

## Chapter 2 Problems and Solutions - Descriptive Statistics: Tabular and Graphical Presentations

8. Data for a sample of 55 members of the Baseball Hall of Fame in Cooperstown, New York, are shown here. Each observation indicates the primary position played by the Hall of Famers: pitcher (P), catcher (H), 1st base (1), 2nd base (2), 3rd base (3), shortstop (S), left field (L), center field (C), and right field (R).

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | P | C | H | 2 | P | R | 1 | S | S | 1 | L | P | R | P |
| P | P | P | R | C | S | L | R | P | C | C | P | P | R | P |
| 2 | 3 | P | H | L | P | 1 | C | P | P | P | S | 1 | L | R |
| R | 1 | 2 | H | S | 3 | H | 2 | L | P |   |   |   |   |   |

- a. Use frequency and relative frequency distributions to summarize the data.
- b. What position provides the most Hall of Famers?
- c. What position provides the fewest Hall of Famers?
- d. What outfield position (L, C, or R) provides the most Hall of Famers?
- e. Compare infielders (1, 2, 3, and S) to outfielders (L, C, and R).

12. Consider the following frequency distribution.

| Class | Frequency |
|-------|-----------|
| 10–19 | 10        |
| 20–29 | 14        |
| 30–39 | 17        |
| 40–49 | 7         |
| 0–59  | 2         |

Construct a cumulative frequency distribution and a cumulative relative frequency distribution.

27. The following data are for 30 observations involving two qualitative variables,  $x$  and  $y$ . The categories for  $x$  are A, B, and C; the categories for  $y$  are 1 and 2.

| Observation | $x$ | $y$ | Observation | $x$ | $y$ |
|-------------|-----|-----|-------------|-----|-----|
| 1           | A   | 1   | 16          | B   | 2   |
| 2           | B   | 1   | 17          | C   | 1   |
| 3           | B   | 1   | 18          | B   | 1   |
| 4           | C   | 2   | 19          | C   | 1   |
| 5           | B   | 1   | 20          | B   | 1   |
| 6           | C   | 2   | 21          | C   | 2   |
| 7           | B   | 1   | 22          | B   | 1   |
| 8           | C   | 2   | 23          | C   | 2   |
| 9           | A   | 1   | 24          | A   | 1   |
| 10          | B   | 1   | 25          | B   | 1   |
| 11          | A   | 1   | 26          | C   | 2   |
| 12          | B   | 1   | 27          | C   | 2   |
| 13          | C   | 2   | 28          | A   | 1   |
| 14          | C   | 2   | 29          | B   | 1   |
| 15          | C   | 2   | 30          | B   | 2   |

- a. Develop a crosstabulation for the data, with  $x$  as the row variable and  $y$  as the column variable.
- b. Compute the row percentages.
- c. Compute the column percentages.
- d. What is the relationship, if any, between  $x$  and  $y$ ?

## Chapter 2 Solutions

8. a.

| Position     | Frequency | Relative Frequency |
|--------------|-----------|--------------------|
| Pitcher      | 17        | 0.309              |
| Catcher      | 4         | 0.073              |
| 1st Base     | 5         | 0.091              |
| 2nd Base     | 4         | 0.073              |
| 3rd Base     | 2         | 0.036              |
| Shortstop    | 5         | 0.091              |
| Left Field   | 6         | 0.109              |
| Center Field | 5         | 0.091              |
| Right Field  | <u>7</u>  | <u>0.127</u>       |
|              | 55        | 1.000              |

b. Pitchers (Almost 31%)

c. 3rd Base (3 - 4%)

d. Right Field (Almost 13%)

e. Infielders (16 or 29.1%) to Outfielders (18 or 32.7%)

12.

| Class                    | Cumulative Frequency | Cumulative Relative Frequency |
|--------------------------|----------------------|-------------------------------|
| less than or equal to 19 | 10                   | .20                           |
| less than or equal to 29 | 24                   | .48                           |
| less than or equal to 39 | 41                   | .82                           |
| less than or equal to 49 | 48                   | .96                           |
| less than or equal to 59 | 50                   | 1.00                          |

27. a.

|       |   |    |    |       |
|-------|---|----|----|-------|
|       |   | y  |    |       |
|       |   | 1  | 2  | Total |
| x     | A | 5  | 0  | 5     |
|       | B | 11 | 2  | 13    |
|       | C | 2  | 10 | 12    |
| Total |   | 18 | 12 | 30    |

b.

|          |          | <b>y</b> |          | <b>Total</b> |
|----------|----------|----------|----------|--------------|
|          |          | <b>1</b> | <b>2</b> |              |
| <b>x</b> | <b>A</b> | 100.0    | 0.0      | 100.0        |
|          | <b>B</b> | 84.6     | 15.4     | 100.0        |
|          | <b>C</b> | 16.7     | 83.3     | 100.0        |

c.

|              |          | <b>y</b> |          |
|--------------|----------|----------|----------|
|              |          | <b>1</b> | <b>2</b> |
| <b>x</b>     | <b>A</b> | 27.8     | 0.0      |
|              | <b>B</b> | 61.1     | 16.7     |
|              | <b>C</b> | 11.1     | 83.3     |
| <b>Total</b> |          | 100.0    | 100.0    |

- d. Category A values for  $x$  are always associated with category 1 values for  $y$ . Category B values for  $x$  are usually associated with category 1 values for  $y$ . Category C values for  $x$  are usually associated with category 2 values for  $y$ .