

Instructor's Manual for:

Introductory Statistics for the Behavioral Sciences, 7th Ed.

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Answers to All Exercises

Chapter 1

1. (a) $\sum X = 195$ $\sum X^2 = 2801$ $(\sum X)^2 = 38,025$
 (b) $\sum X = 138$ $\sum X^2 = 1512$ $(\sum X)^2 = 19,044$
 (c) $\sum X = 70$ $\sum X^2 = 550$ $(\sum X)^2 = 4,900$
 (d) $\sum X = 55$ $\sum X^2 = 685$ $(\sum X)^2 = 3,025$
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) $\sum X = 10$ $(\sum X)^2 = 100$ $\sum(X + Y) = 40$
 $\sum Y = 30$ $(\sum Y)^2 = 900$ $\sum X - \sum Y = -20$
 $\sum X^2 = 30$ $\sum(X - Y) = -20$ $\sum XY = 73$
 $\sum Y^2 = 206$ $\sum X + \sum Y = 40$ $\sum X \sum Y = 300$
 (b) Rule 1: $40 = 10 + 30$
 Rule 2: $-20 = 10 - 30$
 Rule 3: $73 = 300$
 Rule 4: $30 = 100$; $206 = 900$
 (c) $\sum(X + k) = 10 + 20 = 30$; $\sum X + k = 10 + 4 = 14$; Sum of new scores = 30
 (d) $\sum(Y - k) = 30 - 15 = 15$; $\sum Y - k = 30 - 3 = 27$; Sum of new scores = 15
 (e) $\sum(kX) = 2 * 10 = 20$; Sum of new scores = 20

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

$$\sum X = 7; \sum X^2 = 15; (\sum X)^2 = 49; \sum XY = 23; \sum (X + Y) = 18;$$

$$\sum Y = 11; \sum Y^2 = 39; (\sum Y)^2 = 121; \sum X \sum Y = 77; \sum (X - Y) = -4;$$

$$\sum (X * 3.2) = 7 * 3.2 = 22.4; \sum (Y - 7) = 11 - 5(7) = -24;$$

$$\sum (X + 1.8) = 7 + 5(1.8) = 16; \sum (Y / 4) = 11 / 4 = 2.75$$

Data set 2: $N = 8$

$$\sum X = 36.39; \sum X^2 = 253.04; (\sum X)^2 = 1324.23; \sum XY = 86.2; \sum (X + Y) = 56.46;$$

$$\sum Y = 20.07; \sum Y^2 = 76.74; (\sum Y)^2 = 402.80; \sum X \sum Y = 730.35; \sum (X - Y) = 16.32;$$

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

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

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

$$\sum X = 1,176; \sum X^2 = 100,288; (\sum X)^2 = 1,382,976; \sum XY = 96,426; \sum (X + Y) = 2,305$$

$$\sum Y = 1,129; \sum Y^2 = 93,343; (\sum Y)^2 = 1,274,641; \sum X \sum Y = 1,327,704; \sum (X - Y) = 47$$

1.

| Score | Turck | | Kirk | | Dupre | |
|-------|----------|-----------|----------|-----------|----------|-----------|
| | <i>f</i> | <i>cf</i> | <i>f</i> | <i>cf</i> | <i>f</i> | <i>cf</i> |
| 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.

| Score | Turck | | Kirk | |
|-------|----------|-----------|----------|-----------|
| | <i>f</i> | <i>cf</i> | <i>f</i> | <i>cf</i> |
| 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; $PR = (2/15) \times 100 = 13.33\%$, so the PR for 8 is about 13.
(b) The *cf* for a score of 12 is 6; $PR = (6/15) \times 100 = 40\%$, so the PR for 12 is 40.
8. (a) A score of 16 corresponds to a *cf* of 14; $PR = 14/15 \times 100 = 93.33$.
(b) A score of 7 corresponds to a *cf* of about 4; $PR \sim 4/15 \times 100 \sim 27$.
9. (a) The desired *cf* = $(25/100) \times 15 = 3.75$, so the score at the 25th percentile is about 10.
(b) The desired *cf* = $(75/100) \times 15 = 11.25$, so the score at the 75th percentile is about 16.
10. (a) The 2nd decile at Kirk Hall corresponds to a *cf* of $.2 \times 15 = 3$, 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 $.5 \times 15 = 7.5$, 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 $.68 \times 15 = 10$, which corresponds to a score of about 11.