Instructor's Manual for:

Introductory Statistics for the Behavioral Sciences, 7th Ed.

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Answers to All Exercises

Chapter 1

1. (a) $\sum X = 195 \quad \sum X^2 = 2801 \quad \left(\sum X\right)^2 = 38{,}025$

   (b) $\sum X = 138 \quad \sum X^2 = 1512 \quad \left(\sum X\right)^2 = 19{,}044$

   (c) $\sum X = 70 \quad \sum X^2 = 550 \quad \left(\sum X\right)^2 = 4{,}900$

   (d) $\sum X = 55 \quad \sum X^2 = 685 \quad \left(\sum X\right)^2 = 3{,}025$

2. (a) $\sum X + \sum Y$ *or* $\sum(X + Y)$

   (b) $\sum G + \sum P^2$ *or* $\sum(G + P^2)$

   (c) $\sum X^2 - 6\sum XY + 4(\sum X)^2 + 2\sum Y^2$

3. (a) $\sum X = 10 \quad \left(\sum X\right)^2 = 100 \quad \sum\left(X + Y\right) = 40$

   $\sum Y = 30 \quad \left(\sum Y\right)^2 = 900 \quad \sum X - \sum Y = -20$

   $\sum X^2 = 30 \quad \sum\left(X - Y\right) = -20 \quad \sum XY = 73$

   $\sum Y^2 = 206 \quad \sum X + \sum Y = 40 \quad \sum X \sum Y = 300$

   (b) Rule 1: 40 = 10 + 30

   Rule 2: – 20 = 10 – 30

   Rule 3: 73 ≠ 300
   Rule 4: 30 ≠ 100; 206 ≠ 900

   (c) $\sum\left(X + k\right) = 10 + 20 = 30;\ \sum X + k = 10 + 4 = 14;$ Sum of new scores = 30

   (d) $\sum\left(Y - k\right) = 30 - 15 = 15; \sum Y - k = 30 - 3 = 27;$ Sum of new scores = 15

   (e) $\sum\left(kX\right) = 2 * 10 = 20;$ Sum of new scores = 20

4. **Data set 1:** $N = 5$

$$\text{å}\, X = 7; \text{å}\, X^2 = 15; \left(\text{å}\, X\right)^2 = 49; \text{å}\, XY = 23; \text{å}\left(X + Y\right) = 18;$$

$$\text{å}\, Y = 11; \text{å}\, Y^2 = 39; \left(\text{å}\, Y\right)^2 = 121; \text{å}\, X\, \text{å}\, Y = 77; \text{å}\left(X - Y\right) = -4;$$

$$\text{å}(X * 3.2) = 7 * 3.2 = 22.4; \text{å}\left(Y - 7\right) = 11 - 5(7) = -24;$$

$$\text{å}(X + 1.8) = 7 + 5(1.8) = 16; \text{å}(Y / 4) = 11/4 = 2.75$$

Data set 2: $N = 8$

$$\text{å}\, X = 36.39; \text{å}\, X^2 = 253.04; \left(\text{å}\, X\right)^2 = 1324.23; \text{å}\, XY = 86.2; \ \text{å}\left(X + Y\right) = 56.46;$$

$$\text{å}\, Y = 20.07; \text{å}\, Y^2 = 76.74; \left(\text{å}\, Y\right)^2 = 402.80; \text{å}\, X\, \text{å}\, Y = 730.35; \ \text{å}\left(X - Y\right) = 16.32;$$

$$\sum(X * 3.2) = 36.39 * 3.2 = 116.45; \sum\left(Y - 7\right) = 20.07 - 8(7) = -35.93;$$

$$\sum(X + 1.8) = 36.39 + 8(1.8) = 50.79; \sum(Y / 4) = 20.07 / 4 = 5.02$$

5. **Data set 3:** $N = 14$

$$\sum X = 1{,}176; \sum X^2 = 100{,}288; \left(\sum X\right)^2 = 1{,}382{,}976; \sum XY = 96{,}426; \ \text{å}\left(X + Y\right) = 2{,}305$$

$$\sum Y = 1{,}129; \sum Y^2 = 93{,}343; \left(\sum Y\right)^2 = 1{,}274{,}641; \sum X \sum Y = 1{,}327{,}704; \ \text{å}\left(X - Y\right) = 47$$

Chapter 2

1.

Score	Turck		Kirk		Dupre	
	f	*cf*	*f*	*cf*	*f*	*cf*
20	1	15	0	15		
19	0	14	0	15		
18	1	14	0	15		
17	2	13	1	15		
16	1	11	0	14		
15	1	10	0	14		
14	1	9	1	14		
13	2	8	0	13		
12	0	6	3	13		
11	2	6	2	10	1	10
10	1	4	0	8	1	9
9	1	3	1	8	2	8
8	0	2	2	7	0	6
7	0	2	2	5	1	6
6	1	2	1	3	1	5
5	1	1	0	2	2	4
4			0	2	2	2
3			1	2	0	0
2			0	1	0	0
1			1	1	0	0

2.

	Turck		Kirk	
Score	*f*	*cf*	*f*	*cf*
19–20	1	15	0	15
17–18	3	14	1	15
15–16	2	11	0	14
13–14	3	9	1	14
11–12	2	6	5	13
9–10	2	4	1	8
7–8	0	2	4	7
5–6	2	2	1	3
3–4	0	0	1	2
1–2	0	0	1	1

3. The Histogram is approximately symmetrical, and bimodal in shape.

4. The Turck polygon skews to the left, the Kirk polygon skews to the right, and both appear bimodal.

5.

Stems (Intervals)	Leaves (Observations)
3 – 5	5
6 – 8	6
9 – 11	9 0 1 1
12 – 14	3 3 4
15 – 17	5 6 7 7
18 – 20	8 0

6. (1): b (4): b

(2): a (5): d

(3): a (6): g

7. (a) The *cf* corresponding to a score of 8 is 2; PR = (2/15) × 100 = 13.33%, so the PR for 8 is about 13.

(b) The *cf* for a score of 12 is 6; PR = (6/15) × 100 = 40%, so the PR for 12 is 40.

8. (a) A score of 16 corresponds to a *cf* of 14; PR = 14/15 × 100 = 93.33.

(b) A score of 7 corresponds to a *cf* of about 4; PR ~ 4/15 × 100 ~ 27.

9. (a) The desired *cf* = (25/100) × 15 = 3.75, so the score at the 25th percentile is about 10.

(b) The desired *cf* = (75/100) × 15 = 11.25, so the score at the 75th percentile is about 16.

10. (a) The 2nd decile at Kirk Hall corresponds to a *cf* of .2 × 15 = 3, which corresponds to a score of 6.5 (i.e., the upper real limit of the 5–6 interval).

(b) The 50th percentile corresponds to a *cf* of .5 × 15 = 7.5, which corresponds to a score of 9.5 (i.e., midway through the 9–10 interval).

(c) The 68th percentile corresponds to a *cf* of .68 × 15 = 10, which corresponds to a score of about 11.