

**Sketch of Solutions to Selected Problems in Homework #1**

**Section 1.1:**

- 1--44 even and 51, 52
- #2 Population consists of all the individuals that a study is concerned about, whereas a sample is a much smaller subset of the population to be actually examined in a study.
- #4 individual
- #6 Neither the experimenters nor the subjects know whether any subject is in the control group or the experimental group.
- #8 A placebo is an innocuous drug such as a sugar tablet that contains no medication, used in the control group in an experiment.
- #10 A qualitative variable classifies individuals based on some attribute or characteristic that is not numerical in nature (though one may elect to code the classes using numerical values, which however don't permit arithmetic operations.) A qualitative variable provides numerical measures of individuals and allow arithmetic operations to be performed on the values to produce meaningful results.
- #12 True
- #14 No, for we can choose to measure the age of a person to as much accuracy as we desire.
- #16 Quantitative #18 Qualitative #20 Quantitative
- #22 Qualitative #24 Quantitative #26 Qualitative
- #28 Continuous #30 Discrete (Well, this is debatable....)
- #32 Continuous #34 Continuous #36 Discrete #38 Continuous
- #40 Population: All the bottles of Coca-Cola that were filled on October 15.  
Sample: The 50 bottles of Coca-Cola among these that were selected.
- #42 Population: All households within the U.S.  
Sample: The 50,000 households in the U.S. that are surveyed.
- #44 Population: All full-time students in the community college.  
Sample: The 128 full-time students surveyed.
- #51 (See solutions in the book)
- #52 Individuals: M/Z3 Coupe, M/Z3 Roadster, 3 Series, 5 Series, 7 Series, Z8  
Variables: Body style, weight, number of seats.  
Data for body style: coupe, convertible, coupe, sedan, sedan, convertible.  
Data for weight: 2495, 2690, 2780, 3450, 4255, 3600.  
Data for number of seats: 2, 2, 5, 5, 5, 2.  
Body style: qualitative; Weight: continuous; Number of seats: discrete.

**Section 2.1:**

- 9, 10, 11, 12, 13, 14, 15, 16, 26
- #9 (a) Large; 52% (b) X-Large; 9% (c) 23%
- #10 (a) 325,080 (b) 216,720 (c)  $100\% - 21\% - 18\% - 14\% - 9\% = 38\%$
- #11 (a) The United States (b) About 20 million. (Not 20!!!) (c) About 25 million.
- #12 (a) 22,196,000 (Note that the number shown in the graph is in thousands, so the answer is not 22,196, but should be multiplied by 1000.)  
(b)  $12114 / (22196 + 11390 + 12114 + 3551) = 12114 / 49251 \approx 0.246 = 24.6\%$   
(c) It is misleading in that it doesn't indicate the different population sizes of the ethnic groups. It would be more informative if for each ethnic group the *percentage* of its population in poverty is shown rather than the number of people in poverty,

#13

(a) 397,157

(b) Total number of voters:

$$62,041,268 + 59,028,548 + 463,635 + 397,157 + 144,451 + 223,249$$

$$= 122,298,308$$

$$\text{Bush: } 62,041,268 / 122,298,308 \approx 0.507 = 50.7\%$$

$$\text{Kerry: } 59,028,548 / 122,298,308 \approx 0.483 = 48.3\%$$

(c) Nader had  $436,635 / 122,298,308 \approx 0.004 = 0.4\%$ , which was lower than 5%.

Thus he wouldn't receive presidential election funds.

#14 (a) 32% (b)  $(9.3 \text{ million})(0.13) = 1.209 \text{ million}$ , thus about 1.2 million.

#15 (a) 0.16; 0.30 (b) Natural gas (c)  $(107 \text{ million})(0.05) = 5.35 \text{ million}$

(d) (It is impossible to answer this question based on the information given. You can offer your thoughts, **but you definitely shouldn't say "Answers will vary." That phrase in the answer section of the book means the question is open-ended and you are supposed to offer yours.**)

(e) Fuel oil or kerosene; (The reason behind is cannot be deduced from the information given. Offer your thoughts.)

(f) Both natural gas and LPG.

#16 (a)  $5698 - 5265 = 433$

(b) In 2003, the total numbers of doctorate recipients is

$$5963 + 5265 + 8369 + 6777 + 5412 + 6627 + 2297 = 40710$$

$$\text{Physical science accounts for } 5963 / 40710 \approx 0.146 = 14.6\%$$

$$\text{Education accounts for } 6627 / 40710 \approx 0.163 = 16.3\%$$

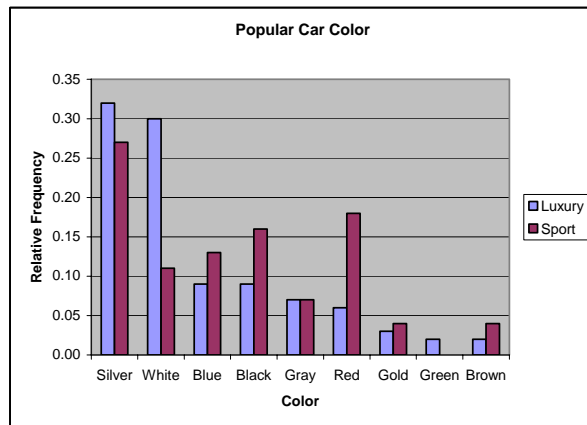
(c) Education (d) Life sciences.

#26 (a)

Color	Num of Luxury Cars	Relative Frquency
Silver	32	0.32
White	30	0.30
Blue	9	0.09
Black	9	0.09
Gray	7	0.07
Red	6	0.06
Gold	3	0.03
Green	2	0.02
Brown	2	0.02

Color	Num of Sport Cars	Relative Frquency
Silver	27	0.27
White	11	0.11
Blue	13	0.13
Black	16	0.16
Gray	7	0.07
Red	18	0.18
Gold	4	0.04
Green	0	0.00
Brown	4	0.04

(b)



(c) (Offer your thoughts.)

**Section 2.2:**

9, 10, 11, 12, 28, 32

#9 (a) 8 (b) 2 (c) 15 (d)  $15/100 = 15\%$  (e) Bell shaped.

#10 (a) 4 (b) 9

(c)  $4 + 2 + 9 + 8 + 12 + 8 + 5 + 2 + 1 + 1 = 52$ , so we get  $9/52 \approx 0.1731 \approx 17.3\%$

(d) Skewed right.

#11 (a)  $2 + 3 + 13 + 42 + 58 + 40 + 31 + 8 + 3 + 1 = 200$  (b) 10

(c)

Class	Frequency
60-69	2
70-79	3
80-89	13
90-99	42
100-109	58
110-119	40
120-129	31
130-139	8
140-149	2
150-159	1

(d) 100-109 (e) 150-159

#12 (a) 200 (b) 0-199, 200-399, 400-599, 600-799, 800-999, 1000-1199, 1200-1399, 1400-1599, 1600-1799 (c) 0-199 (d) Skewed right.

#28 Note that an Excel file (Data Sets\chapt 02\ch2 Excel\2\_2\_28.xls) is included on the CD that accompanies the textbook.

(a)

Number of Potholes	Frequency
1	6
2	15
3	9
4	6
5	6
6	1
7	5
8	0
9	1
10	1
Total	50

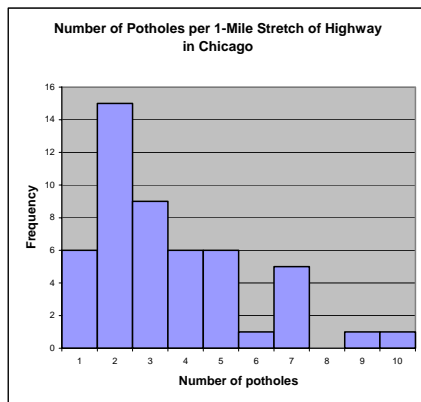
(b)

Number of Potholes	Relative Frequency
1	0.12
2	0.30
3	0.18
4	0.12
5	0.12
6	0.02
7	0.10
8	0.00
9	0.02
10	0.02

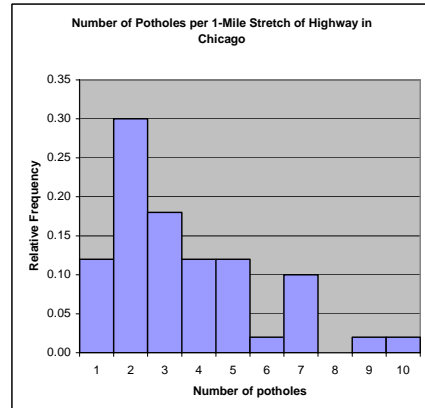
(c) There are  $5 + 0 + 1 + 1 = 7$  1-mile stretches of highway that had seven or more potholes. This accounts for  $7/50 = 0.14 = 14\%$  of all stretches.

(d) There are  $6 + 15 = 21$  1-mile stretches of highway that had two or fewer potholes. This accounts for  $21/50 = 0.42 = 42\%$  of all stretches.

(e)



(f)



(g) Skewed right

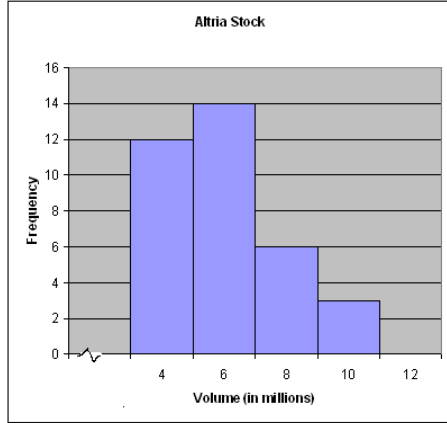
#32 (a)

Daily Stock Volume	Frequency
3.00 - 4.99	12
5.00 - 6.99	14
7.00 - 8.99	6
9.00 - 10.99	3
11.00 - 12.99	0

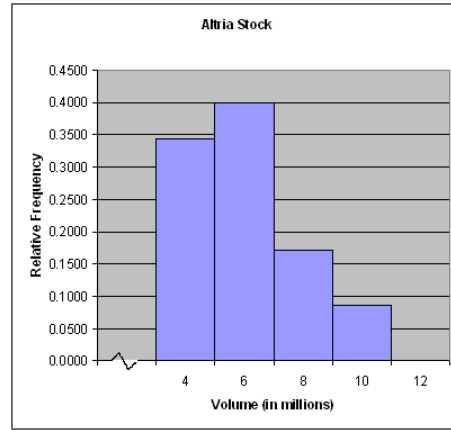
(b)

Daily Stock Volume (in millions)	Relative Frequency
3.00 - 4.99	0.3429
5.00 - 6.99	0.4000
7.00 - 8.99	0.1714
9.00 - 10.99	0.0857
11.00 - 12.99	0.0000

(c)



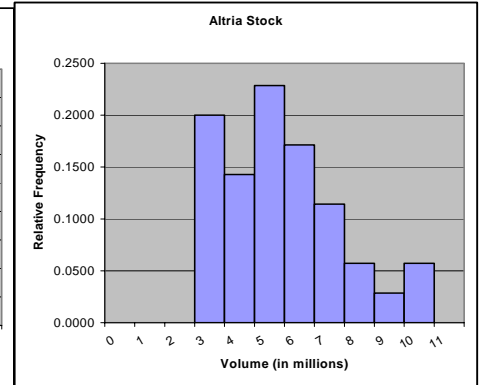
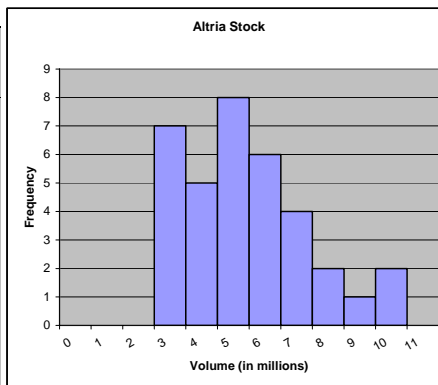
(d)



(e) Skewed right

(f)

Daily Stock Volume (in millions)	Frequency	Daily Stock Volume (in millions)	Relative Frequency
0.00 - 0.99	0	0.00 - 0.99	0.0000
1.00 - 1.99	0	1.00 - 1.99	0.0000
2.00 - 2.99	0	2.00 - 2.99	0.0000
3.00 - 3.99	7	3.00 - 3.99	0.2000
4.00 - 4.99	5	4.00 - 4.99	0.1429
5.00 - 5.99	8	5.00 - 5.99	0.2286
6.00 - 6.99	6	6.00 - 6.99	0.1714
7.00 - 7.99	4	7.00 - 7.99	0.1143
8.00 - 8.99	2	8.00 - 8.99	0.0571
9.00 - 9.99	1	9.00 - 9.99	0.0286
10.00 - 10.99	2	10.00 - 10.99	0.0571
11.00 - 11.99	0	11.00 - 11.99	0.0000



(g) It seems class width of 2 gives too much bunching effect. The choice of a class width of 1 appears to provide a better summary of the data.