

AE

Additional Exercises

1. Median family income has grown substantially in recent years. The table below contains median household incomes in the United States for the years 1990 through 2009.

| Median Family Income | | | | | |
|----------------------|-------------|-------------------|------|-------------|-------------------|
| Year | Income (\$) | Percentage Change | Year | Income (\$) | Percentage Change |
| 1990 | 29,943 | – | 2000 | 41,990 | 3.2 |
| 1991 | 30,126 | 0.6 | 2001 | 42,228 | 0.6 |
| 1992 | 30,636 | 1.7 | 2002 | 42,409 | 0.4 |
| 1993 | 31,241 | 2.0 | 2003 | 43,318 | 2.1 |
| 1994 | 32,264 | 3.3 | 2004 | 44,334 | 2.3 |
| 1995 | 34,076 | 5.6 | 2005 | 46,326 | 4.5 |
| 1996 | 35,492 | 4.2 | 2006 | 48,201 | 4.0 |
| 1997 | 37,005 | 4.3 | 2007 | 50,233 | 4.2 |
| 1998 | 38,885 | 5.1 | 2008 | 50,303 | 0.1 |
| 1999 | 40,696 | 4.7 | 2009 | 49,777 | –1.0 |

Source: U.S. Census Bureau

- What graphical methods would be useful in displaying the data?
 - Graph the data.
 - Write a short paragraph describing the data.
2. The following data represent income of households headed by adults 25 years and older, tabulated by educational attainment.

| Income and Educational Attainment | | | | | | | | | |
|-----------------------------------|--------------|-----------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------|---------------|
| Educational Attainment | Under \$5000 | \$5000 – \$9999 | \$10,000 – 14,999 | \$15,000 – 24,999 | \$25,000 – 34,999 | \$35,000 – 49,999 | \$50,000 – 74,999 | \$75,000 & Over | Median Income |
| Elementary | 16.3% | 26.7% | 17.2% | 19.7% | 9.9% | 6.4% | 2.9% | 0.8% | \$11,730 |
| < 8 Years | 18.4 | 27.9 | 17.3 | 18.1 | 8.9 | 5.9 | 2.7 | 0.7 | 10,884 |
| 8 Years | 13.7 | 25.2 | 17.1 | 21.7 | 11.0 | 7.0 | 3.1 | 1.0 | 12,999 |
| High School | 6.8 | 12.4 | 12.0 | 21.8 | 17.8 | 17.0 | 9.5 | 2.8 | 23,382 |
| 1 – 3 Years | 10.9 | 19.4 | 14.9 | 22.2 | 14.2 | 11.2 | 5.6 | 1.6 | 16,727 |
| 4 Years | 5.4 | 10.0 | 11.0 | 21.6 | 19.0 | 18.9 | 10.8 | 3.2 | 25,910 |
| College | 2.6 | 4.3 | 5.8 | 15.1 | 16.3 | 22.7 | 20.1 | 13.2 | 38,337 |
| 1 – 3 Years | 3.6 | 6.6 | 8.1 | 18.7 | 18.1 | 22.6 | 16.1 | 6.1 | 31,865 |
| 4 Years + | 1.8 | 2.5 | 4.1 | 12.4 | 14.9 | 22.8 | 23.0 | 18.5 | 43,952 |

Source: U.S. Census Bureau

- What graphical methods would be useful in displaying the data?
- Use a graphics program to display the data.
- Discuss any conclusions you made from your graph(s).

3. Where do business school students most want to work? A CNNMoney list ranks companies that MBA students want to work for most after getting their degree. It can be seen that men and women have different desires when it comes to employment after business school. The table below shows seven of the top companies students want to work for and the percentage of students that ranked the particular company in their top 5.

| Most Desired Companies | | |
|------------------------|-------------------|---------------------|
| Company | Percentage of Men | Percentage of Women |
| Google | 22.36 | 21.72 |
| Goldman Sachs | 17.76 | 5.81 |
| Johnson & Johnson | 5.68 | 11.41 |
| Bain & Company | 12.89 | 7.88 |
| Apple Computer | 12.80 | 11.01 |
| Nike | 8.06 | 9.04 |
| J.P. Morgan | 12.08 | 4.44 |

Source: CNNMoney.com

- What graphical method do you think would be most useful in summarizing these data? Explain your answer.
 - Graph the data using the method you identified in part a.
 - Write a short paragraph describing the data, making conclusions from the graph you constructed in part b.
4. The following data give the percentage of people in the U.S. holding more than one job in a one-year period. Graph the data using a method that would contrast the difference between men and women in this situation.

| Percentage Holding More Than One Job | | |
|--------------------------------------|------|-------|
| Year | Men | Women |
| 1970 | 7.0% | 2.2% |
| 1979 | 5.9% | 3.5% |
| 1989 | 6.4% | 5.9% |
| 1999 | 5.7% | 5.6% |
| 2003 | 5.2% | 5.4% |

Source: Bureau of Labor Statistics

5. *Billboard* magazine, in cooperation with Arbitron, produces a national radio format rating. The following data were gathered from radio listeners 12 and older.

| Radio Formats | | | | | | |
|--------------------|---------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------------|
| | Mon – Fri 6 AM – 10 AM | Mon – Fri 10 AM – 3 PM | Mon – Fri 3 PM – 7 PM | Mon – Fri 7 PM – 12 AM | Mon – Sun 12 AM – 6 AM | Mon – Sun 6 AM – 12 AM |
| Adult Contemporary | 17.2% | 19.7% | 17.7% | 15.0% | 16.2% | 20.0% |
| News/Talk | 17.9 | 13.1 | 12.5 | 14.3 | 5.3 | 15.6 |
| Country | 13.0 | 13.2 | 13.2 | 10.3 | 11.7 | 14.3 |
| Album Rock | 10.0 | 10.4 | 10.9 | 9.8 | 18.7 | 10.2 |
| Top 40 | 8.9 | 9.7 | 10.9 | 12.9 | 14.3 | 4.7 |
| Urban | 7.5 | 7.6 | 8.9 | 14.1 | 11.8 | 7.1 |
| Oldies | 6.0 | 6.8 | 6.9 | 6.5 | 4.3 | 10.2 |
| Classic Rock | 4.7 | 3.6 | 3.7 | 3.9 | 6.1 | 2.9 |
| Spanish | 4.5 | 4.2 | 3.7 | 2.2 | 4.9 | 4.2 |
| Adult Standards | 3.4 | 4.2 | 3.7 | 2.7 | 0.3 | 2.8 |
| Religious | 2.1 | 1.7 | 1.8 | 1.8 | 1.3 | 2.5 |
| Classical | 1.4 | 1.7 | 1.7 | 1.9 | 0.5 | 2.3 |
| Easy Listening | 0.9 | 1.1 | 0.9 | 0.8 | 0.2 | 1.2 |
| Modern Rock | 1.0 | 1.1 | 1.3 | 1.6 | 2.4 | 0.4 |
| Adult Alternative | 1.5 | 1.9 | 2.2 | 2.2 | 2.0 | 1.6 |

- What kinds of graphs would be appropriate for displaying the data? Explain your choices.
 - Graph a column of the data. Briefly analyze your graph.
 - Create a graph that would be useful in visually comparing two columns of the data. Briefly analyze your graph.
6. The Caribbean has been a favorite vacation spot for affluent North Americans and Europeans, especially during the winter months. The following table lists the number of tourists during the first six months of the year for a number of Caribbean destinations.

| Number of Tourists | | | |
|--------------------|---------|--------|--------|
| | U.S. | Canada | Europe |
| Antigua & Barbuda | 53,811 | 10,709 | 18,591 |
| Aruba | 94,028 | 1320 | 4681 |
| Barbados | 105,236 | 51,830 | 34,562 |
| Bermuda | 250,390 | 21,241 | 11,715 |
| Bonaire | 12,210 | 352 | 2266 |
| Cayman Islands | 81,180 | 3791 | 3025 |
| Curacao | 15,186 | 572 | 6543 |
| Guadeloupe | 15,596 | 10,654 | 25,409 |
| Trinidad & Tobago | 29,110 | 12,470 | 11,820 |

- Create a stacked bar graph that shows where tourists from the U.S., Canada, and Europe travel in the Caribbean.
- Create three separate bar charts, one for American tourists, one for Canadian tourists, and one for European tourists, that show the number of people traveling to each Caribbean destination.

7. The following table contains a list of the top 20 global corporations, ranked by the amount spent on research and development in 2009.

| Amount Spent on Research and Development (R&D) in 2009 (Millions of Dollars) | | | | | |
|---|-------------------|--------------|-----------------------------------|-----------------------|---------------------------|
| Rank | Company | R&D Spending | Spending as a Percentage of Sales | Headquarters Location | Industry |
| 1 | Roche Holding | 9120 | 20.1 | Europe | Healthcare |
| 2 | Microsoft | 9010 | 15.4 | N. America | Software and Internet |
| 3 | Nokia | 8240 | 14.4 | Europe | Computing and Electronics |
| 4 | Toyota | 7822 | 3.8 | Japan | Auto |
| 5 | Pfizer | 7739 | 15.5 | N. America | Healthcare |
| 6 | Novartis | 7469 | 16.9 | Europe | Healthcare |
| 7 | Johnson & Johnson | 6986 | 11.3 | N. America | Healthcare |
| 8 | Sanofi-Aventis | 6391 | 15.6 | Europe | Healthcare |
| 9 | GlaxoSmithKline | 6187 | 13.9 | Europe | Healthcare |
| 10 | Samsung | 6002 | 5.5 | S. Korea | Computing and Electronics |
| 11 | General Motors | 6000 | 5.7 | N. America | Auto |
| 12 | IBM | 5820 | 6.1 | N. America | Computing and Electronics |
| 13 | Intel | 5653 | 16.1 | N. America | Computing and Electronics |
| 14 | Merck | 5613 | 20.5 | N. America | Healthcare |
| 15 | Volkswagen | 5359 | 3.7 | Europe | Auto |
| 16 | Siemens | 5285 | 5.1 | Europe | Industrials |
| 17 | Cisco Systems | 5208 | 14.4 | N. America | Computing and Electronics |
| 18 | Panasonic | 5143 | 6.4 | Japan | Computing and Electronics |
| 19 | Honda | 4996 | 5.4 | Japan | Auto |
| 20 | Ford | 4900 | 4.1 | N. America | Auto |

Source: Booz & Company

- For comparative purposes, which of the two columns reporting R&D spending is more useful, and why?
- What types of graphs would be useful in presenting these data? Explain your answers.
- Develop a histogram for the spending as a percentage of sales.
- Use computer software to develop pie charts for the headquarters location and industry categories of the top 20 global R&D spenders.

8. In New York, a group of women challenged the state's ban on topless sunbathing. The legal issue was whether the ban was discriminatory. During the controversy, the Gallup poll conducted a survey asking the following question: *Do you think women should be permitted to sunbathe topless on public beaches, if they choose to, or do you think topless sunbathing on public beaches should be banned?*

| Responses to Survey Question | | | | |
|------------------------------|-----------|--------|------------|----------------------|
| | Permitted | Banned | No Opinion | Number of Interviews |
| National | 33% | 63% | 4% | 1001 |
| Gender | | | | |
| Male | 50 | 45 | 5 | 500 |
| Female | 18 | 79 | 3 | 501 |
| Age | | | | |
| 18 – 29 | 47 | 51 | 2 | 219 |
| 30 – 49 | 39 | 58 | 3 | 411 |
| 50 – 64 | 18 | 76 | 6 | 206 |
| 65 + | 18 | 77 | 5 | 357 |
| Region | | | | |
| East | 39 | 59 | 2 | 247 |
| Midwest | 34 | 62 | 4 | 254 |
| South | 25 | 71 | 4 | 301 |
| West | 38 | 57 | 5 | 199 |
| Community | | | | |
| Urban | 42 | 55 | 3 | 345 |
| Suburban | 35 | 62 | 3 | 351 |
| Rural | 23 | 72 | 5 | 298 |
| Race | | | | |
| White | 33 | 64 | 3 | 871 |
| Non-white | 39 | 57 | 4 | 121 |
| Education | | | | |
| College Grads | 46 | 48 | 6 | 288 |
| Some College | 35 | 62 | 3 | 233 |
| No College | 28 | 69 | 3 | 475 |
| Sex/Education | | | | |
| Male/College | 56 | 40 | 4 | 238 |
| Male/ No College | 45 | 49 | 6 | 238 |
| Female/ College | 26 | 70 | 4 | 264 |
| Female/ No College | 13 | 85 | 2 | 237 |

- Suggest two different types of graphs that might be useful in graphing the data.
- Create two different graphs using the data.
- Write a short paragraph describing the data.

9. The nation's political identification (Republican, Democrat, or Independent) changes over time. The data in the following table represent Harris poll results on political identification from 1977 to 2008.

| Nation's Political Identification (Percentage of the Population) 1977 – 2008 | | | | | | | |
|---|------------|----------|-------------|------|------------|----------|-------------|
| Year | Republican | Democrat | Independent | Year | Republican | Democrat | Independent |
| 1977 | 21 | 48 | 25 | 1993 | 29 | 38 | 27 |
| 1978 | 22 | 43 | 30 | 1994 | 32 | 37 | 26 |
| 1979 | 22 | 41 | 31 | 1995 | 31 | 36 | 28 |
| 1980 | 24 | 41 | 29 | 1996 | 30 | 38 | 26 |
| 1981 | 28 | 39 | 28 | 1997 | 29 | 37 | 26 |
| 1982 | 26 | 40 | 28 | 1998 | 28 | 37 | 27 |
| 1983 | 26 | 41 | 27 | 1999 | 29 | 36 | 26 |
| 1984 | 27 | 40 | 24 | 2000 | 29 | 37 | 23 |
| 1985 | 30 | 39 | 26 | 2001 | 31 | 36 | 22 |
| 1986 | 30 | 39 | 25 | 2002 | 31 | 34 | 24 |
| 1987 | 29 | 38 | 28 | 2003 | 28 | 33 | 24 |
| 1988 | 31 | 39 | 25 | 2004 | 31 | 34 | 24 |
| 1989 | 33 | 40 | 23 | 2005 | 30 | 36 | 22 |
| 1990 | 33 | 38 | 25 | 2006 | 27 | 36 | 24 |
| 1991 | 32 | 37 | 26 | 2007 | 26 | 35 | 23 |
| 1992 | 30 | 36 | 29 | 2008 | 26 | 36 | 31 |

Source: Harris Interactive

- What types of graphs would be useful in visualizing these data? Explain your answer.
- Construct two different types of graphs from the data.
- Examine the data and write a short paragraph on your conclusions.

10. Monaco is noted for having one of the highest population densities in the world, approximately 16,923 persons per square kilometer. Usually, dense urban areas have relatively high crime rates. This is not the case in Monaco. The following table gives crime data per 100,000 population for the year 2000 in Monaco as well as in other urban areas.

| Crime Data per 100,000 Population | | | | | |
|-----------------------------------|--------|--------|---------|----------|---------------|
| | Monaco | London | Chicago | New York | San Francisco |
| Homicide | 1.0 | 4.7 | 23.0 | 43.4 | 8.6 |
| Forcible Rape | 7.9 | 34.7 | – | 19.1 | 26.7 |
| Robbery | – | 625 | 635.6 | 352.5 | 409.9 |
| Aggravated Assault | – | 847.4 | 880.4 | 473.7 | 327.2 |
| Burglary | – | 938.9 | 895.4 | 394.6 | 764.8 |
| Larceny/Theft | 333.0 | 2675.3 | 3361.9 | 1674.2 | 803.0 |

Source: U.S. Department of Justice, CIA, BBC

- What types of graphs would be useful in visualizing this data? Explain your answer.
- Construct two different types of graphs from the data.
- Examine the data and write a short paragraph on your conclusions.