



Concept: Understanding Statistics

Name:

PART A: COMPUTER COMPONENT

Instructions: Select the computer program *Understanding Graphing* (Neufeld).
Follow the instructions to the Main Menu.
Select *Statistics* from the Main Menu.



Work through all sections of the following topics **in order**:

- *An Introduction*
- *Data... What is It?*
- *Examples of Data*
- *Statistics... What is it?*
- *Collecting Data*
- *Presenting Data*

Notice: You will not be finishing the entire topic before stopping to complete some **OFF COMPUTER EXERCISES**.



As you work through **PART A: COMPUTER COMPONENT**, make notes in your notebook/math journal.

When you reach the end of the section *Presenting Data*, leave the computer and move on to **PART A: SUMMARY** below.

PART A: SUMMARY

1. The Tally Chart below records the number of fish in Sasha's aquarium over a four-year period.

Number of Fish	
1999	### /
2000	### ///
2001	////
2002	### ### //





(a) How many fish were there in 2000? *8 fish are in the aquarium.*

(b) How many more fish were there in 2002 than in 1999? *There were 6 more fish.*

(c) In which year did Sasha have the least number of fish? *2001*

2. The Pictograph below records the number of balls each grade uses during gym class.

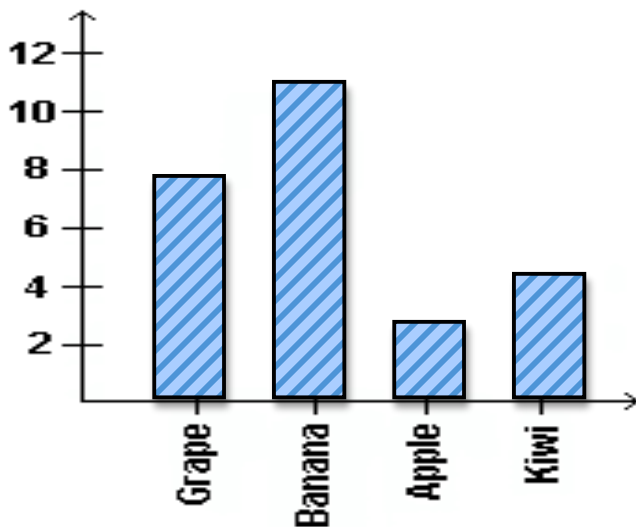
Each  represents 2 balls.

Number of Balls	
1st	
3rd	
5th	
8th	

- (a) How many balls does the 5th grade use? *5th grade uses 6 balls.*
- (b) Which grade uses the greatest number of balls? *The 3rd grade uses the least number of balls.*
- (c) How many more balls does the 8th grade use than the 3rd grade? *The 8th grade uses 4 more balls.*

3. Use the information in Tally Chart below to draw a Bar Graph of the students' favorite fruits.
(Don't forget to label the axes!)

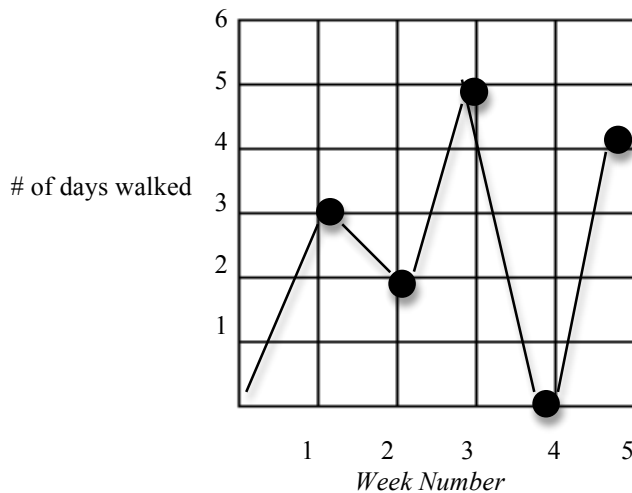
Favorite Fruit	
Grape	
Banana	
Apple	
Kiwi	



- (a) How many students like banana the most? *11 people like banana the most.*
- (b) Which fruit is the least popular? *Apples are the least popular.*
- (c) How many students are in the class? *There are 27 people in the class.*

4. Using the information in the chart, draw a Line Graph of the number of times Tim walked to school over the weeks. (*Don't forget to label the axes!*)

Week #	# of Days Walked
1	3
2	2
3	5
4	0
5	4



- (a) In which week did Tim walk the most often? *Tim walked most often in week 3.*
- (b) In which week did Tim walk the least often? Why do you think that this was the case?
He may have received a drive, he may have been ill etc.
- (c) How many times did Tim walk to school in the five weeks counted? *He walked to school 14 times.*

Demonstrate your superior knowledge of ‘statistics’ by filling in the spaces below to complete the sentences and answer the questions.

(a) In order to help readers understand the data, we can convert data to other forms, such as

charts, graphs and tables.

(b) Statistics is a branch of mathematics that provides you with methods of collecting

data, organizing data interpreting data.

(c) The method of collecting your own data is called a primary data collection method.

(d) To begin a stem and leaf plot, you set up a table.

Describe in your own words how to proceed from there.

The stems are derived from the greatest common place values; the leaves are found in the next most common place values.

(e) In a bar graph, the bars are the same width.

(f) What is the difference between a bar graph and a histogram? *The Y axis indicates the frequency that an item of data occurs. This is illustrated with bars that have no gaps left between.*

(e) A line graph involves connecting each point on the graph with a straight line.

(f) When drawing the sections in a circle graph, we must first calculate the degrees of

the circle that each sector must be.

I.e. 80% of the circle is 80% of $360^\circ = ????$

The calculation involved here is $0.80 \times 360^\circ = 288^\circ$

(g) We use scatter plots to find trends in the data.

When you reach the end of **Part A: SUMMARY**, complete **Part A: OFF COMPUTER EXERCISES**
Record your answers in your *notebook*.

PART A: OFF COMPUTER EXERCISES

1. Below are the speeds of the vehicles travelling on the Intercity Highway.

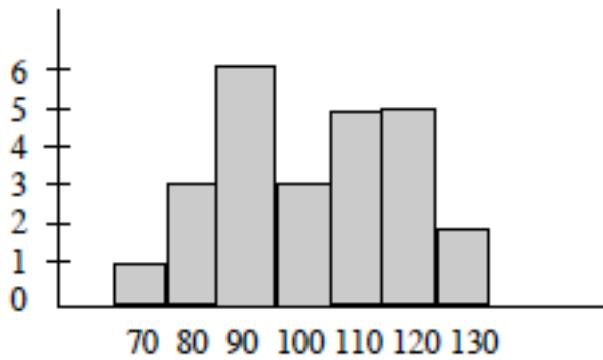
Note: the speeds are in kilometers per hour

95 82 85 108 83 95 120 111 90 110 116
 99 103 115 78 134 121 109 117 99 131 122
 99 123 127

(a) Place these results in a Stem and Leaf Plot.

<i>Stem</i>	<i>Leaf</i>
7	8
8	235
9	055999
10	389
11	01567
12	01237
13	14

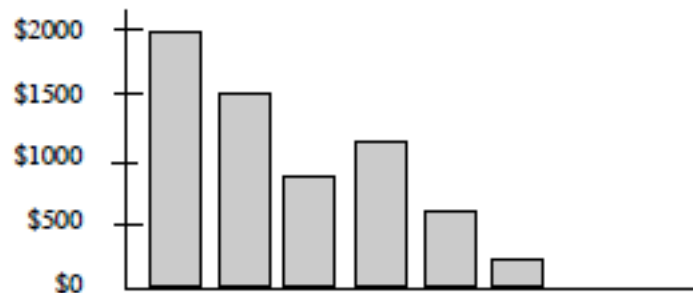
(b) Create a Histogram using the information given.



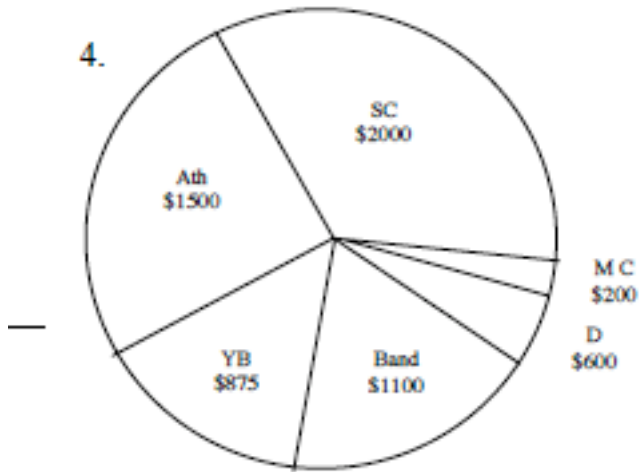
2. The following data represents the breakdown of the money in a school’s Student Activity Fund:

Student Council \$2000, Athletics \$1500, Yearbook \$875, Band \$1100, Dances \$600, Math Club\$200.

(a) Create a Bar Graph to present this information.



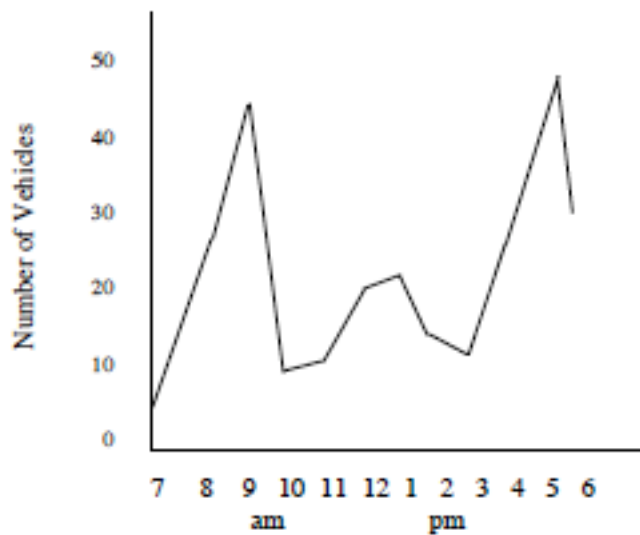
(b) Create a Circle Graph using the data given.



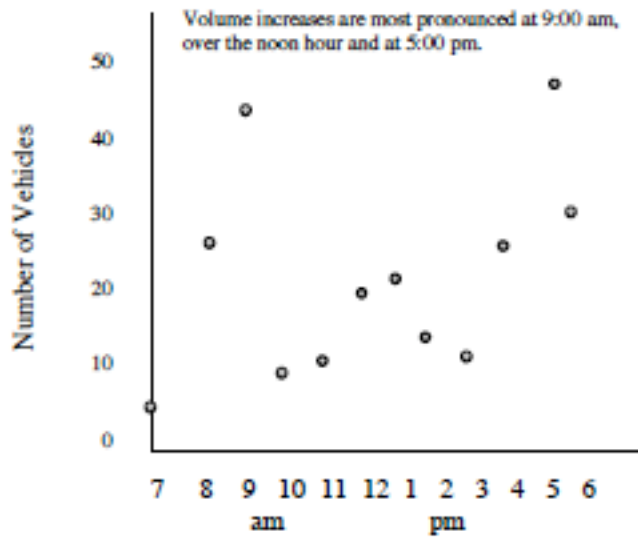
3. The number of vehicles passing through a particular intersection on a Tuesday is given below.

7:00am	– 5	11:00am – 9	3:00pm – 9
8:00am	– 25	12:00am – 18	4:00pm – 25
9:00am	– 45	1:00pm – 20	5:00pm – 48
10:00am	– 8	2:00pm – 12	6:00pm – 30

(a) Draw a Line Graph to show the data.



(b) Re-plot the data given as a Scatter Diagram. *What are the trends?*



Concept: Understanding Statistics

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PART B: COMPUTER COMPONENT

Instructions: Return to the program *Understanding Graphing* (Neufeld).
 Follow the instructions to the Main Menu.
 Select *Statistics* from the Main Menu.
 Use the *Jump To* Menu to select Measure of *Central Tendency*.



Work through all sections of the following topics in order:

- Measures of Central Tendency*
- Box & Whisker Plots*
- Misleading Statistics*



As you work through **PART B: COMPUTER COMPONENT**, make notes in your notebook/math journal.

When you reach the end of the section *Misleading Statistics*, leave the computer and move on to **PART B: SUMMARY** below.

PART B: SUMMARY

Demonstrate your superior knowledge by filling in the blanks below.

1. A Measure of Central Tendency is one number, which describes an entire sets of data.

*When we discuss the **average** of a set of data, we could be talking about a variety of things. One type of **average** may be better suited for a particular question than another. Often times, it is up to us to decide which **average** is most appropriate for answering certain questions.*

Different Types of “Average”:

- (a) To find the *mean*: Add all of the numbers in the set of data and divide by the number of data sources.
- (b) To find the *median*: Find the middle number in the set of data items.
- (c) To find the *mode*: Find the most frequent number in the data set.

2. To make a Box & Whisker Plot:

Step 1: Find the second quartile.

Step 2: Find the first or lower quartile.

Step 3: Find the third or upper quartile.

Step 4: Plot the data on a number line, marking each quartile with a straight vertical line.

Step 5: Mark any outliers with a star line.

Note: Outliers are values that are far away from the rest of the data.

Step 6: Whiskers (highest and lowest pieces of data, not including outliers) are represented by dots.

Step 7: Connect the quartiles by boxes.

Step 8: Connect the whiskers by lines that extend from the box to the dots that represent whiskers.

WHEN YOU REACH THE END OF **PART B: SUMMARY**, COMPLETE **PART B: OFF COMPUTER EXERCISES**. RECORD YOUR ANSWERS IN YOUR NOTEBOOK.

PART B: OFF COMPUTER EXERCISES

1. Jennie's bowling scores in a 5-pin tournament are given below.

156	145	168	170	202	245	170	145
182	198	203	196	157	175	210	

Find the following types of *“average”*:

- (a) Mean average – $2722 \div 15 = 181.5$ points.
- (b) Median average – 175 points
- (c) Mode average - 145 and 170 points appear twice in the data set.

2. Bryan plays on his school's junior basketball team. The table below shows the number of points Bryan scores in his district's 10-game regular season.

Game	Points
1	8
2	6
3	8
4	5
5	7
6	34
7	10
8	8
9	6
10	26

Can you explain why the mean average will not be a true representation of Bryan's usual performance?

The mean of 11.8 is not a true representation of Bryan's usual performance because he only really scores more than 10 twice in 10 performances.

3. Sarah had scores of 80, 75, 80 and 85 on her first four exams in Algebra.

(a) Find the mean, median and mode for the exam scores.

$$\text{Mean- } 320 \div 4 = 80$$

$$\text{Median- } 75, 80, 80, 85 = 80$$

Mode- 80 is the most common score.

(b) Which “average” would Sarah like her teacher to use in determining her mid-term grade?

Although all averages represent 80, I believe that Sarah would like for her teacher to select the mode to determine her mid-term grade.

(c) What score would Sarah have to achieve on a fifth examination in order to raise her mean score to 84? Is it reasonable to expect Sarah to achieve that score?

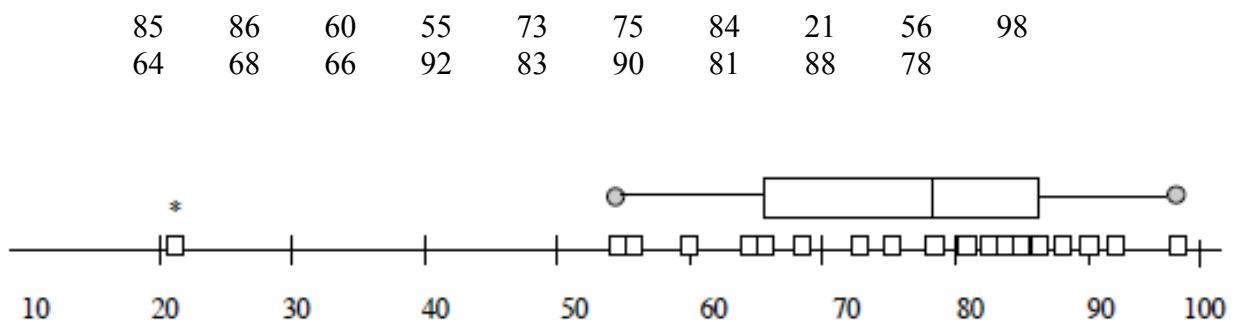
$$5 \times 84 = 420 - 320 = 100 \quad \therefore \text{ Sarah would need to achieve a score of 100 on her 5}^{\text{th}} \text{ examination.}$$

Sarah could potentially receive this score, as she has achieved quite high in the past. This side, trends suggest that it is unlikely.

4. The mean of a set of numbers is 5 and the median is 6. There are 8 numbers in all.

What might these numbers be? (answers will vary)

5. Draw a Box & Whisker Plot to present the following driving test scores.



6. Is it possible for the *mean* of a set of data to fall outside the box for its box-and-whisker plot? *Explain your response with an example.*
(answers will vary)

Instructions: Return to the program *Understanding Graphing* (Neufeld).
Follow the instructions to the Main Menu.
Select *Statistics* from the Main Menu.
Use the *Jump To* Menu to select *Practice Questions*.
Complete the questions given to you by the computer.
Record 1 set of 6 questions and their corresponding solutions in your notebook.

Be prepared to hand in this completed booklet to your teacher.