第三章 数据资料的统计描述：图表及数值计算 Part A

MULTIPLE CHOICE QUESTIONS

1. A frequency distribution is a tabular summary of data showing the
   a. fraction of items in several classes
   b. percentage of items in several classes
   c. relative percentage of items in several classes
   d. number of items in several classes
   Answer: d

2. A frequency distribution is
   a. a tabular summary of a set of data showing the relative frequency
   b. a graphical form of representing data
   c. a tabular summary of a set of data showing the frequency of items in each of several nonoverlapping classes
   d. a graphical device for presenting qualitative data
   Answer: c

3. A tabular summary of a set of data showing the fraction of the total number of items in several classes is a
   a. frequency distribution
   b. relative frequency distribution
   c. frequency
   d. cumulative frequency distribution
   Answer: b

4. Qualitative data can be graphically represented by using a(n)
   a. histogram
   b. frequency polygon
   c. ogive
   d. bar graph
   Answer: d

5. The relative frequency of a class is computed by
   a. dividing the midpoint of the class by the sample size
   b. dividing the frequency of the class by the midpoint
   c. dividing the sample size by the frequency of the class
   d. dividing the frequency of the class by the sample size
   Answer: d

6. The percent frequency of a class is computed by
   a. multiplying the relative frequency by 10
   b. dividing the relative frequency by 100
   c. multiplying the relative frequency by 100
   d. adding 100 to the relative frequency
   Answer: c

7. The sum of frequencies for all classes will always equal

a. 1
b. the number of elements in a data set
c. the number of classes
d. a value between 0 and 1
Answer: b

8. Fifteen percent of the students in a school of Business Administration are majoring in Economics, 20% in Finance, 35% in Management, and 30% in Accounting. The graphical device(s) which can be used to present these data is (are)
a. a line graph
b. only a bar graph
c. only a pie chart
d. both a bar graph and a pie chart
Answer: d

9. A researcher is gathering data from four geographical areas designated:
South = 1; North = 2; East = 3; West = 4. The designated geographical regions represent
a. qualitative data
b. quantitative data
c. label data
d. either quantitative or qualitative data
Answer: a

10. A situation in which conclusions based upon aggregated crosstablulation are different from unaggregated crosstabulation is known as
a. wrong crosstabulation
b. Simpson's rule
c. Simpson's paradox
d. aggregated crosstabulation
Answer: c

11. A cumulative relative frequency distribution shows
a. the proportion of data items with values less than or equal to the upper limit of each class
b. the proportion of data items with values less than or equal to the lower limit of each class
c. the percentage of data items with values less than or equal to the upper limit of each class
d. the percentage of data items with values less than or equal to the lower limit of each class
Answer: a

12. If several frequency distributions are constructed from the same data set, the distribution with the widest class width will have the
a. fewest classes
b. most classes
c. same number of classes as the other distributions since all are constructed from the same data
Answer: a

13. The sum of the relative frequencies for all classes will always equal
a. the sample size
b. the number of classes
c. one
d. any value larger than one
Answer: c

14. The sum of the percent frequencies for all classes will always equal
a. one

b. the number of classes
c. the number of items in the study
d. 100
Answer: d

15. The most common graphical presentation of quantitative data is a
a. histogram
b. bar graph
c. relative frequency
d. pie chart
Answer: a

16. The total number of data items with a value less than the upper limit for the class is given by the
a. frequency distribution
b. relative frequency distribution
c. cumulative frequency distribution
d. cumulative relative frequency distribution
Answer: c

17. The relative frequency of a class is computed by
a. dividing the cumulative frequency of the class by n
b. dividing n by cumulative frequency of the class
c. dividing the frequency of the class by n
d. dividing the frequency of the class by the number of classes
Answer: c

18. In constructing a frequency distribution, the approximate class width is computed as
a. (largest data value – smallest data value)/number of classes
b. (largest data value – smallest data value)/sample size
c. (smallest data value – largest data value)/sample size
d. largest data value/number of classes
Answer: a

19. In constructing a frequency distribution, as the number of classes are decreased, the class width
a. decreases
b. remains unchanged
c. increases
d. can increase or decrease depending on the data values
Answer: c

20. The difference between the lower class limits of adjacent classes provides the
a. number of classes
b. class limits
c. class midpoint
d. class width
Answer: d

21. In a cumulative frequency distribution, the last class will always have a cumulative frequency equal to
a. one
b. 100%
c. the total number of elements in the data set
Answer: c

22. In a cumulative relative frequency distribution, the last class will have a cumulative relative frequency equal to
a. one
b. zero
c. the total number of elements in the data set
Answer: a

23. In a cumulative percent frequency distribution, the last class will have a cumulative percent frequency equal to
a. one
b. 100
c. the total number of elements in the data set
Answer: b

24. Data that provide labels or names for categories of like items are known as
a. qualitative data
b. quantitative data
c. label data
d. category data
Answer: a

25. A tabular method that can be used to summarize the data on two variables simultaneously is called
a. simultaneous equations
b. crosstabulation
c. a histogram
d. an ogive
Answer: b

26. A graphical presentation of the relationship between two variables is
a. an ogive
b. a histogram
c. either an ogive or a histogram, depending on the type of data
d. a scatter diagram
Answer: d

27. A histogram is said to be skewed to the left if it has a
a. longer tail to the right
b. shorter tail to the right
c. shorter tail to the left
d. longer tail to the left
Answer: d

28. When a histogram has a longer tail to the right, it is said to be
a. symmetrical
b. skewed to the left
c. skewed to the right
d. none of these alternatives is correct
Answer: c

29. In a scatter diagram, a line that provides an approximation of the relationship between the variables is known as
a. approximation line
b. trend line

c. line of zero intercept
d. line of zero slope
Answer: b

Exhibit 2-1

The numbers of hours worked (per week) by 400 statistics students are shown below.

Number of hours	Frequency
0 - 9	20
10 - 19	80
20 - 29	200
30 - 39	100

30. Refer to Exhibit 2-1. The class width for this distribution
a. is 9
b. is 10
c. is 39, which is: the largest value minus the smallest value or 39 - 0 = 39
d. varies from class to class
Answer: b

31. Refer to Exhibit 2-1. The number of students working 19 hours or less
a. is 80
b. is 100
c. is 180
d. is 300
Answer: b

32. Refer to Exhibit 2-1. The relative frequency of students working 9 hours or less
a. is 20
b. is 100
c. is 0.95
d. 0.05
Answer: d

33. Refer to Exhibit 2-1. The percentage of students working 19 hours or less is
a. 20%
b. 25%
c. 75%
d. 80%
Answer: b

34. Refer to Exhibit 2-1. The cumulative relative frequency for the class of 20 - 29
a. is 300
b. is 0.25
c. is 0.75
d. is 0.5
Answer: c

35. Refer to Exhibit 2-1. The cumulative percent frequency for the class of 30 - 39 is
a. 100%
b. 75%
c. 50%
d. 25%

Answer: a

36. Refer to Exhibit 2-1. The cumulative frequency for the class of 20 - 29
a. is 200
b. is 300
c. is 0.75
d. is 0.5
Answer: b

37. Refer to Exhibit 2-1. If a cumulative frequency distribution is developed for the above data, the last class will have a cumulative frequency of
a. 100
b. 1
c. 30 - 39
d. 400
Answer: d

38. Refer to Exhibit 2-1. The percentage of students who work at least 10 hours per week is
a. 50%
b. 5%
c. 95%
d. 100%
Answer: c

39. Refer to Exhibit 2-1. The number of students who work 19 hours or less is
a. 80
b. 100
c. 200
d. 400
Answer: b

40. Refer to Exhibit 2-1. The midpoint of the last class is
a. 50
b. 34
c. 35
d. 34.5
Answer: d

Exhibit 2-2

A survey of 800 college seniors resulted in the following crosstabulation regarding their undergraduate major and whether or not they plan to go to graduate school.

	Undergraduate Major			
Graduate School	Business	Engineering	Others	Total
Yes	70	84	126	280
No	182	208	130	520
Total	252	292	256	800

41. Refer to Exhibit 2-2. What percentage of the students does not plan to go to graduate school?

a. 280
b. 520
c. 65
d. 32
Answer: c

42. Refer to Exhibit 2-2. What percentage of the students' undergraduate major is engineering?

a. 292
b. 520
c. 65
d. 36.5
Answer: d

43. Refer to Exhibit 2-2. Of those students who are majoring in business, what percentage plans to go to graduate school?
a. 27.78
b. 8.75
c. 70
d. 72.22
Answer: a

44. Refer to Exhibit 2-2. Among the students who plan to go to graduate school, what percentage indicated "Other" majors?
a. 15.75
b. 45
c. 54
d. 35
Answer: b

PROBLEMS

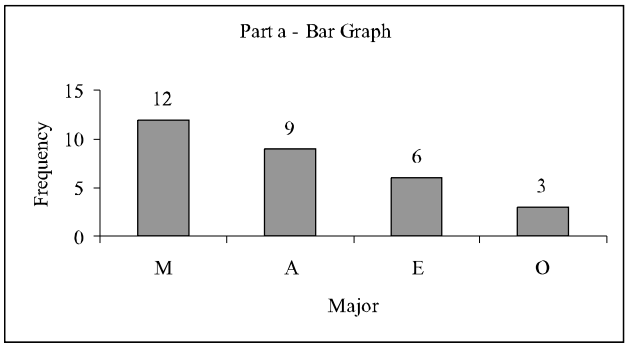
1. Thirty students in the School of Business were asked what their majors were. The following represents their responses (M = Management; A = Accounting; E = Economics; O = Others).

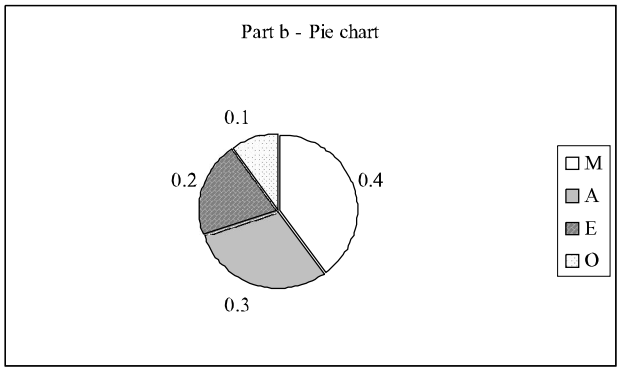
A	M	M	A	M	M	E	M	O	A
E	E	M	A	O	E	M	A	M	A
M	A	O	A	M	E	E	M	A	M

a. Construct a frequency distribution and a bar graph.
b. Construct a relative frequency distribution and a pie chart.

Answers:

	(a)	(b)
Major	**Frequency**	**Relative Frequency**
M	12	0.4
A	9	0.3
E	6	0.2
O	3	0.1
Total	30	1.0





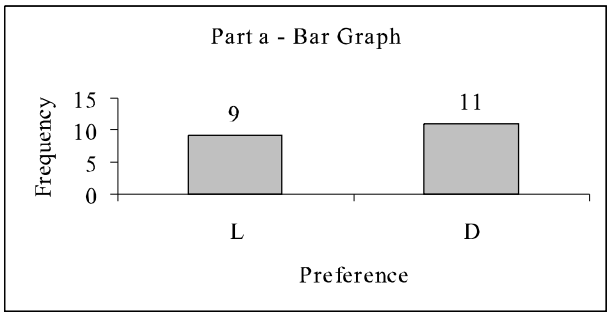
2. Twenty employees of ABC Corporation were asked if they liked or disliked the new district manager. Below you are given their responses. Let L represent liked and D represent disliked.

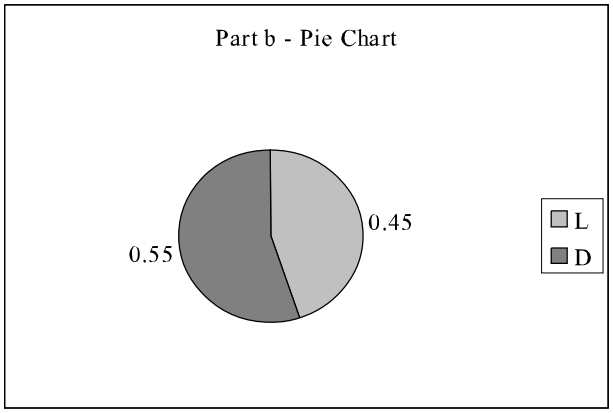
D	L	D	L	D
D	D	L	L	D
D	L	D	D	L
D	D	D	D	L

a. Construct a frequency distribution and a bar graph.
b. Construct a relative frequency distribution and a pie chart.

Answers:
a. and b.

Preferences	**Frequency**	**Relative Frequency**
L	9	0.45
D	11	0.55
Total	20	1.00





3. Forty shoppers were asked if they preferred the weight of a can of soup to be 6 ounces, 8 ounces, or 10 ounces. Below you are given their responses.

6	6	6	10	8	8	8	10	6	6
10	10	8	8	6	6	6	8	6	6
8	8	8	10	8	8	6	10	8	6
6	8	8	8	10	10	8	10	8	6

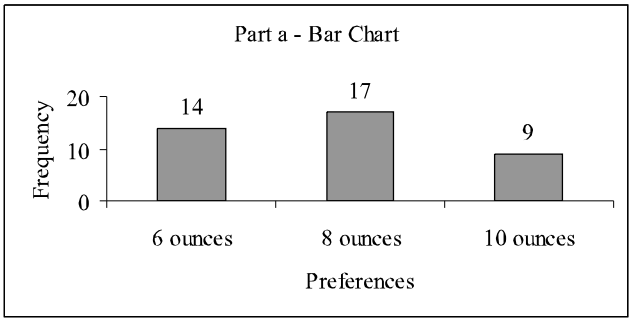
a. Construct a frequency distribution and graphically represent the frequency distribution.

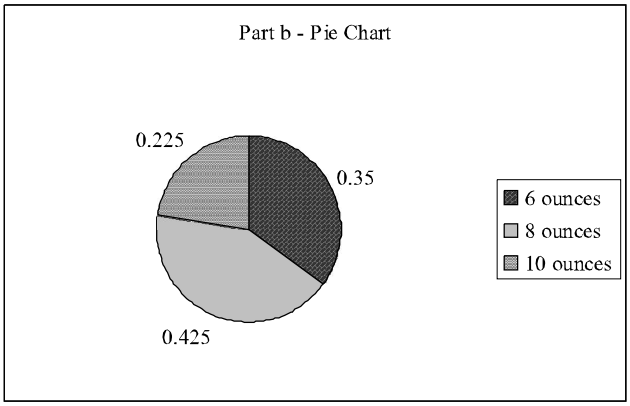
b. Construct a relative frequency distribution and graphically represent the relative frequency distribution.

Answers:

a. and b.

Preferences	Frequency	Relative Frequency
6 ounces	14	0.350
8 ounces	17	0.425
10 ounces	9	0.225
Total	40	1.000





4. A student has completed 20 courses in the School of Arts and Sciences. Her grades in the 20 courses are shown below.

A	B	A	B	C
C	C	B	B	B
B	A	B	B	B
C	B	C	B	A

a. Develop a frequency distribution and a bar graph for her grades.

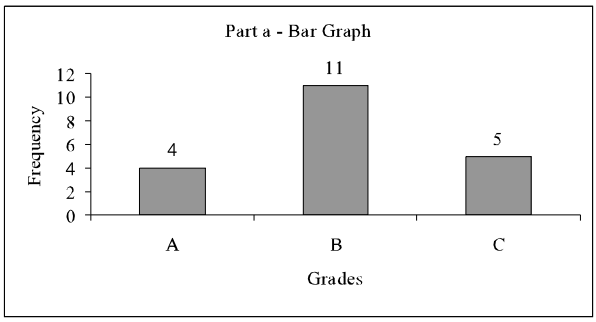
b. Develop a relative frequency distribution for her grades and construct a pie chart.

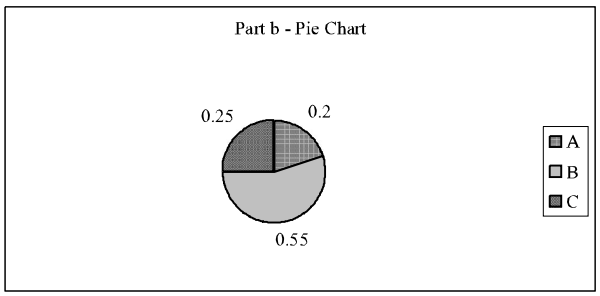
Answers:

a. and b.

Grade	Frequency	Relative Frequency

A	4	0.20
B	11	0.55
C	5	0.25
Total	20	1.00





5. A sample of 50 TV viewers were asked, "Should TV sponsors pull their sponsorship from programs that draw numerous viewer complaints?" Below are the results of the survey. (Y = Yes; N = No; W = Without Opinion)

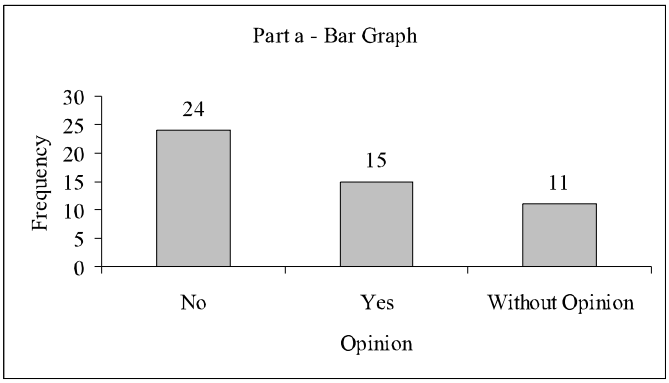
N	W	N	N	Y	N	N	N	Y	N
N	Y	N	N	N	N	N	Y	N	N
Y	N	Y	W	N	Y	W	W	N	Y
W	W	N	W	Y	W	N	W	Y	W
N	Y	N	Y	N	W	Y	Y	N	Y

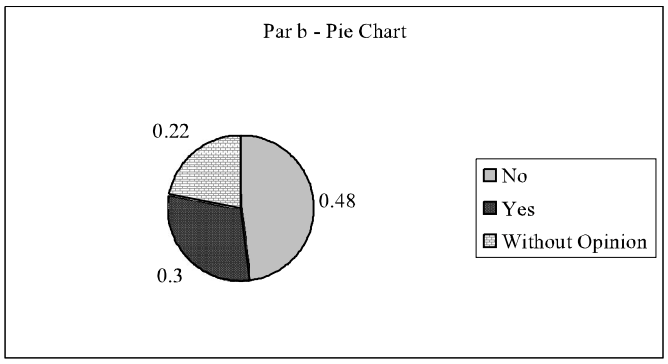
a. Construct a frequency distribution and a bar graph.
b. Construct a relative frequency distribution and a pie chart.

Answers:

a. and b.

	Frequency	**Relative Frequency**
No	24	0.48
Yes	15	0.30
Without Opinion	11	0.22
Total	50	1.00





6. Below you are given the examination scores of 20 students.

52	99	92	86	84
63	72	76	95	88
92	58	65	79	80
90	75	74	56	99

a. Construct a frequency distribution for this data. Let the first class be 50 - 59 and draw a histogram.
b. Construct a cumulative frequency distribution.
c. Construct a relative frequency distribution.
d. Construct a cumulative relative frequency distribution.

Answers:

	a.	b.	c.	d.
Score	**Frequency**	**Cumulative Frequency**	**Relative Frequency**	**Cumulative Relative Frequency**
50 - 59	3	3	0.15	0.15
60 - 69	2	5	0.10	0.25
70 - 79	5	10	0.25	0.50
80 - 89	4	14	0.20	0.70

90 - 99	6	20	0.30	1.00
Total	20		1.00	

7. The frequency distribution below was constructed from data collected from a group of 25 students.

Height in Inches	Frequency
58 - 63	3
64 - 69	5
70 - 75	2
76 - 81	6
82 - 87	4
88 - 93	3
94 - 99	2

a. Construct a relative frequency distribution.
b. Construct a cumulative frequency distribution.
c. Construct a cumulative relative frequency distribution.

Answers:

		a.	b.	c.
Height (In Inches)	**Frequency**	**Relative Frequency**	**Cumulative Frequency**	**Cumulative Relative Frequency**
58 - 63	3	0.12	3	0.12
64 - 69	5	0.20	8	0.32
70 - 75	2	0.08	10	0.40
76 - 81	6	0.24	16	0.64
82 - 87	4	0.16	20	0.80
88 - 93	3	0.12	23	0.92
94 - 99	2	0.08	25	1.00
		1.00		

8. The frequency distribution below was constructed from data collected on the quarts of soft drinks consumed per week by 20 students.

Quarts of Soft Drink	Frequency
0 - 3	4
4 - 7	5
8 - 11	6
12 - 15	3
16 - 19	2

a. Construct a relative frequency distribution.
b. Construct a cumulative frequency distribution.

c. Construct a cumulative relative frequency distribution.

Answers:

		a.	b.	c.
Quarts of Soft Drinks	**Frequency**	**Relative Frequency**	**Cumulative Frequency**	**Cumulative Relative Frequency**
0 – 4	4	0.20	4	0.20
4 - 8	5	0.25	9	0.45
8 – 12	6	0.30	15	0.75
12 – 16	3	0.15	18	0.90
16 – 20	2	0.10	20	1.00
Total	20	1.00		

9. The grades of 10 students on their first management test are shown below.

94	61	96	66	92
68	75	85	84	78

a. Construct a frequency distribution. Let the first class be 60 - 69.
b. Construct a cumulative frequency distribution.
c. Construct a relative frequency distribution.

Answers:

	a.	b.	c.
Class	**Frequency**	**Cumulative Frequency**	**Relative Frequency**
60 - 69	3	3	0.3
70 - 79	2	5	0.2
80 - 89	2	7	0.2
90 - 99	3	10	0.3
Total	10		1.0

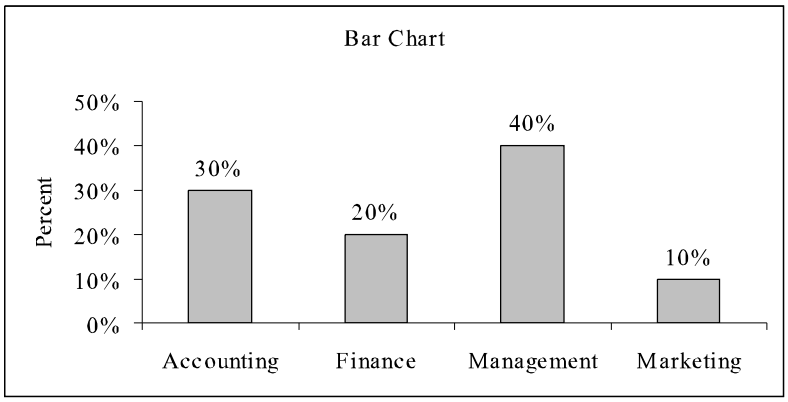
10. There are 800 students in the School of Business Administration. There are four majors in the School: Accounting, Finance, Management, and Marketing. The following shows the number of students in each major.

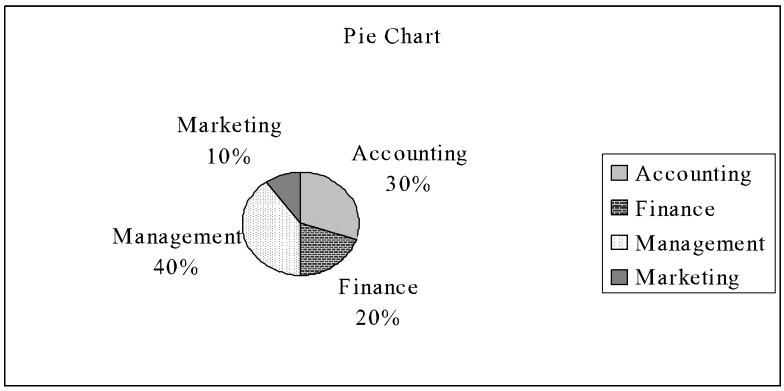
Major	**Number of Students**
Accounting	240
Finance	160
Management	320
Marketing	80

Develop a percent frequency distribution and construct a bar chart and a pie chart.

Answer:

Major	Percent Frequency
Accounting	30%
Finance	20%
Management	40%
Marketing	10%





11. You are given the following data on the ages of employees at a company. Construct a stem-and-leaf display.

26	32	28	45	58
52	44	36	42	27
41	53	55	48	32
42	44	40	36	37

Answer:

2 | 6	7	8				
3 | 2	2	6	6	7		
4 | 0	1	2	4	4	5	8
5 | 2	3	5	8			

12. Construct a stem-and-leaf display for the following data.

12	52	51	37	47	40	38	26	57	31
49	43	45	19	36	32	44	48	22	18

Answer:

1 | 2	8	9				
2 | 2	6					
3 | 1	2	6	7	8		
4 | 0	3	4	5	7	8	9
5 | 1	2	7				

13. The SAT scores of a sample of business school students and their genders are shown below.

SAT Scores

Gender	Less than 20	20 up to 25	25 and more	Total
Female	24	168	48	240
Male	40	96	24	160
Total	64	264	72	400

a. How many students scored less than 20?
b. How many students were female?
c. Of the male students, how many scored 25 or more?
d. Compute row percentages and comment on any relationship that may exist between SAT scores and gender of the individuals.
e. Compute column percentages.

Answers:

a. 64
b. 240
c. 24
d.

SAT Scores

Gender	Less than 20	20 up to 25	25 and more	Total
Female	10%	70%	20%	100%
Male	25%	60%	15%	100%

From the above percentages it can be noted that the largest percentages of both genders' SAT scores are in the 20 to 25 range. However, 70% of females and only 60% of males have SAT scores in this range. Also it can be noted that 10% of females' SAT scores are under 20, whereas, 25% of males' SAT scores fall in this category.

e.

SAT Scores

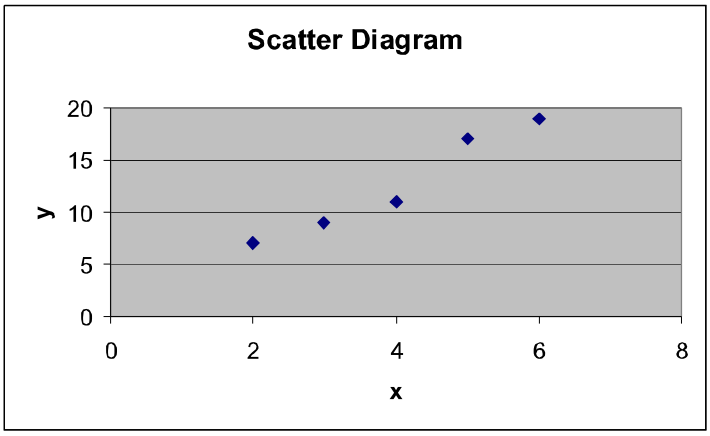
Gender	Less than 20	20 up to 25	25 and more
Female	37.5%	63.6%	66.7%

Male	62.5%	36.4%	33.3%
Total	100%	100%	100%

14. For the following observations, plot a scatter diagram and indicate what kind of relationship (if any) exist between x and y.

x	y
2	7
6	19
3	9
5	17
4	11

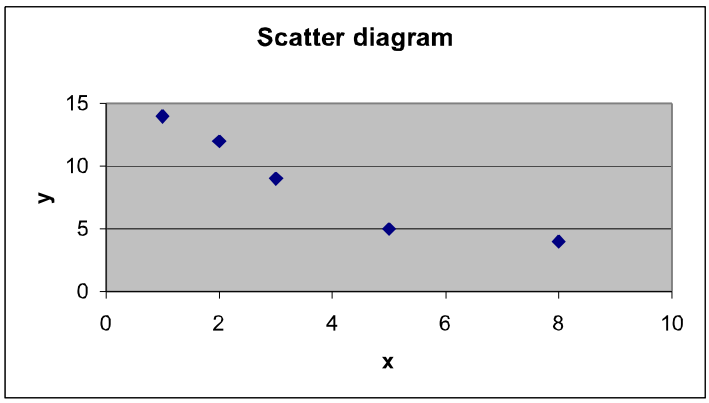
Answer:
A positive relationship between x and y appears to exist.



15. For the following observations, plot a scatter diagram and indicate what kind of relationship (if any) exist between x and y.

x	y
8	4
5	5
3	9
2	12
1	14

Answer:
A negative relationship between x and y appears to exist.


Scatter diagram
15
10
5
0
y
0
2
4
6
8
10
x