58    0.000
Residual Error   41     123.04       3.00
Total            46    2427.51

Source    DF     Seq SS
W          1    2265.07
DUMMY1     1       5.59
DUMMY2     1       0.00
INTER1     1       0.60
INTER2     1      33.20
```

```
Unusual Observations

Obs      W         V       Fit    SE Fit    Residual    St Resid
17    10.8     8.366     4.257     0.496       4.109       2.48R
36    47.0    15.400    16.971     1.145      −1.571      −1.21X
41    96.0    20.000    24.938     1.265      −4.938      −4.17RX
46    87.0    30.900    23.702     0.881       7.198       4.83R

R denotes an observation with a large standardized residual.
X denotes an observation whose X value gives it large influence.
```

Chapter 12

12.3.1. $X^2 = 2.072,\ p > .05$
12.3.3. $X^2 = 3.417,\ p > .10$
12.3.5. $X^2 = 2.21,\ p > .10$
12.4.1. $X^2 = .078,\ p > .10$
12.4.3. $X^2 = 816.410,\ p < .005$
12.4.5. $X^2 = 42.579,\ p < .005$
12.5.1. $X^2 = 3.622,\ d.f. = 3,\ p > .10$
12.5.3. $X^2 = .297,\ d.f. = 1,\ p > .10$
12.5.5. $X^2 = 82.373,\ d.f. = 2,\ p < .005$
12.6.1. Since $b = 7 > 3$ (for $A = 10, B = 10, a = 8$), $p > 2(.035) = .070$. Do not reject H_0.
12.6.3. Since $b = 1$ (for $A = 9, B = 7, a = 16$), $p = 2(.002) = .004$. Reject H_0.
12.7.1. $\widehat{RR} = 13.51$, 95% C.I. 9.7, 18.8
12.7.3. $X^2 = 12.898, p < .005, \widehat{OR} = 1.967$
12.7.5. $\widehat{OR}_{MH} = 3.733, X^2_{MH} = 25.095, p < .005$

Review Exercises

15. $X^2 = 7.124,\ d.f. = 3, p > .05$, Fail to reject.
17. $X^2 = 2.40516, p > .10$
19. $X^2 = 5.1675, p > .10$
21. $X^2 = 67.8015, p < .005$
23. $X^2 = 7.2577.05 > p > .025$
25. Independence
27. Homogeneity
35. Overall Satisfaction

$X^2 = 3.143$
d.f. $= 2, p = 0.208$
2 cells with expected counts less than 5.0

Pain
$X^2 = 0.444$
d.f. $= 2, p = 0.801$
2 cells with expected counts less than 5.0
Nausea and Vomiting
$X^2 = 0.483$
d.f. $= 2, p = 0.785$

37. $\widehat{OR} = 2.06$; 95% C.I.: .92, 4.61
41. $X^2 = 13.530$
d.f. $= 1, p = 0.000$
43. Test statistic $= 2, p = .019$ (one-sided test)
45. $X^2 = 8.749$
d.f. $= 1, p = 0.003$
47. $X^2 = 4.875$
d.f. $= 1, p = 0.027$
49. $\widehat{OR} = 3.79$; 95% C.I.: 1.52, 9.48OR
51. $X^2 = 11.589$
d.f. $= 1, p = 0.001$

Chapter 13

13.3.1. $P = .3036, p = .6072$
13.3.3. $P(x \leq 2|13, .5) = .0112$. Since $.0112 < .05$, reject H_0. $p = .0112$
13.4.1. $T_+ = 48.5$. $.1613 < p < .174$
13.4.3. $T = 11.5$, $.1054 < p < .1308$
13.5.1. $X^2 = 16.13, p < .005$.
13.6.1. $T = 712.5, p = .2380$, Fail to reject H_0.
13.6.3. $S = 1772.5, p = .7566$, Fail to reject H_0.
13.7.1. $D = .3241, p < .01$
13.7.3. $D = .1319, p > .20$
13.8.1. $H = 11.38, p = .003$, df $= 3$.
13.8.3. $H = 18.13, p < .0001, d.f. = 2$.
13.8.5. $H = 19.61$ (adjusted for ties), $p < .005$
13.9.1. $\chi_r^2 = 8.67, p = .01$
13.9.3. $\chi_r^2 = 29.38, p < .005$
13.10.1. $r_s = -0.07, p > .20$
13.10.3. $r_s = .018, n = 20, p > .05$
13.10.5. $r_s = -.43, n = 30, .01 < p < .02$
13.11.1. $\hat{\beta}_1 = 1.429$
$(\hat{\beta}_0)_{1,\mathrm{M}} = -176.685$
$(\hat{\beta}_0)_{2,\mathrm{M}} = -176.63$

Review Exercises

7. $T = 0, n = 7, p = .0078$
9. $\chi_r^2 = 16.2, p < .005$
11. $D = .1587, p > .20$
13. $r_s = .09, p = .4532$
15. $T = 29.5, p = 0.0263$, Reject H_0
17. $H = 9.02$, d.f. $= 3, p = 0.029$
$H = 9.30$, d.f. $= 3, p = 0.026$ (adjusted for ties)
19. $r_s = -.036, p = .802$
21. $T = 62.5, p = .0072$, Reject H_0
23. USO: $\chi_r^2 = 3.94, p = .140$
BSO: $\chi_r^2 = 4.77, p = .093$
25. $T = 89, p = .0046$, Reject H_0
27. PFK: T $= 38, p = .8598$, Fail to reject H_0
HK: T $= 61.5, p = .0703$, Fail to reject H_0
LDH: T $= 37, p = .7911$, Fail to reject H_0
29. $r_s = .733, p = .001$

Chapter 14

14.3.1

```
      Number of Cases : 53  Censored :34 (64.1 5%)  Events: 19

     Survival Time    Standard Error    95% Confidence Interval
Mean:    12.57            1.10            ( 10.40, 14.73 )
  (Limited to 19.00 )
Median:  16.00            1.80            ( 12.47, 19.53 )

                    Percentiles
                25.00  50.00  75.00
Value           18.00  16.00   4.00
Standard Error          1.80   3.76
```

14.4.3 Support group:

```
      Number of Cases: 22    Censored: 0 ( .00%)    Events: 22
     Survival Time    Standard Error    95% Confidence Interval
Mean:    45.09             3.98            ( 37.29, 52.89 )
Median:  60.00              .00            (   .  ,   .   )

                    Percentiles
                25.00  50.00  75.00
Value           60.00  60.00  26.00
Standard Error     .      .     6.96
```

Nonsupport group:

```
 Number of Cases: 28    Censored: 0  ( .00%)    Events: 28
     Survival Time    Standard Error    95% Confidence Interval
Mean:    16.04             1.86           ( 12.39, 19.68 )
Median:  15.00             5.29           (  4.63, 25.37 )

                    Percentiles
                 25.00  50.00  75.00
Value            22.00  15.00   7.00
Standard Error    3.44   5.29    .92

Log Rank Statistic and (Significance): 29.22 ( .0000)
Breslow Statistic and (Significance): 23.42 ( .0000)
Tarone-Ware Statistic and (Significance): 26.28 ( .0000)


Breslow's Test = 21.843, p < 0.001
```

14.5.1 The variable "weight" was significant in this model when used to predict time-to-onset of cancer after exposure to UV light. $100(e^{.19} - 1) = 20.9\%$; therefore, for each unit increase in weight, the hazard for time-to-onset of cancer increases by 20.9%.

14.5.3 (a) Age: $\beta = \ln(1.69) = .525$; Tumor size: $\beta = \ln(1.32) = .278$; Chemotherapy: $\beta = \ln(.88) = -.128$; Radiation: $\beta = \ln(.54) = -.616$.
(b) The hazard of metastases is increased to 1.69 times for those 50+, 1.32 times if the tumor size is > 2 cm, .88 times for those receiving chemotherapy, and is .54 times for those receiving radiation. Hence, increased age and larger tumor size are predictive of increased metastases, whereas chemotherapy and radiation are protective against metastases.

Review Exercises

7. h(t) = .25/.15 = 1.67

9. $03 = -\dfrac{\Delta s(t)}{(10-2)} = -.24$

11. Survival Analysis for DAYS

```
Factor GRADE = 1
Time   Status   Cumulative    Standard    Cumulative     Number
                  Survival       Error        Events  Remaining
450         1        .8889       .1048             1          8
556         1        .7778       .1386             2          7
2102        1        .6667       .1571             3          6
2756        0                                      3          5
3496        0                                      3          4
3990        1        .5000       .1863             4          3
5686        0                                      4          2
6290        0                                      4          1
8490        0                                      4          0
```

```
Number of Cases: 9    Censored: 5  ( 55.56%)    Events: 4

     Survival Time    Standard Error    95% Confidence Interval
Mean:      5255             1197            ( 2910, 7601 )
  (Limited to 8490 )
Median:    3990                .            (    .,   .  )

Survival Analysis for DAYS

Factor GRADE = 2
Time  Status   Cumulative    Standard    Cumulative     Number
                 Survival       Error        Events  Remaining
106        1        .8333       .1521             1          5
169        1        .6667       .1925             2          4
306        1        .5000       .2041             3          3
348        1        .3333       .1925             4          2
549        1        .1667       .1521             5          1
973        1        .0000       .0000             6          0

Number of Cases: 6    Censored:  ( .00%)    Events: 6

     Survival Time    Standard Error    95% Confidence Interval
Mean:       409             129            ( 155, 662 )
Median:     306             110            (  91, 521 )

Survival Analysis for DAYS

                    Total     Number       Number    Percent
                              Events     Censored   Censored
GRADE      0           40          0           40     100.00
GRADE      1            9          4            5      55.56
GRADE      2            6          6            0        .00
Overall                55         10           45      81.82


Breslow's Test 73.630, p < 0.001
```

13. **(a)** Age: $\beta = \ln(1.02) = .020$; Hormone therapy: $\beta = \ln(.89) = -.117$; Pre-PSA: $\beta = \ln(2.41) = .880$; Tumor classification: $\beta = \ln(1.42) = .351$.
(b) Age and hormone therapy were not significant in terms of long-term control of prostate cancer. Having a pre-treatment PSA of > 10 ng/mL and a high tumor classification were both significant risk factors (Pre-PSA increased the hazard by 2.41 times and high tumor classification increased the hazard *y* 1.42 times).
(c) $100(e^{.02} - 1) = 2\%$; therefore, an increase in 1 unit of age increases long-term cancer risk by 2%.

Chapter 15–ONLINE ONLY

15.2.1 **(a)** 5.8 **(b)** White: 10.0, Black: 3.7, **(c)** 9.43 **(d)** 5.5
(e) 9.43 **(f)** MN 22 .2, MCD 34.5

15.2.3

Age (Years)	Population[a]	Deaths[b]	U.S. Population[c]	Age-Specific Death Rates (per 100,000)	Standard Population Based on U.S. Population 2000	Number of Expected Deaths in Standard Population
0–4	539,509	1,178	19,175,798	218.3	68139	149
5–14	1,113,920	224	41,077,577	20.1	145964	29
15–24	1,117,439	954	39,183,891	85.4	139235	119
25–34	1,213,415	1,384	39,891,724	114.1	141751	162
35–44	1,287,120	2,823	45,148,527	219.3	160430	352
45–54	1,085,150	5,271	37,677,952	485.7	133884	650
55–64	723,712	8,035	24,274,684	1110.2	86257	958
65 and Over	969,048	51,863	34,991,753	5352.0	124339	6655
Total	8,049,313	71,732	281,421,906	891.2	1000000	9073

Age-adjusted death rate = 9.1

15.3.1 **(a)** (10–14): 1.3, (15–19): 59.9, (20–24): 126.7, (25–29): 112.6, (30–34): 83.6, (35–39): 36.5, (40–over): 2.6; **(b)** 2142.1 **(c)** (10–14): 6.3, (15–19): 305.9, (20–24): 939.2, (25–29): 1502.3, (30–34): 1920.2, (35–39): 2102.9, (40–over): 2142.1 **(d)** 46.7

15.3.3 **(a)** (10–14): 1.2, (15–19): 58.5, (20–24): 120.2, (24–29): 113.7, (30–34): 84.2, (35–39): 33.8, (40–44): 6.0, (45 and over): .5; **(b)** 2089.6 **(c)** (10–14): 6.1, (15–19): 298.5, (20–24): 899.6, (25–29): 1468.1, (30–34): 1889.3, (35–39): 2058.2, (40–44): 2088.1, (45 and over): 2089.6 **(d)** 45.6

15.4.1 **(a)** immaturity ratio: 1997—7.3, 2001—8.1 **(b)** prevalence ratio: Nevada—22.2, United States—20.5 **(c)** incidence rate—14.5 per 100,000

Review Exercises

9. 8.9

11. Infant mortality: Total—5.7; white—5.3; nonwhite—6.5; Cause of death: heart disease total—36.8; white 37.7; nonwhite 32.3 Cancer total—23.7; white—23.8; nonwhite—23.1 AIDS total—1.5; white .8; nonwhite 4.9 Immaturity ratio: total—7.0; white—6.7; nonwhite—7.5 Incident rate C-section: total—22.6; white 25.0; nonwhite—18.3

13. 15.9, 51.6