SOLUTIONS

# CHAPTER 2: UNDERSTANDING DATA DISTRIBUTIONS WITH TABLES AND GRAPHS

1. The following data represent the age of first arrest for a sample of 50 boys. With this data, construct an ungrouped frequency distribution, and a percent, cumulative frequency, and cumulative percent distribution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 11 | 15 | 10 | 19 | 15 |
| 13 | 11 | 12 | 10 | 14 |
| 10 | 12 | 11 | 14 | 13 |
| 16 | 15 | 12 | 11 | 10 |
| 13 | 11 | 14 | 16 | 11 |
| 16 | 15 | 13 | 11 | 10 |
| 12 | 10 | 13 | 11 | 10 |
| 9 | 16 | 17 | 15 | 16 |
| 15 | 10 | 11 | 15 | 12 |
| 13 | 13 | 14 | 11 | 10 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| X | Frequency | Cum. Freq. | Percentage | Cum. % |
| 9 | 1 | 1 | 2% | 2% |
| 10 | 9 | 10 | 18% | 20% |
| 11 | 10 | 20 | 20% | 40% |
| 12 | 5 | 25 | 10% | 50% |
| 13 | 7 | 32 | 14% | 64% |
| 14 | 4 | 36 | 8% | 72% |
| 15 | 7 | 43 | 14% | 86% |
| 16 | 5 | 48 | 10% | 96% |
| 17 | 1 | 49 | 2% | 98% |
| 19 | 1 | 50 | 2% | 100% |

**Using the above distribution,**

1. **7 boys had their first arrest at age 13**
2. **86% of boys had their first arrest by age 15 (43 of the 50)**
3. **34% (8 + 14 + 10 + 2 or 98 – 64)**
4. **64% of the boys had their first arrest before age 14 (32 of the 50)**
5. **14% (10 + 2 + 2 or 100 – 86)**

f.

2. The state of Maryland is interested in analyzing cases of domestic violence in order to increase the effectiveness of the law enforcement response to violence against women. In a study of 40 incidents of domestic assault reported to law enforcement agencies in Maryland, researchers collect information about the age of each victim.

|  |  |  |  |
| --- | --- | --- | --- |
| 33 | 26 | 20 | 26 |
| 36 | 26 | 18 | 36 |
| 31 | 33 | 32 | 35 |
| 29 | 22 | 29 | 38 |
| 24 | 29 | 27 | 26 |
| 52 | 37 | 40 | 24 |
| 30 | 48 | 31 | 32 |
| 41 | 43 | 25 | 34 |
| 29 | 31 | 24 | 58 |
| 31 | 40 | 41 | 24 |

Group these data into categories with an interval width of 4 (the first interval should begin at 16). Calculate the stated class limits, real limits, midpoints, frequency, cumulative frequency, proportion, cumulative proportion, percentage and cumulative percentage.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Stated  Limits | Real  Limits | Midpoint | f | cf | p | % | cp | c% |
| 16–19 | 15.5–19.5 | 17.5 | 1 | 1 | 0.025 | 2.50 | 0.025 | 2.50 |
| 20–23 | 19.5–23.5 | 21.5 | 2 | 3 | 0.050 | 5.00 | 0.075 | 7.50 |
| 24–27 | 23.5–27.5 | 25.5 | 10 | 13 | 0.250 | 25.00 | 0.325 | 32.50 |
| 28–31 | 27.5–31.5 | 29.5 | 9 | 22 | 0.225 | 22.50 | 0.550 | 55.00 |
| 32–35 | 31.5–35.5 | 33.5 | 6 | 28 | 0.150 | 15.00 | 0.700 | 70.00 |
| 36–39 | 35.5–39.5 | 37.5 | 4 | 32 | 0.100 | 10.00 | 0.800 | 80.00 |
| 40–43 | 39.5–43.5 | 41.5 | 5 | 37 | 0.125 | 12.50 | 0.925 | 92.50 |
| 44–47 | 43.5–47.5 | 45.5 | 0 | 37 | 0.000 | 0.00 | 0.925 | 92.50 |
| 48–51 | 47.5–51.5 | 49.5 | 1 | 38 | 0.025 | 2.50 | 0.950 | 95.00 |
| 52–55 | 51.5–55.5 | 53.5 | 1 | 39 | 0.025 | 2.50 | 0.975 | 97.50 |
| 56–59 | 55.5–59.5 | 57.5 | 1 | 40 | 0.025 | 2.50 | 1.000 | 100.00 |

3.

a.

b. **No these data to not have a normal distribution. The data have a positive skew.**

c. **There are high outliers in the data – 14, 15, and 29 prior convictions are unusually high scores**.