Chapter 2: Organizing the Data

1. A cross-tabulation of serious illnesses is a table in which the distribution of illnesses is

- **a.** presented separately for the categories of a second variable, such as gender, age, or race.
- **b.** presented in a table.
- **c.** presented in a graph.
- **d.** presented in a pie chart.

Answer: (a) presented separately for the categories of a second variable, such as gender, age, or race.

2. Frequency distributions can be used to

- **a.** compare gender differences in violent criminal behavior.
- **b.** display the grades on a midterm examination for all students in a sociology course.
- **c.** compare attitudes of college students and their parents regarding war.
- **d.** show attitudes of all students on a campus regarding war.
- **e.** All of the above

Answer: (e) All of the above

3. Which of the following is *not* used to make comparisons between distributions when their total frequencies differ?

- **a.** Proportions
- **b.** Rates
- **c.** Ratios
- **d.** Class limits

Answer: (d) ratios

4. By definition, class intervals contain more than one

- **a.** score value.
- **b.** score.
- **c.** respondent.
- **d.** category.

Answer: (a) score value.

5. Which of the following is employed when comparing a score on a final examination against the entire distribution of grades in a class?

- **a.** Midpoint
- **b.** Class interval
- **c.** Class limits
- **d.** Percentiles

Answer: (d) Percentiles

6. The peakedness of a distribution of scores is also known as

- **a.** kurtosis.
- **b.** skewness.
- **c.** midpoint.
- **d.** mean.

Answer: (a) kurtosis

7. A frequency distribution of the number of defendants sentenced to death in each of the 50 states during 2001 would be depicted best in the form of a

- **a.** histogram.
- **b.** bar graph.
- **c.** frequency polygon.
- **d.** line chart.

Answer: (c) frequency polygon

8. The direction of skewness is determined by the relative position of the

- **a.** peak of the distribution.
- **b.** midpoint of the distribution.
- **c.** tail of the distribution.
- **d.** class limits of the distribution.

Answer: (c) tail of the distribution

9. To show changes in birth rate from 1980 to the present, by year, a researcher would probably use a

a. pie chart.
b. bar graph.
c. line chart.
d. frequency polygon.

Answer: (c) line chart

10. From the following table representing achievement for 173 television viewers and 183 nonviewers, find (a) the percent of nonviewers who are high achievers, (b) the percent of viewers who are high achievers, (c) the proportion of nonviewers who are high achievers, and (d) the proportion of viewers who are high achievers.

Achievement for Television Viewers and Nonviewers

	Viewing Status	
Achievement	*Nonviewers*	*Viewers*
High achievers	93	46
Low achievers	90	127
Total	183	173

Answer:

a.

$$\% = (100)\frac{f}{N}$$

$$= (100)\frac{93}{183}$$

$$= 50.8\%$$

b.

$$\% = (100)\frac{f}{N}$$

$$= (100)\frac{46}{173}$$

$$= 26.6\%$$

c.

$$P = \frac{f}{N}$$
$$= \frac{93}{183}$$
$$= 0.51$$

d.

$$P = \frac{f}{N}$$
$$= \frac{46}{173}$$
$$= 0.27$$

11. From the following table representing family structure for black and white children in a particular community, find (a) the percent of black children having two-parent families, (b) the percent of white children having two-parent families, (c) the proportion of black children having two-parent families, and (d) the proportion of white children having two-parent families.

Family Structure for Black and White Children

	Race of Child	
Family	*Black*	*White*
One parent	53	59
Two parents	60	167
Total	113	226

Answer:

a.

$$\% = (100)\frac{f}{N}$$
$$= (100)\frac{60}{113}$$
$$= 53.1\%$$

b.

$$\% = (100)\frac{f}{N}$$

$$= (100)\frac{167}{226}$$

$$= 73.9\%$$

c.

$$P = \frac{f}{N}$$

$$= \frac{60}{113}$$

$$= 0.53$$

d.

$$P = \frac{f}{N}$$

$$= \frac{167}{226}$$

$$= 0.74$$

12. From the following table illustrating the handedness of a random sample of men and women, find (a) the percent of men who are left-handed, (b) the percent of women who are left-handed, (c) the proportion of men who are left-handed, and (d) the proportion of women who are left-handed. (e) What can you conclude about gender and the prevalence of left-handedness?

Handedness of Men and Women

	Gender	
Handedness	*Male*	*Female*
Left-handed	15	8
Right-handed	86	114
Total	101	122

Answer:

a.

$$\begin{aligned} \% &= (100)\frac{f}{N} \\ &= (100)\frac{15}{101} \\ &= 14.9\% \end{aligned}$$

b.

$$\begin{aligned} \% &= (100)\frac{f}{N} \\ &= (100)\frac{8}{122} \\ &= 6.6\% \end{aligned}$$

c.

$$\begin{aligned} P &= \frac{f}{N} \\ &= \frac{15}{101} \\ &= 0.15 \end{aligned}$$

d.

$$\begin{aligned} P &= \frac{f}{N} \\ &= \frac{8}{122} \\ &= 0.07 \end{aligned}$$

e. Left-handedness is more prevalent among men.

13. As part of a public health survey, a random sample of college students were asked about their weekly drinking habits. The following results were obtained:

Gender of Student	Never	< 3 Drinks per Week	3+ Drinks per week
Men	116	88	49
Women	164	104	32

a. Are there independent and dependent variables in this case? If so, what are they? If not, why not?
b. What percent of the sample reports not drinking?
c. What percent of men report drinking, but having fewer than three drinks per week?
d. What percent of women report drinking, but having fewer than three drinks per week?
e. What percent of men report drinking at least three drinks per week?
f. What percent of women report drinking at least three drinks per week?
g. What percent of the sample reports having at least three drinks per week?

Answer:

a. Gender is the independent variable
Number of drinks is the dependent variable

b.

$$\% = (100)\frac{f}{N}$$
$$= (100)\frac{280}{553}$$
$$= 50.6\%$$

c.

$$\% = (100)\frac{f}{N}$$
$$= (100)\frac{88}{253}$$
$$= 34.8\%$$

d.

$$\begin{aligned}\% &= (100)\frac{f}{N} \\ &= (100)\frac{104}{300} \\ &= 34.7\%\end{aligned}$$

e.

$$\begin{aligned}\% &= (100)\frac{f}{N} \\ &= (100)\frac{49}{253} \\ &= 19.4\%\end{aligned}$$

f.

$$\begin{aligned}\% &= (100)\frac{f}{N} \\ &= (100)\frac{32}{300} \\ &= 10.7\%\end{aligned}$$

g.

$$\begin{aligned}\% &= (100)\frac{f}{N} \\ &= (100)\frac{81}{553} \\ &= 14.6\%\end{aligned}$$

14. A researcher collects information from emergency room staff members about whether they have ever been assaulted by a patient or a patient's family member while at work.

Position	No	Assault
Nurses	62	36
Physicians	24	3

a. Are there independent and dependent variables in this case? If so, what are they? If not, why not?
b. What percent of the sample reports being assaulted?
c. What percent of nurses report being assaulted?
d. What percent of physicians report being assaulted?

Answer:

a. Position type is the independent variable
Assaulted or not is the dependent variable

b.

$$\% = (100)\frac{f}{N}$$
$$= (100)\frac{39}{125}$$
$$= 31.2\%$$

c.

$$\% = (100)\frac{f}{N}$$
$$= (100)\frac{36}{98}$$
$$= 36.7\%$$

d.

$$\% = (100)\frac{f}{N}$$
$$= (100)\frac{3}{27}$$
$$= 11.1\%$$

15. A researcher collects information from a random sample of consumers of different social classes about whether they had purchased a new car within the past year.

Social Class	No New	New Car
Upper class	23	10
Middle class	21	6
Lower class	12	1

a. Are there independent and dependent variables in this case? If so, what are they? If not, why not?
b. What percent of the sample reported purchasing a new car within the last year?
c. What percent of upper-class respondents reported purchasing a new car?
d. What percent of middle-class respondents reported purchasing a new car?
e. What percent of lower-class respondents reported purchasing a new car?
f. What is the effect of social class on purchases of new cars?

Answer:

a. Class position is the independent variable
Car purchase is the dependent variable

b.

$$\% = (100)\frac{f}{N}$$
$$= (100)\frac{17}{73}$$
$$= 23.3\%$$

c.

$$\begin{aligned}\% &= (100)\frac{f}{N} \\ &= (100)\frac{10}{33} \\ &= 30.3\%\end{aligned}$$

d.

$$\begin{aligned}\% &= (100)\frac{f}{N} \\ &= (100)\frac{6}{27} \\ &= 22.2\%\end{aligned}$$

e.

$$\begin{aligned}\% &= (100)\frac{f}{N} \\ &= (100)\frac{1}{13} \\ &= 7.7\%\end{aligned}$$

f. The higher the social class the higher the percentage of new cars purchased in the past year

16. In a group of 125 males and 80 females, what is the gender ratio (number of males per 100 females)?

Answer:

$$\begin{aligned}\text{Gender ratio} &= (100)\left(\frac{f \text{ males}}{f \text{ females}}\right) \\ &= (100)\left(\frac{125}{80}\right) \\ &= 156.25\end{aligned}$$

17. In a group of 15 black children and 20 white children, what is the ratio of blacks to whites?

Answer:

$$\begin{aligned}\text{ratio} &= \left(\frac{f_1}{f_2}\right) \\ &= \left(\frac{15}{20}\right) \\ &= \frac{3}{4}\end{aligned}$$

18. If 300 live births occur among 3,500 women of childbearing age, what is the birth rate (per 1,000 women of childbearing age)?

$$\begin{aligned}\text{Birth rate} &= (1{,}000)\left(\frac{f \text{ actual cases}}{f \text{ potential cases}}\right) \\ &= (1{,}000)\left(\frac{300}{3{,}500}\right) \\ &= 85.71\end{aligned}$$

There are 85.71 live births for every 1,000 women of childbearing age.

19. What is the rate of change for a population increase from 15,000 in 1960 to 25,000 in 2000?

Answer:

$$\begin{aligned}\text{rate of change} &= (100)\left(\frac{\text{time } 2f - \text{time } 1f}{\text{time } 1f}\right) \\ &= (100)\left(\frac{25{,}000 - 15{,}000}{15{,}000}\right) \\ &= 66.67\%\end{aligned}$$

20. What is the rate of change for a tax increase from \$32 billion per year to \$37 billion per year?

Answer:

$$\text{rate of change} = (100)\left(\frac{\text{time } 2f - \text{time } 1f}{\text{time } 1f}\right)$$
$$= (100)\left(\frac{37-32}{32}\right)$$
$$= 15.63\%$$

21. A researcher studying the prevalence of alcohol use among seniors in a particular high school asked 45 of these youths how many drinks they had consumed in the last week. Convert the following frequency distribution of responses (number of drinks) into a grouped frequency distribution containing four class intervals, and (a) determine the size of the class intervals, (b) indicate the upper and lower limits of each class interval, (c) identify the midpoint of each class interval, (d) find the percentage for each class interval, (e) find the cumulative frequency of each class interval, and (f) find the cumulative percentage for each class interval.

Number of Drinks	*f*
7	5
6	9
5	6
4	11
3	4
2	3
1	3
0	4
	N =45

Answer:

Number of	*f*	*%*	*Cf*	*c%*
6-7	14	31.1	45	100.0
4-5	17	37.8	31	69.0
2-3	7	15.6	14	31.2
0-1	7	15.6	7	15.6
	N = 45			

a. Size of class intervals = 2
b. Upper and lower limit for class interval 6-7 = 5.5-7.5
Upper and lower limit for class interval 4-5 = 3.5-5.5
Upper and lower limit for class interval 2-3 = 1.5-3.5
Upper and lower limit for class interval 0-1 =-0.5-1.5
c. Midpoint for class interval 6-7 = (6 + 7)/2 = 6.5
Midpoint for class interval 4-5 = (4 + 5)/2 = 4.5
Midpoint for class interval 2-3 = (2 + 3)/2 = 2.5
Midpoint for class interval 0-1 = (0 + 1)/2 = 0.5
d. See above
e. See above
f. See above

22. The Psychopathy Checklist—Revised (PCL—R) is an assessment tool used to identify psychopaths, with scores ranging from 0 to 40 (a score of 30 or higher being indicative of psychopathy). A forensic psychologist interested in the prevalence of psychopaths in a prison administered the PCL—R to 74 random prison inmates and obtained the following distribution of scores. Convert this into a grouped frequency distribution containing five class intervals, and (a) determine the size of the class intervals, (b) indicate the upper and lower limits of each class interval, (c) identify the midpoint of each class interval, (d) find the percentage for each class interval, (e) find the cumulative frequency for each class interval, and (f) find the cumulative percentage for each class interval.

Score Value	*f*
39	4
38	4
35	2
32	3
31	4
27	9
26	7
25	6
21	13
20	10
17	5
15	7
	N =74

Answer:

Score	*f*	*%*	*cf*	*c%*
35-39	10	13.5	74	100.0
30-34	7	9.5	64	86.5
25-29	22	29.7	57	77.0
20-24	23	31.1	35	47.3
15-19	12	16.2	12	16.2
	N =74			

a. Size of class intervals = 5

b. Upper and lower limit for class interval 35-39 = 34.5-39.5
Upper and lower limit for class interval 30-34 = 29.5-34.5
Upper and lower limit for class interval 25-29 = 24.5-29.5
Upper and lower limit for class interval 20-24 = 19.5-24.5
Upper and lower limit for class interval 15-19 = 14.5-19.5

c. Midpoint for class interval 35-39 = (35 + 39)/2 = 37
Midpoint for class interval 30-34 = (30 + 34)/2 = 32
Midpoint for class interval 25-29 = (25 + 29)/2 = 27
Midpoint for class interval 20-24 = (20 + 24)/2 = 22
Midpoint for class interval 15-19 = (15 + 19)/2 = 17

d. See above

e. See above

f. See above

23. The following is a cross-tabulation of whether respondents rent or own their home by social class for a sample of 240 heads of households:

	Housing Status		
Social Class	*Rent*	*Own*	*Total*
Lower Class	62	18	80
Middle Class	47	63	110
Upper Class	11	39	50
Total	120	120	240

a. Which is the independent variable and which is the dependent variable?
b. Compute row percents for the cross-tabulation.
c. What percent of the sample owns their home?
d. What percent of the sample rents?
e. What percent of the lower-class respondents owns?
f. What percent of the middle-class respondents rents?
g. Which social class has the greatest tendency to rent?
h. Which social class has the greatest tendency to own?
i. What can be concluded about the relationship between social class and housing status?

` Answer:

a. IV = social class, DV = housing status
b.

	Housing Status		
Social Class	*Rent*	*Own*	*Total*
Lower Class	62 77.5%	18 22.5%	80 100%
Middle Class	47 42.7%	63 57.3	110 100%
Upper Class	11 22.0%	39 78.0%	50 100%
Total	120 50.0%	120 50.0%	240 100%

c. Percent of sample that owns = $100\left(\frac{120}{240}\right) = 50.0\%$

d. Percent of sample that rents = $100\left(\frac{120}{240}\right) = 50.0\%$

e. Percent of lower-class respondent who owns = $100\left(\frac{18}{80}\right) = 22.5\%$

f. Percent of middle-class respondent who rents = $100\left(\frac{47}{110}\right) = 42.7\%$

g. Lower class
h. Upper class
i. The higher the social class, the greater the tendency to own rather than rent.

24. A sample of respondents was asked their opinions of the death penalty for convicted murderers and of mercy killing for the terminally ill. The responses are given in the following cross-tabulation:

	Death Penalty		
Mercy Killing	*Favor*	*Oppose*	*Total*
Favor	63	29	92
Oppose	70	18	88
Total	133	47	180

a. Why is there no independent or dependent variable?
b. Compute total percents for the cross-tabulation.
c. What percent of the sample favors the use of the death penalty?
d. What percent of the sample favors mercy killing?
e. What percent of the sample favors both types of killing?
f. What percent of the sample opposes both types of killing?
g. What percent of the sample favors one type of killing but not the other?
h. What can be concluded about the relationship between the variables?

Answer:

a. Because neither opinion is clearly the result of the other
b.

	Death Penalty		
Mercy Killing	*Favor*	*Oppose*	*Total*
	63	29	92
Favor	35.0%	16.1%	51.1%
	70	18	88
Oppose	38.9%	10.0%	48.9%
	133	47	180
Total	73.9%	26.1%	100%

c. Percent of sample that favors the use of the death penalty = $100\left(\frac{133}{180}\right) = 73.9\%$

d. Percent of sample that favors mercy killings = $100\left(\frac{92}{180}\right) = 51.1\%$

e. Percent of sample that favors both types of killings = $100\left(\frac{63}{180}\right) = 35.0\%$

f. Percent of sample that opposes both types of killings = $100\left(\frac{18}{180}\right) = 10.0\%$

g. Percent of sample that favors one type of killing but not the other = $100\left(\frac{99}{180}\right) = 55.0\%$

h. People who favor the death penalty are more likely to oppose mercy killing, whereas people who oppose the death penalty are more likely to favor mercy killing.

25.

	Gender		
Sexual Orientation	*Male*	*Female*	*Total*
Heterosexual	87	106	193
Homosexual	14	9	23
Bisexual	6	3	9
Total	107	118	225

a. Are there independent and dependent variables in this case? If so, what are they? If not, why not?
b. Compute column percents for the cross-tabulation.
c. What percent of the sample is heterosexual?
d. What percent of the sample is comprised of female homosexuals?
e. What percent of the sample is bisexual?
f. What percent of the sample is comprised of male heterosexuals?
g. What can we conclude about gender differences in sexual orientation?

` Answer:

a. No, there is no IV or DV because gender does not cause sexual orientation

b.

	Gender		
Sexual Orientation	*Male*	*Female*	*Total*
Heterosexual	87 81.3%	106 89.8%	193 85.8%
Homosexual	14 13.1%	9 7.6%	23 10.2%
Bisexual	6 5.6%	3 2.5%	9 4.0%
Total	107 100%	118 100%	225 100%

c. Percent of sample that is heterosexual = $100\left(\frac{193}{225}\right) = 85.8\%$

d. Percent of sample that is comprised of female homosexuals = $100\left(\frac{9}{225}\right) = 4.0\%$

e. Percent of sample that is bisexual = $100\left(\frac{9}{225}\right) = 4.0\%$

f. Percent of sample that is comprised of male heterosexuals = $100\left(\frac{87}{225}\right) = 38.7\%$

g. Both males and females tend to be heterosexual.

26. A random sample of women over the age of 18 was asked if they considered themselves to be depressed. Their responses are given next, cross-tabulated with their marital status:

State of	**Martial Status**				
Depression	*Single*	*Married*	*Divorced*	*Widowed*	***Total***
Depressed	24	37	11	3	75
Nondepressed	113	82	68	14	277
Total	137	119	79	17	352

a. Compute total percents for the cross-tabulation.
b. What percent of the sample considered themselves to be depressed?
c. What percent of the sample did not consider themselves to be depressed?
d. What percent of the sample is divorced women who are not depressed?
e. What percent of the sample is single women who are depressed?
f. Which marital status is associated with the highest percentage of depressed women?

Answer:

a.

State of Depression	Martial Status				
	Single	*Married*	*Divorced*	*Widowed*	***Total***
Depressed	24 6.8%	37 10.5%	11 3.1%	3 0.8%	75 21.3%
Nondepressed	113 32.1%	82 23.3%	68 19.3%	14 4.0%	277 78.7%
Total	137 38.9%	119 33.8%	79 22.4%	17 4.8%	352 100%

b.

Percent of sample that consider themselves to be depressed

$= 100\left(\frac{75}{352}\right) = 21.3\%$

c.

Percent of sample that did not consider themselves to be depressed

$= 100\left(\frac{227}{352}\right) = 78.7\%$

d.

Percent of sample that is divorced women who are not depressed

$= 100\left(\frac{68}{352}\right) = 19.3\%$

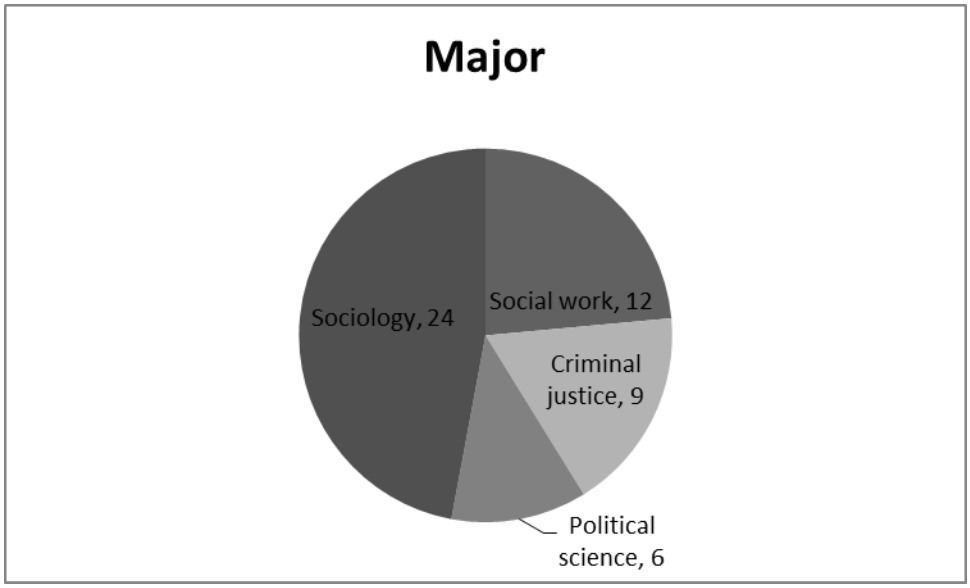
e. Percent of sample that is single women who are depressed $=100\left(\frac{24}{352}\right) = 6.8\%$

f. Married

27. Use a pie chart to depict the following information about college majors of students in a statistics class.

Major	*f*	*%*
Social work	12	24
Criminal justice	9	17
Political science	6	12
Sociology	24	47

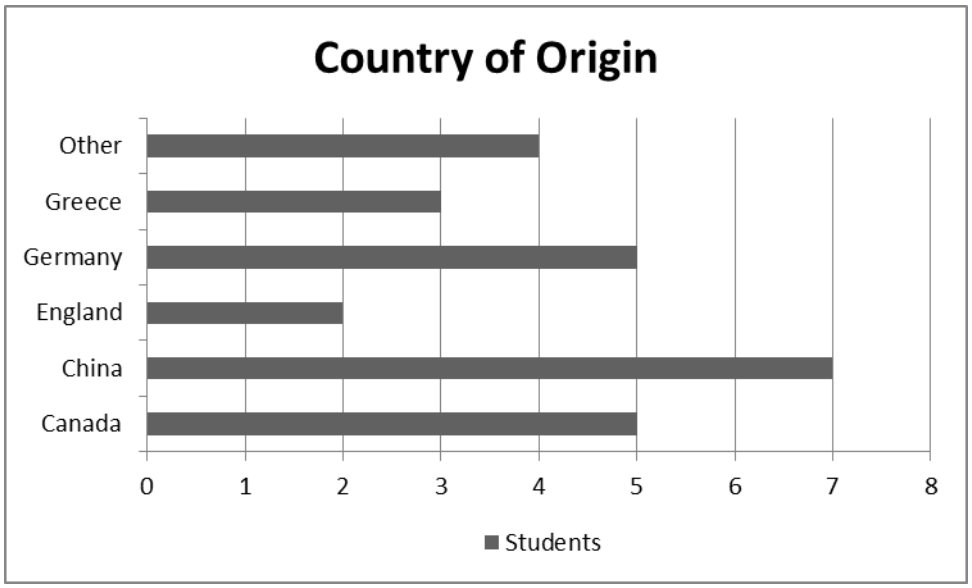
Answer:



28. Depict the following data in a bar graph:

Country of Origin of International	***f***
Canada	5
China	7
England	2
Germany	5
Greece	3
Other	4
	N = 26

Answer:



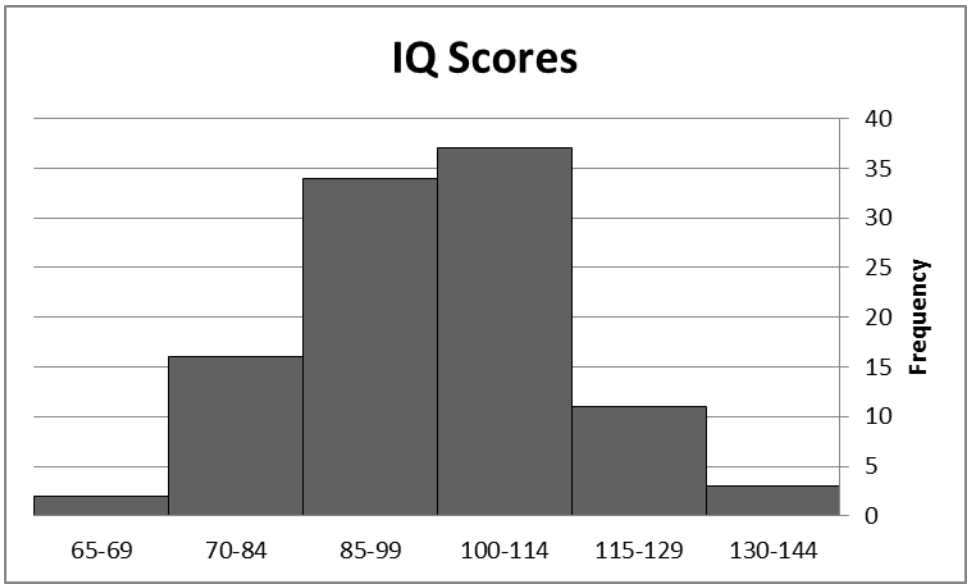
29. On graph paper, draw both a histogram and a frequency polygon to illustrate the following distribution of IQ scores:

Homicide Victims by Age Group for 2010

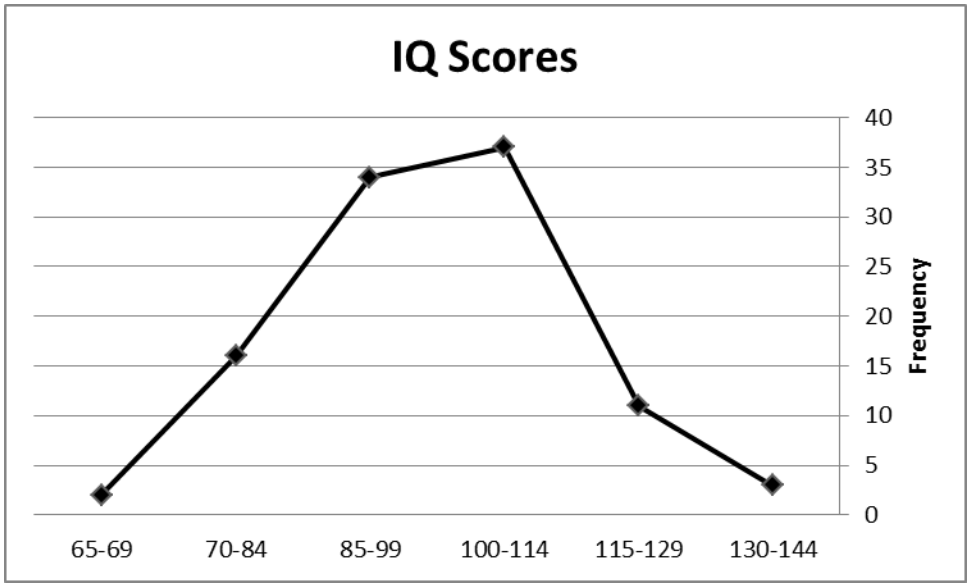
Class-	***f***
130-144	3
115-129	11
100-114	37
85-99	34
70-84	16
65-69	2
	N =

Answer:

Histogram:



Frequency Polygon:

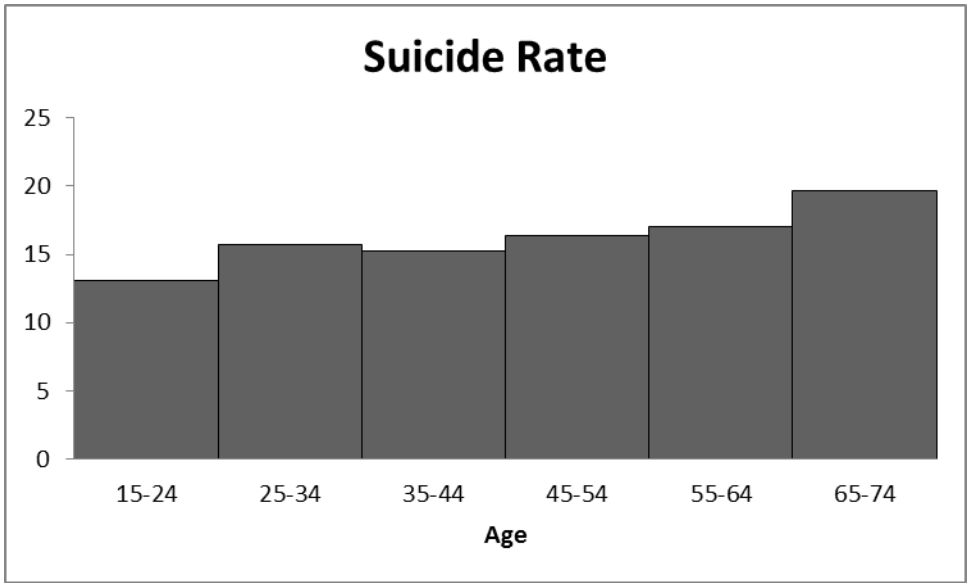


30. Display the following suicide rates (per 100,000) both as a histogram and as a line chart:

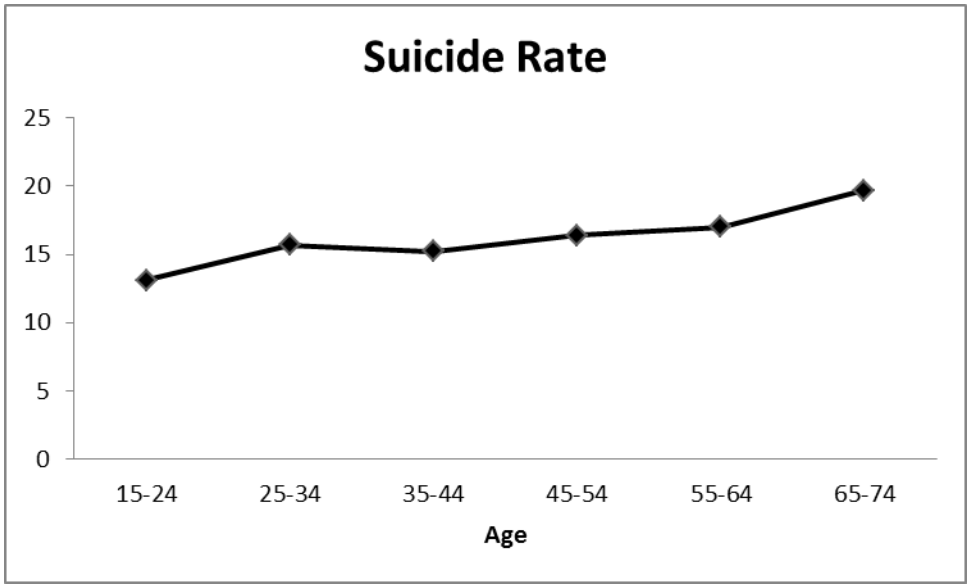
Age	Suicide
15-24	13.1
25-34	15.7
35-44	15.2
45-54	16.4
55-64	17.0
65-74	19.7
75-84	25.2
85+	20.8

Answer:

Histogram:



Line Chart:



31. The distribution of Scholastic Assessment Test (SAT) scores for 38 high school seniors who graduated in the top third of their class is as follows:

SAT	*f*
750-800	1
700-740	2
650-690	3
600-640	5
550-590	10
500-540	8
450-490	4
400-440	3
350-390	2
	N = 38

a. For each class interval, find the size, midpoint, upper and lower limits, the cumulative frequency, the percentage, and the cumulative percentage.
b. To depict the distribution of SAT scores for the 38 students, draw a histogram and a frequency polygon.
c. To depict the cumulative distribution of these SAT scores, draw a cumulative frequency polygon.

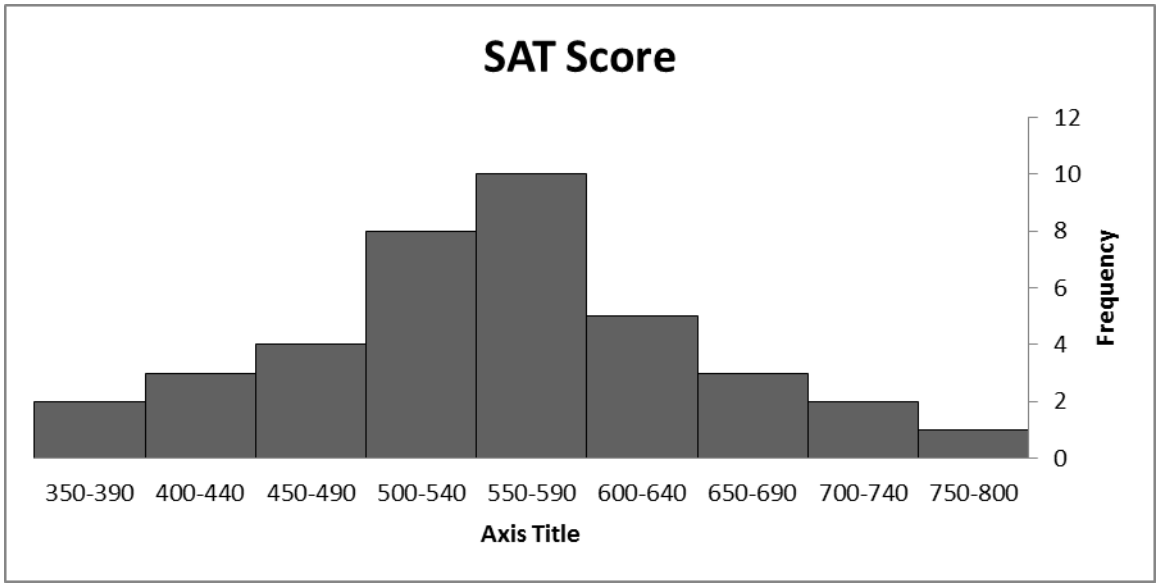
Answer:

SAT	*f*	*%*	*cf*	*c%*
750-800	1	2.6%	38	100%
700-740	2	5.3%	37	97.5%
650-690	3	7.9%	35	92.2%
600-640	5	13.2%	32	84.3%
550-590	10	26.3%	27	71.1%
500-540	8	21.1%	17	44.8%
450-490	4	10.5%	9	23.7%
400-440	3	7.9%	5	13.2%
350-390	2	5.3%	2	5.3%
	N = 38			

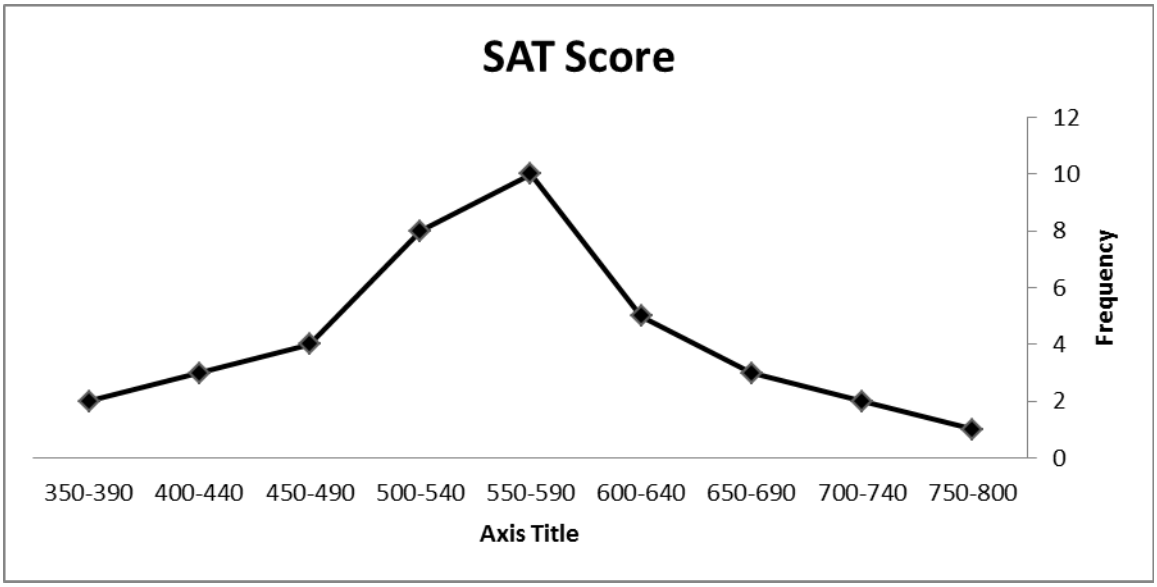
a. Size of class intervals = 50

Upper and lower limit for class interval 750-800 = 745-805
Upper and lower limit for class interval 700-740 = 695-745
Upper and lower limit for class interval 650-690 = 645-695
Upper and lower limit for class interval 600-640 = 595-645
Upper and lower limit for class interval 550-590 = 545-595
Upper and lower limit for class interval 500-540 = 495-545
Upper and lower limit for class interval 450-490 = 445-495
Upper and lower limit for class interval 400-440 = 395-445
Upper and lower limit for class interval 350-390 = 345-395
Midpoint for class interval 750-800 = 775
Midpoint for class interval 700-740 = 720
Midpoint for class interval 650-690 = 670
Midpoint for class interval 600-640 = 620
Midpoint for class interval 550-590 = 570
Midpoint for class interval 500-540 = 520
Midpoint for class interval 450-490 = 470
Midpoint for class interval 400-440 = 420
Midpoint for class interval 350-390 = 370

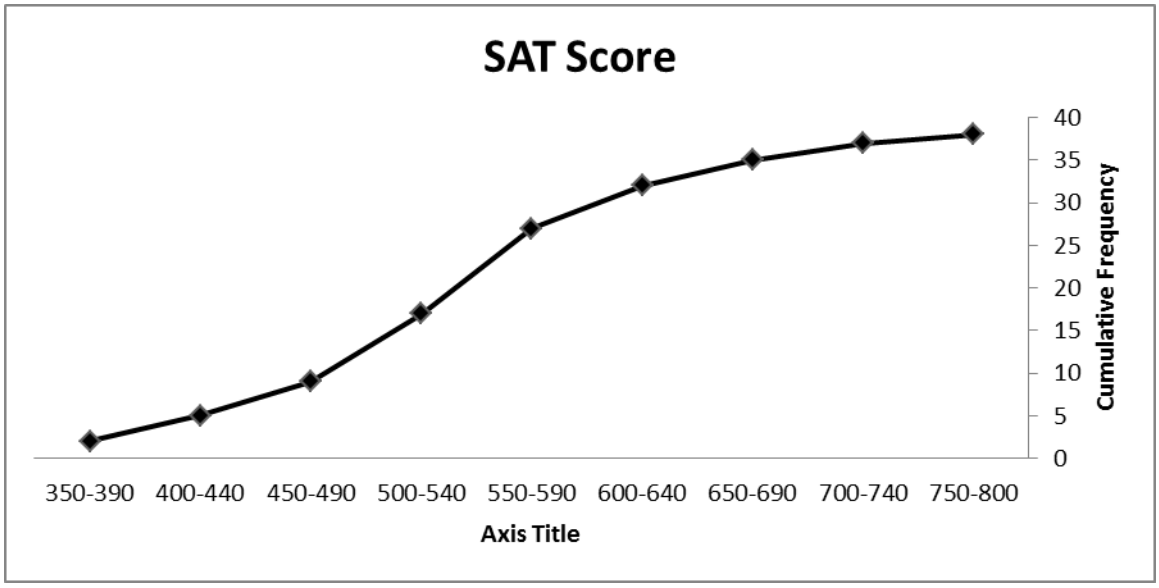
b. Histogram



Frequency Polygon



c. Cumulative frequency Polygon

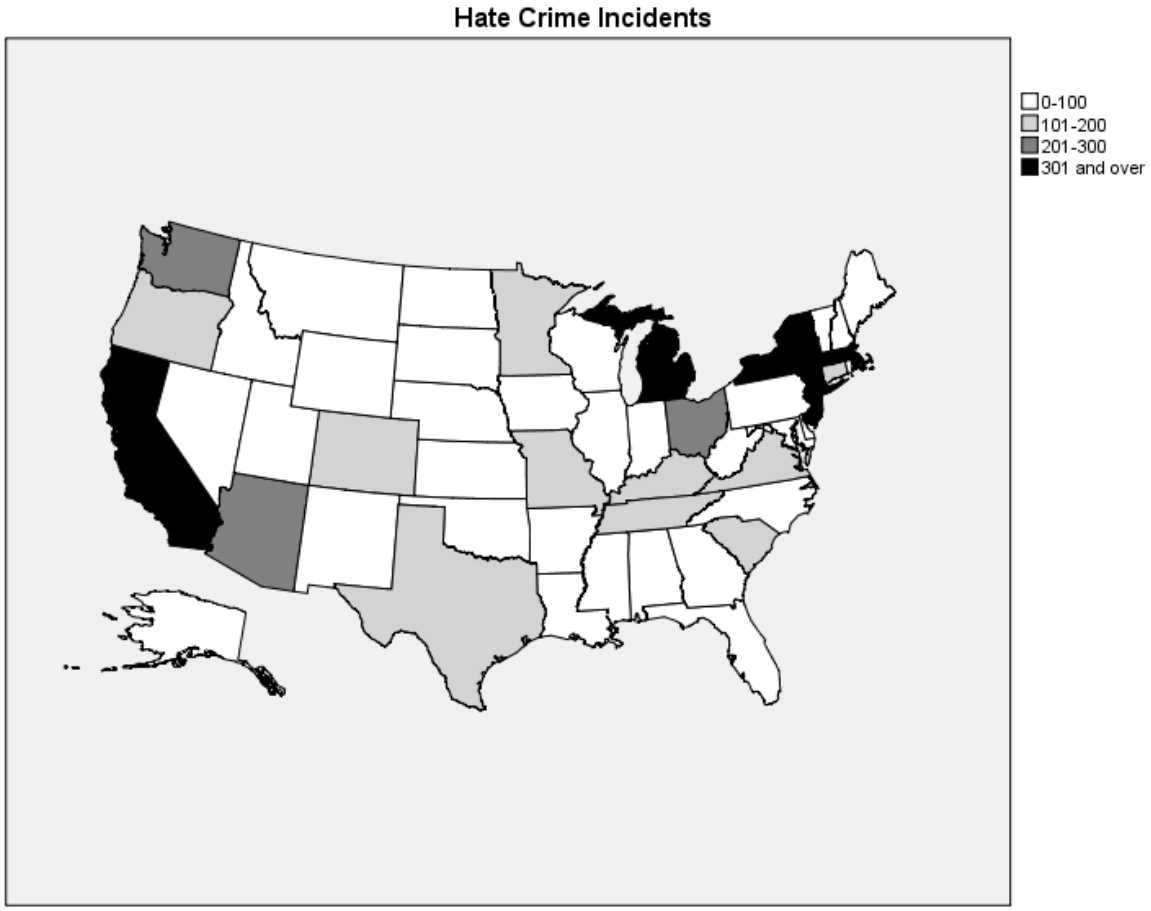


32. Create a grouped frequency distribution with four categories using the following data. Then, using your grouped frequency distribution and a blank map of the United States, display the data on the number of hate crimes reported in 2010.

State	Total Number	State	Total Number of
Alabama	19	Nebraska	61
Alaska	7	Nevada	68
Arizona	236	New	31
Arkansas	63	New Jersey	543
California	1,092	New Mexico	24
Colorado	154	New York	699
Connecticut	147	North Carolina	94
Delaware	20	North Dakota	8
Florida	136	Ohio	247
Georgia	17	Oklahoma	49
Idaho	28	Oregon	134
Illinois	94	Pennsylvania	57
Indiana	94	Rhode Island	20
Iowa	17	South	109
Kansas	58	South Dakota	51
Kentucky	173	Tennessee	147
Louisiana	13	Texas	174
Maine	61	Utah	63
Maryland	80	Vermont	17
Massachusetts	316	Virginia	175
Michigan	304	Washington	232
Minnesota	127	West Virginia	33
Mississippi	11	Wisconsin	93
Missouri	142	Wyoming	2
Montana	31		

Answer:

Number of Incidents Reported	*f*
301 and over	5
201-300	3
101-200	11
0-100	30
Total	49


Hate Crime Incidents
0-100
101-200
201-300
301 and over