MATH 10043 CHAPTER 2 EXAMPLES & DEFINITIONS

Section 2.2

Definition: **Frequency distribution –** a chart or table giving the values of a variable together with their corresponding frequencies. A frequency distribution may be ungrouped or grouped.

A frequency distribution for qualitative data: Blood type is given for a sample of patients.

Blood type	Number of patients
A	40
B	10
AB	5
O	45
	Σ 100

An ungrouped frequency distribution: A sample of families was asked the number of school-age children in the family.

NUMBER OF SCHOOL-AGE CHILDREN (x)	FREQUENCY (f)
0	12
1	6
2	7
3	4
4	2
	Σ 31

A grouped frequency distribution: A recent survey of Roman Catholic nuns summarized their ages in the table below.

Age of nun	Number of nuns
20 up to 30	34
30 up to 40	58
40 up to 50	76
50 up to 60	187
60 up to 70	25
70 up to 80	24
80 up to 90	14
	Σ 418

Definition: **Class width –** the difference between two consecutive lower class boundaries. Typical class widths are 5s, 10s, 20s, 100s, etc.

Ex. A) Ages of 35 diabetes patients are listed below. (a) Construct a frequency distribution for this data set. (b) Add class midpoints. (c) add relative frequencies.

7	10	18	31	35	38	41
41	45	47	47	48	48	53
54	55	56	57	59	60	61
61	64	65	68	68	70	75
76	77	79	79	82	83	83

Definition: **Class midpoints –** the center value of each class.

Definition: **Relative frequency –** a proportional measure of frequency. Relative frequency for a class is calculated by dividing the frequency of that class by the total frequency of the data set.

PRACTICE PROBLEMS OVER SECTION 2.2

1. A survey of the time to complete construction on several projects is summarized below. (a) Find the relative frequencies to complete the table. (b) How many projects were completed?

Construction times (in months)	Number of Projects	Relative Frequency
$3 \le x < 6$	2	
$6 \le x < 9$	10	
$9 \le x < 12$	12	
$12 \le x < 15$	9	
$15 \le x < 18$	7	

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Section 2.2 Practice Problems, continued

2. Botanists are studying a new hybrid tree to determine its growth rate. Construct a frequency distribution **using a class width of five**.

9	15	11	13	25	18	14	6
16	4	17	18	14	7	3	17

Height (in inches)	Frequency	Relative frequency

3. Below is a list of elementary grades for a group of elementary students enrolled in the gifted and talented program. Construct an **ungrouped** frequency distribution of this data (including relative frequency).

3	5	2	4	4	1	3	4	4	2	5	3
3	5	4	1	3	5	2	4	4	2	3	1

Section 2.3

Definition: **Pie chart –** a circular graph showing the relationships of parts to a whole. Only one variable at a time may be displayed in a single pie chart.

Definition: **Bar graph –** a rectangular graph representing quantities using heights (areas) of detached rectangles. A bar graph is generally used to display qualitative or discrete data. An ungrouped frequency distribution is commonly displayed visually as a bar graph.

Definition: **Histogram –** a rectangular graph representing quantities using heights (areas) of attached rectangles. A histogram is generally used to display continuous data. A grouped frequency distribution is commonly displayed visually as a histogram. A histogram has:

1. a title, identifying the source of the data.
2. a horizontal scale, identifying the variable.
3. a vertical scale, identifying frequencies.

Ex. B) Use the data from example A above to sketch a histogram.

PRACTICE PROBLEMS OVER SECTION 2.3

1. Refer to practice problem 1, section 2.2. Sketch a histogram of this grouped data. [Remember to label each axis.]

2. Refer to practice problem 2, section 2.2. Sketch a histogram of this grouped data. [Remember to label each axis.]

3. Refer to practice problem 3, section 2.2. Sketch a bar graph of this ungrouped data. [Remember to label each axis.]

Section 2.4

Definition: The **stem and leaf display** has become a popular technique. It combines graphing and sorting the data. Each data value is split into two parts:

- the leading digit(s) becomes the stem.
- the trailing digit becomes a leaf.

Ex. C) (a) The number of home runs hit by Babe Ruth during his 15 years with the New York Yankees are listed. Construct a stem-and-leaf plot.

54	59	35	41	46	25	47	60
54	46	49	46	41	34	22	

(b) The number of home runs hit during his 10 years in the American League by Roger Maris, who broke Babe Ruth's record in 1961, are listed below. Construct a comparative stem-and-leaf display using both data sets.

8	33	26	14	13	23	16	28	39	61

Definition: An **outlier** is an unusually large or small data value with respect to its data set.

Ex. D) (a) Construct a stem-and-leaf display for the following set of cholesterol levels (in milligrams per deciliter). (b) Construct a **repeated** stem-and-leaf display for this data.

210	209	212	208	217	207	214	203	208	214
214	199	224	221	213	218	203	217	227	241

Definition: A **dotplot** consists of a number line above which each data value is plotted as a point or dot. A dotplot helps us see the distribution of the data – the pattern of variability and the frequency of each value.

Ex. E.) Construct a dot plot for the cholesterol levels given in example D.

PRACTICE PROBLEMS OVER SECTION 2.4

1. An article on peanut butter in a recent CONSUMER REPORTS reported the following quality scores for various brands. Construct a comparative stem-and-leaf display. Note similarities and differences for the two types of peanut butter.

CREAMY:	56	44	62	36	39	53	50	65	45	50
	68	41	30	40	50	56	30	22	56	44
CRUNCHY:	62	53	75	42	47	40	34	62	52	50
	34	42	36	75	80	47	56	62	68	71

2. An article on shower heads in a recent CONSUMER REPORTS reported the following flow rates. Construct a stem-and-leaf display using stems 1, 2, 3, 4, & 5. Construct another display using repeated stems. Compare your results.

2.0	3.6	2.7	2.5	2.6	3.3	2.9
2.2	2.5	2.8	1.8	2.7	4.7	3.1
3.4	2.6	2.4	2.5	5.4	4.9	2.3

3. Use the stem-and leaf plot below to generate the original data set. (Leaf unit 0.1)

Stem	Leaf
1	4 7 1
2	4 5
3	5 0 4 1
4	4
5	5 8 7
6	8 8 2 8 6
7	5
8	
9	4

4. Referring to practice problem 1 above, construct a dot plot for the quality scores given for the creamy peanut butter.