

## Applying the Concepts 2-2

### Ages of Presidents at Inauguration

The data represent the ages of our presidents at the time they were first inaugurated.

57	61	57	57	58	57	61	54	68
51	49	64	50	48	65	52	56	46
54	49	50	47	55	55	54	42	51
56	55	54	51	60	62	43	55	56
61	52	69	64	46	54			

1. Were the data obtained from a population or a sample? Explain your answer.
2. What was the age of the oldest president?
3. What was the age of the youngest president?
4. Construct a frequency distribution for the data. (Use your own judgment as to the number of classes and class size.)
5. Are there any peaks in the distribution?
6. Identify any possible outliers.
7. Write a brief summary of the nature of the data as shown in the frequency distribution.

See page 93 for the answers.

## Exercises 2-2

1. List five reasons for organizing data into a frequency distribution.
2. Name the three types of frequency distributions, and explain when each should be used.
3. Find the class boundaries, midpoints, and widths for each class.
  - a. 12–18
  - b. 56–74
  - c. 695–705
  - d. 13.6–14.7
  - e. 2.15–3.93
4. How many classes should frequency distributions have? Why should the class width be an odd number?
5. Shown here are four frequency distributions. Each is incorrectly constructed. State the reason why.

a.

Class	Frequency
27–32	1
33–38	0
39–44	6
45–49	4
50–55	2

b.

Class	Frequency
5–9	1
9–13	2
13–17	5
17–20	6
20–24	3

c.

Class	Frequency
123–127	3
128–132	7
138–142	2
143–147	19


d.

Class	Frequency
9–13	1
14–19	6
20–25	2
26–28	5
29–32	9

6. What are open-ended frequency distributions? Why are they necessary?
7. A survey was taken on how much trust people place in the information they read on the Internet. Construct a categorical frequency distribution for the data. A = trust


in everything they read, M = trust in most of what they read, H = trust in about one-half of what they read, S = trust in a small portion of what they read. (Based on information from the *UCLA Internet Report*.)

M	M	M	A	H	M	S	M	H	M
S	M	M	M	M	A	M	M	A	M
M	M	H	M	M	M	H	M	H	M
A	M	M	M	H	M	M	M	M	M


-  **8.** The heights in inches of commonly grown herbs are shown. Organize the data into a frequency distribution with six classes, and think of a way in which these results would be useful.

18	20	18	18	24	10	15
12	20	36	14	20	18	24
18	16	16	20	7		

Source: *The Old Farmer's Almanac*.


-  **9.** The following data are the measured speeds in miles per hour of 30 charging elephants. Construct a grouped frequency distribution for the data. From the distribution, estimate an approximate average speed of a charging elephant. Use 5 classes. (Based on data in the *World Almanac and Book of Facts*.)

25	24	25	24	25
23	25	19	32	23
22	24	26	25	23
28	25	25	26	27
22	28	24	23	24
21	25	22	29	23

-  **10.** The total energy consumption in trillions of BTU for each of the 50 states in the United States is shown. Construct a frequency distribution using 10 classes, and analyze the nature of the data.


1,215	2,706	1,400	4,417	1,868
11,588	1,799	1,199	627	1,099
1,688	1,083	2,501	561	4,001
1,035	863	594	2,303	583
329	620	1,722	744	1,143
264	417	365	302	250
8,518	4,779	4,620	3,943	3,121
1,659	511	246	1,520	1,977
1,079	2,777	2,769	1,477	632
3,965	2,173	2,025	718	164

Source: *Energy Information Administration*.

-  **11.** The average quantitative GRE scores for the top 30 graduate schools of engineering are listed. Construct a frequency distribution with 6 classes.


767	770	761	760	771	768	776	771	756	770
763	760	747	766	754	771	771	778	766	762
780	750	746	764	769	759	757	753	758	746

Source: *U.S. News & World Report Best Graduate Schools*.

-  **12.** The number of unhealthy days in selected U.S. metropolitan areas is shown. Construct a frequency distribution with 7 classes. (The data in this exercise will be used in Exercise 22 in Section 3–2.)


61	88	40	5	12	12	18	23	1	15
6	81	50	21	0	27	5	13	0	24
5	1	32	12	23	93	38	29	16	0
1	22	36							

Source: *N.Y. Times Almanac*.

-  **13.** The ages of the signers of the Declaration of Independence are shown. (Age is approximate since only the birth year appeared in the source, and one has been omitted since his birth year is unknown.) Construct a frequency distribution for the data using 7 classes. (The data for this exercise will be used for Exercise 5 in Section 2–3 and Exercise 23 in Section 3–2.)


41	54	47	40	39	35	50	37	49	42	70	32
44	52	39	50	40	30	34	69	39	45	33	42
44	63	60	27	42	34	50	42	52	38	36	45
35	43	48	46	31	27	55	63	46	33	60	62
35	46	45	34	53	50	50					

Source: *The Universal Almanac*.

-  **14.** The number of automobile fatalities in 27 states where the speed limits were raised in 1996 is shown here. Construct a frequency distribution using 8 classes. (The data for this exercise will be used for Exercise 6 in Section 2–3 and Exercise 24 in Section 3–2.)


1100	460	85
970	480	1430
4040	405	70
620	690	180
125	1160	3630
2805	205	325
1555	300	875
260	350	705
1430	485	145

Source: *USA TODAY*.

-  **15.** The following data represent the ages of 47 of the wealthiest people in the United States. Construct a grouped frequency distribution for the data using 7 classes. Analyze the results in terms of peaks, extreme values, etc. (The information in this exercise will be used for Exercise 9 in Section 2–3 and Exercise 25 in Section 3–2.)


48	48	74	74	84	51	71
56	55	76	85	68	42	79
73	58	73	81	51	81	55
65	66	87	60	74	62	64
39	60	60	37	90	68	67
61	40	72	61	71	74	31
62	63	67	31	40		

Source: *Forbes*.

 **16.** The acreage of the 39 U.S. National Parks under 900,000 acres (in thousands of acres) is shown here. Construct a frequency distribution for the data using 8 classes. (The data in this exercise will be used in Exercise 11 in Section 2-3.)


41	66	233	775	169
36	338	233	236	64
183	61	13	308	77
520	77	27	217	5
650	462	106	52	52
505	94	75	265	402
196	70	132	28	220
760	143	46	539	

Source: *The Universal Almanac*.

 **17.** The heights (in feet above sea level) of the major active volcanoes in Alaska are given here. Construct a frequency distribution for the data using 10 classes. (The data in this exercise will be used in Exercise 9 in Section 3-2 and Exercise 17 in Section 3-3.)

4,265	3,545	4,025	7,050	11,413
3,490	5,370	4,885	5,030	6,830
4,450	5,775	3,945	7,545	8,450
3,995	10,140	6,050	10,265	6,965
150	8,185	7,295	2,015	5,055
5,315	2,945	6,720	3,465	1,980
2,560	4,450	2,759	9,430	
7,985	7,540	3,540	11,070	
5,710	885	8,960	7,015	

Source: *The Universal Almanac*.

 **18.** During the 1998 baseball season, Mark McGwire and Sammy Sosa both broke Roger Maris's home run record of 61. The distances (in feet) for each home run follow. Construct a frequency distribution for each player, using 8 classes. (The information in this exercise will be used for Exercise 12 in Section 2-3, Exercise 10 in Section 3-2, and Exercise 14 in Section 3-3.)

McGwire				Sosa			
306	370	370	430	371	350	430	420
420	340	460	410	430	434	370	420
440	410	380	360	440	410	420	460
350	527	380	550	400	430	410	370
478	420	390	420	370	410	380	340
425	370	480	390	350	420	410	415
430	388	423	410	430	380	380	366
360	410	450	350	500	380	390	400
450	430	461	430	364	430	450	440
470	440	400	390	365	420	350	420
510	430	450	452	400	380	380	400
420	380	470	398	370	420	360	368
409	385	369	460	430	433	388	440
390	510	500	450	414	482	364	370
470	430	458	380	400	405	433	390
430	341	385	410	480	480	434	344
420	380	400	440	410	420		
377	370						

Source: *USA TODAY*.

## Extending the Concepts

**19.** A researcher conducted a survey asking people if they believed more than one person was involved in the assassination of John F. Kennedy. The results were as

follows: 73% said yes, 19% said no, and 9% had no opinion. Is there anything suspicious about the results?

### Technology Step by Step

#### MINITAB Step by Step

#### Make a Categorical Frequency Table (Qualitative or Discrete Data)

- Type in all the blood types from Example 2-1 down C1 of the worksheet.  
A B B AB O O O B AB B B B O A O A O O O AB AB A O B A

2. Click above row 1 and name the column **BloodType**.

3. Select **Stat>Tables>Tally Individual Values**.

The cursor should be blinking in the Variables dialog box. If not, click inside the dialog box.