Chapter 2

Problems for You to Do: (Sec. 2.2 to 2.3) 2.4, 2.5

1. a) Construct a frequency table for the "Global Sales" data:

Global Sales ($ Billions US)	Tally	Frequency
3.0 – 3.9		
4.0 – 4.9		
5.0 – 5.9		
6.0 – 6.9		
7.0 – 7.9		
8.0 – 8.9		
9.0 – 9.9		
10.0 – 10.9		

Of the top 20 companies in 1998 global pharmaceutical sales, half have since merged or announced plans to merge.

Rank	Company	Global sales ($billions U.S.)	Merger status
1.	Novartis	$10.6	—
2.	Merck & Co.	10.6	—
3.	Glaxo Wellcome	10.5	Buying SmithKline
4.	Pfizer	9.9	Trying to buy Warner
5.	Bristol-Myers Squibb	9.8	—
6.	Johnson & Johnson	9.0	—
7.	American Home	7.8	Trying to buy Warner
8.	Roche	7.6	—
9.	Lilly	7.4	—
10.	SmithKline Beecham	7.3	Being acquired by Glaxo
11.	Astra	6.9	Merged with Zeneca
12.	Abbott	6.4	—
13.	Hoechst Marion Roussel	6.2	Merged with Rhone
14.	Schering-Plough	6.2	—
15.	Warner-Lambert	6.0	Both Pfizer and American Home have made bids
16.	Bayer	5.2	—
17.	Rhone-Poulenc Rore	4.5	Merged with Hoechst
18.	Pharmacia & Upjohn	4.5	Merging with Monsanto
19.	Zeneca	3.7	Merged with Astra
20.	Boehringer Ingelheim	3.6	—

Source: The Vancouver Sun, p. D4; Jan. 18, 2000

b) What are the **boundaries** of the first class?

c) What is the **class width?**

d) What is the **class mark** of the last class?

e) Construct a **relative frequency** histogram for the "Global Sales". Clearly label and scale both axes, and identify the "tick marks" ___|___ on each axis.

f) Construct a suitable stem and leaf plot for the "Global Sales" data. (Identify the "stem" and the "leaf".)

2. Which histogram shape to the right

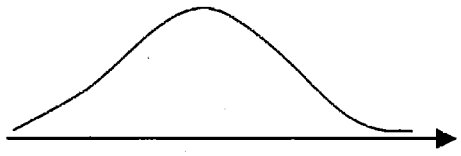
a) is called skewed to the right?

b) do you think best suits the variable "the speeds of cars along a straight section of the Upper Levels Highway where the speed limit is 80 km/h"?

Briefly explain why you chose the one you did, and mark 80 km/h on the graph.

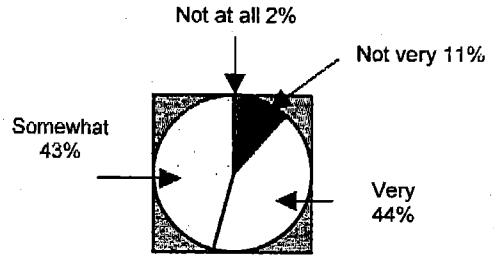
1.

2.



3.

3. How many degrees is the central angle for the "Not at all" response?



How active is your life style?

4. If you are constructing a frequency table for the weight of newborns and you decide to use a class width of 0.4 kg and a lower class limit of 1.6 kg for the first class,
   a) fill in the blanks for the other class limits in the table to the right
   b) what is the class mark of the first class?

Weights (kg.)
1.6 – _____
_____ – _____
_____ – _____

5. The 100 m sprint times (sec) and heart rates (beats per minute) for a sample of students are given to the right.

Sprint Time	Heart Rate
13.6	85
15.2	92
12.3	80
13.2	102
13.7	86
13.3	95
14.1	92
11.8	87
12.5	72
12.7	78
13.2	83
11.5	80
14.6	90
12.7	103
13.2	77
12.1	79
13.4	96
12.9	87
13.1	82
12.0	76
12.6	79
14.0	86
13.9	92
12.3	83
12.9	80

   a) Is **heart rate** a discrete or continuous variable?

   b) Construct a frequency table for the **sprint times**.

Sprint Times	Tally	Frequency
11.5 – 11.9		
12.0 – 12.4		
12.5 – 12.9		
13.0 – 13.4		
13.5 – 13.9		
14.0 – 14.4		
14.5 – 14.9		
15.0 – 15.4		

   c) What is the **relative frequency** for the 12.5 – 12.9 interval?

   d) Construct a frequency histogram for the sprint times. Be sure to
      - label each axis
      - identify the numbers that corresponds to each tick mark on each axis

6. http://infoseek.go.com/Topic/Sports/Hocke...ucks?tid=7310&sk=sportsalias7310r_rl&tm=R

GO Network Sports : Vancouver Canucks - Roster

MATTIAS OHLUND	D	6.03	220 lbs.
BRET HEDICAN	D	6.02	205 lbs.
BRYAN MCCABE	D	6.01	204 lbs.
DANA MURZYN	D	6.02	208 lbs.
ADRIAN AUCOIN	D	6.02	210 lbs.
JAMIE HUSCROFT	D	6.02	210 lbs.
DONALD BRASHEAR	LW	6.02	225 lbs.
BRAD MAY	LW	6.01	205 lbs.
MARK MESSIER	C	6.01	200 lbs.
*BILL MUCKALT	C	6.00	190 lbs.
BERT ROBERTSSON	D	6.03	210 lbs.
MARKUS NASLUND	LW	6.00	195 lbs.
DAVE SCATCHARD	C	6.02	220 lbs.
MURRAY BARON	D	6.03	215 lbs.
*MATT COOKE	C	5.11	200 lbs.
STEVE STAIOS	RW	6.00	200 lbs.
TRENT KLATT	RW	6.01	205 lbs.
HARRY YORK	C	6.01	220 lbs.
GARTH SNOW	G	6.03	200 lbs.
COREY HIRSCH	G	5.10	175 lbs.
JASON STRUDWICK	D	6.03	225 lbs.
CHRIS MCALLISTER	D	6.07	235 lbs.
TODD BERTUZZI	LW	6.03	225 lbs.
ALEXANDER MOGILNY	RW	5.11	200 lbs.

a) Construct a frequency table for the weights of the Canucks

Weights (lbs.)	Tally	Frequency
175 – 184		
185 – 194		
195 – 204		
205 – 214		
215 – 224		
225 – 234		
235 – 244		

b) What are the class boundaries of the first class?

c) What is the class mark of the last class?

d) Construct a histogram for the players' weights. **Label** each axis and **identify** the numbers for each tick mark on each axis.

e) Construct a stem and leaf plot for the weights.

7. Preliminary results from the Math 101-1 statistics survey yielded the following responses to the question "How many cups of coffee did you drink yesterday?"

0, 0, 2, 0, 8, 1, 0, 1, 1, 3, 0, 2, 4, 0, 1, 0, 5, 0, 0, 2

a) Construct a **frequency table** for amount of coffee consumed:

b) Construct a histogram for the % relative frequencies. Be sure to label the axes and identify each "tick mark".

8. a) If a pie chart were used to illustrate the responses to Question 2, how many degrees should you make the central angle for the "Much more optimistic" response? (round your answer to the nearest degree)

b) If a Pareto chart were used to illustrate the responses to Question 59, how high would the first bar on the left be?
(The numbers in the right column represent % of respondents.)

MACLEAN'S /CBC POLL TEXT

2. Are you more or less optimistic about the future than you were a decade ago

Much more optimistic	9
A little more optimistic	23
Feelings not changed much	27
A little more pessimistic	28
Much more pessimistic	12

59. Suppose you have a 17-year old teenage daughter who became pregnant, and she did not wish to continue the relationship with the male she became pregnant by, which of the following would you be most likely to advise that she do?

Have an abortion	19
Have the child, but give it up for adoption	20
Keep the child and be a single parent	44
Allow her to make her own decision (Volunteered)	9
Don't know	7

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9. a) Identify the variable in each of the following examples as "discrete" or "continuous":

   (i) the player's weight

   (ii) the year that the player was born

   b) Identify the **level of measurement** of:

   (i) the player's sweater

   (ii) the year that the player was born

   (iii) the height of the player

   c) Construct a frequency table for the weights (WT column) of the players.

Weights	Tally	Frequency
165 – 174		
175 – 184		
185 – 194		
195 – 204		
205 – 214		
215 – 224		
225 – 234		

   d) What is the class mark of the first class?

   e) Construct a histogram for the weights;
   - **label** each axis
   - **identify** the number that corresponds to each tick mark on each axis.

10. Which histogram shape to the right

   a) is called skewed to the left?_____

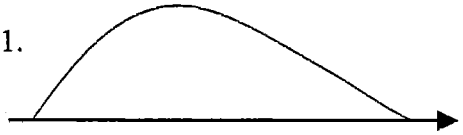
   b) do you think best suits the variable "ages of B.C. women who got married in 1999"? Briefly explain **why** you chose the one you did.

1999 Vancouver Canucks Training Camp

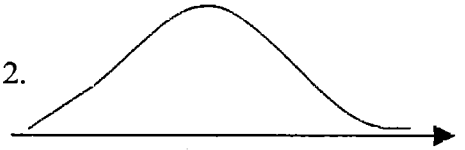
FORWARDS

PLAYER	POS.	HT	WT	BIRTHPLACE	DATE
44 Bertuzzi, Todd	LW	6'3"	230	Sudbury, ON	Feb. 2, 1975
48 Bodtker, Stewart	C	6'1"	190	Penticton, BC	Sept. 15, 1976
64 Bonin, Brian	C	5'10"	185	St. Paul, MN	Nov. 28, 1973
8 Brashear, Donald	LW	6'2"	230	Bedford, IN	Jan. 7, 1972
50 Brown, Mike	LW	6'4"	205	Surrey, BC	Apr. 27, 1979
25 Cassels, Andrew	C	6'1"	185	Bramalea, ON	July 23, 1969
41 Chubarov, Artem	C	6'1"	190	Novogorod, Russia	Dec. 12, 1979
24 Cooke, Matt	C	5'11"	205	Belleville, ON	Sept 7, 1978
54 Druken, Harold	C	6'0"	200	St. John's, NFLD	Jan. 26, 1979
43 Ferone, Paul	RW	5'11"	190	Vancouver, BC	Apr. 2, 1976
15 Gendron, Martin	RW	5'8"	190	Valleyfield, PQ	Feb. 15, 1974
58 Gustafsson, Marcus	LW	6'0"	190	Knivsta, Swe	Sept. 24, 1974
21 Holden, Josh	C	6'0"	190	Calgary, AB	Jan. 18, 1978
18 Kariya, Steve	LW	5'7"	170	North Vancouver, BC	Dec. 22, 1977
69 Kavanagh, Pat	RW	6'3"	195	Ottawa, ON	Mar. 14, 1979
26 Klatt, Trent	RW	6'1"	210	Robbinsdale, MN	Jan. 30, 1971
68 Lee, Mike	RW	6'0"	215	Anchorage, AK	May 22, 1980
74 Leeb, Brad	RW	5'11"	180	Red Deer, AB	Aug. 27, 1979
14 Hendrickson, Darby	C	6'1"	195	Richfield, MN	Aug. 28, 1972
56 Matts, Vince	RW	6'2"	215	Philadelphia, PA	Nov. 11, 1978
9 May, Brad	LW	6'0"	210	Toronto, ON	Nov. 29, 1971
11 Messier, Mark	C	6'1"	210	Edmonton, AB	Jan. 18, 1961
89 Mogilny, Alex	RW	5'11"	205	Khabarovsk, Russia	Feb. 18, 1969
17 Muckalt, Bill	RW	6'0"	200	Surrey, BC	July 15, 1974
19 Naslund, Markus	LW	5'11"	195	Omskoldsvik, SWE	July 30, 197
51 Pearson, Rob	RW	6'3"	200	Oshawa, ON	Mar. 8, 197
39 Ready, Ryan	LW	6'2"	185	Peterborough, ON	Nov. 7, 1978
72 Rowe, Randy	LW	5'11"	195	Burford, ON	Jun. 15, 1980
37 Ruutu, Jarkko	LW	6'2"	195	Helsinki, FIN	Aug. 23, 1975
47 Savage, Reggie	C/LW	6'0"	190	Montreal, PQ	May 1, 1970
20 Scatchard, Dave	C	6'2"	217	Hinton, AB	Feb. 20, 1976
29 Schaefer, Peter	LW	5'11"	195	Regina, SK	July 12, 1977
52 Shapley, Larry	RW	6'6"	215	Dunnville, ON	Feb. 6, 1978
75 Shrum, Steve	C	5'10"	180	Edmonton, AB	Oct 9, 1979
73 Smithson, Jarred	C	6'2"	190	Vernon, BC	Feb. 4, 1979
53 Soling, Jonas	LW	6'4"	195	Stockholm, SWE	Sept. 7, 1978
71 Thorpe, Ryan	LW	6'4"	205	White Rock, BC	Feb. 6, 1981
38 Valic, Lubomir	C	5'8"	165	Spisska Nova Ves, SL	Mar. 6, 1977
27 York, Harry	C	6'2"	220	Ponoka, AB	Apr. 16, 1974

1.



2.



3.

11. If the weights of newborns are grouped into the weight intervals shown to the right,
    a) what is the **class width?**
    b) what are the **boundaries** of the first class?

Weights (kg)
2.3 – 2.7
2.8 – 3.2
3.3 – 3.7
3.8 – 4.2
4.3 – 4.7

12. Construct a stem and leaf plot for the earthquake magnitudes.

Stem	Leaves

You do **not** have to put the leaves in order.

Earthquake Magnitudes (Richter Scale)
1.6
0.7
3.2
1.8
2.3
3.6
0.9
1.4
1.7
2.8
3.5
4.1
5.6
2.7
2.5

13. The data to the right represents the first 20 responses to the question "How many hours per week do you plan to study for this course outside of class?"

Math 101-1 Statistics Survey
8.0
4.0
8.0
5.0
6.0
4.5
8.0
7.0
9.0
3.5
7.0
2.0
8.0
12.0
5.0
4.5
15.0
8.0
4.0
6.0

a) Construct a frequency table for the "study hours".

Study Hours	Tally	Frequency
0 – 2		
2.5 – 4.5		
5 – 7		
7.5 – 9.5		
10 – 12		
12.5 – 14.5		
15 – 17		

b) What are the **boundaries** of the last class?
c) What is the **class mark** of the second class?
d) What is the **class width**?
e) Construct a histogram for the study hours.
   - **label** both axes
   - **identify** tick marks on each axis.
f) Construct a stem and leaf plot for the study hours.

14. Set up a frequency table with 5 classes for the following IQ data scores:

105	122	94	89	101	100	85	96	102	100
96	117	96	120	99	105	96	108	92	89

a) Range = _____ b) Class Width = _____

c) Complete the table using lowest score as the starting point.

Class	Tally	Frequency	Relative Frequency (%)	Cumulative Frequency

d) Draw a relative frequency histogram using **class boundaries** (be sure to label fully).

e) Determine the class mark for the 4^{th} class.

15. a) What is the level of measurement for the responses to Question 40?

b) If a Pareto chart were used for the responses to Question 41, how high (in %) should you plot the first bar on the left?

c) If a Pie chart were used for the responses to Question 40, how many degrees should you make the central angle for the "Very Upset" response? (Round to the nearest degree.)

MACLEAN'S /CBC POLL

		%
40.	**How do you feel about the amount of tax you pay**	
	Very upset	31
	Somewhat upset	46
	Not very upset	15
	Not upset at all	8
41.	**(Asked of those who answered "very upset" or "somewhat upset" to question 40) Which tax do you get the most upset about?**	
	Personal income tax	37
	GST and sales taxes generally	49
	Property and municipal taxes	12
	Don't know/refused	2

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16. The data to the right represent the first 20 student responses to the question "How many hours of sleep did you get last night?".

Math 101 Survey Sleep Hrs.
6.5
5.5
10.5
7.0
9.0
4.0
7.5
9.0
7.0
3.5
6.5
9.0
9.0
7.0
7.0
8.0
6.5
9.5
8.0
4.0

a) Construct a frequency table for the sleep hours.

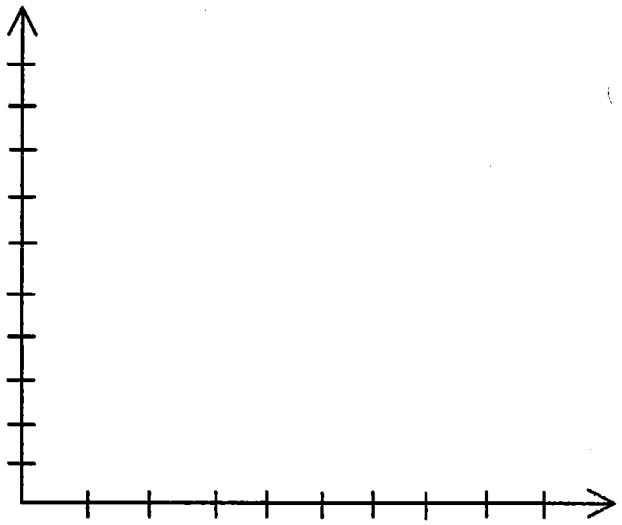
Sleep Hours	Tally	Frequency
3.0 – 4.0		
4.5 – 5.5		
6.0 – 7.0		
7.5 – 8.5		
9.0 – 10.0		
10.5 – 11.5		

b) What are the **boundaries** of the first class?

c) What is the **class mark** of the last class?

d) What is the **class width**?

e) Construct a histogram for the sleep hours:
- **label** each axis
- **identify** the numbers for each tick mark on each axis



f) Construct a stem and leaf plot for the sleep hours.

Stem	Leaves
3	
4	
5	
6	
7	
8	
9	
10	

You do not have to put the leaves in order.