Important Concepts . . .

Preview Review

Mathematics Grade 6 TEACHER KEY

W3 - Lesson 3: Collecting and Analyzing Data

V5-07

Important Concepts of Grade 6 Mathematics

Materials Required: A textbook is not needed. This is a stand-alone course.

Mathematics Grade 6
Version 5
Preview/Review W3 - Lesson 3 TEACHER KEY

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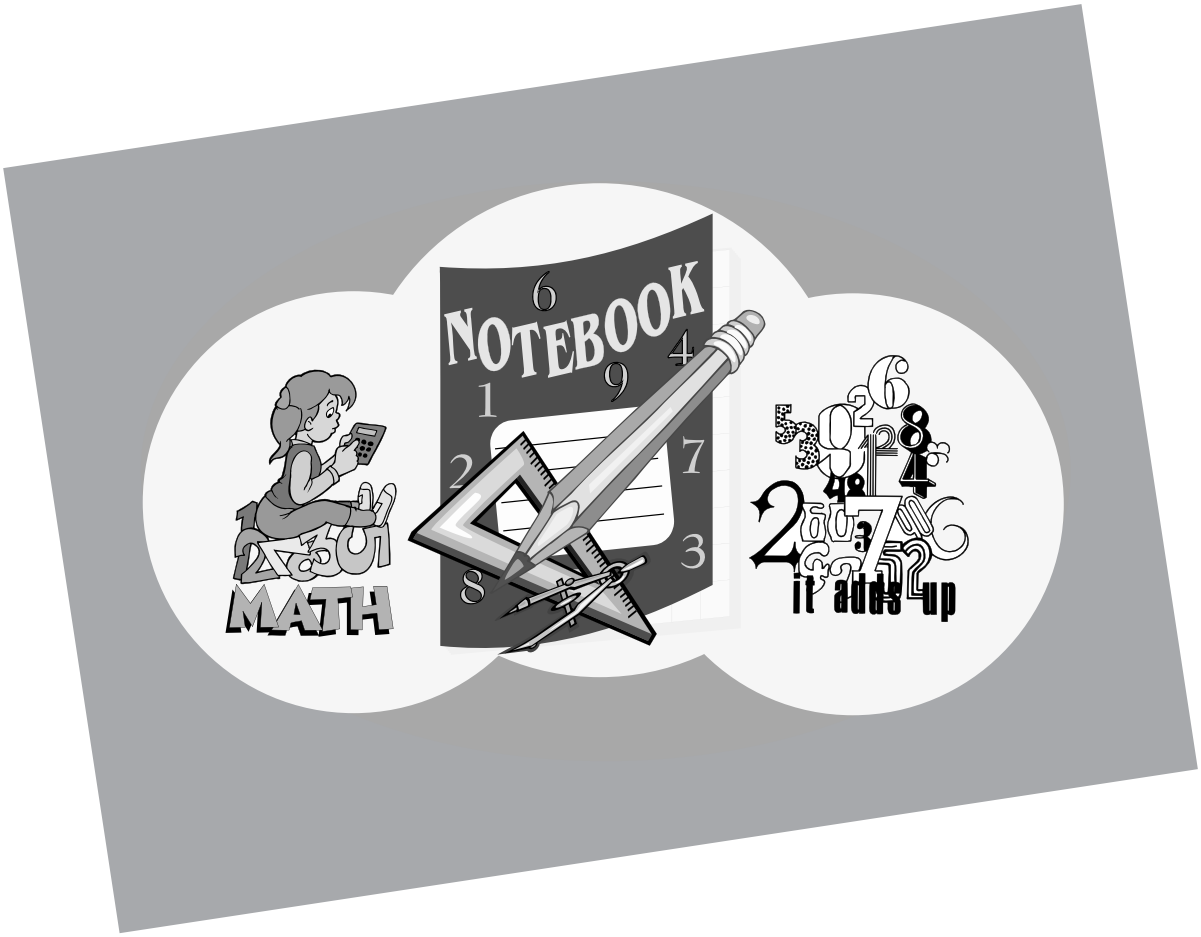
Preview/Review Concepts for Grade Six Mathematics

TEACHER KEY



W3 - Lesson 3: Collecting and Analyzing Data

OBJECTIVES

By the end of this lesson, you should

- understand the importance of organizing data
- understand median, mean, and mode
- organize data using scatter plots, line plots, and stem and leaf plots

GLOSSARY

data - factual information in numerical form

mean - the average of a set of values

median - the value that is mid-point of all values in a set of data

mode - the most frequently occurring value in a set of data

random sample - a sample in which each item has an equal chance of being chosen

range - the distance between the lowest value and the highest value

W3 - Lesson 3: Collecting and Analyzing Data

Welcome to W3 - Lesson 3! The world seems full of data. Data is just information such as the number of students in a grade, the number of M&Ms in a package, the number of bluebirds seen on a journey to the mountains, the number of crows in your town, and so on. People are always collecting information, and the number of anything seems important to someone. This lesson looks at ways to organize data. You will review some key terms about data, and you will show data and relationships in scatter plots, line plots, and stem and leaf plots.

Scatter Plots and Line Plots

Factual information usually written in numerical form is **data**.
An example of a set of data is a set of Math marks: 88%, 62%, 88%, 70%, 79%, and 81%.

A **random sample** is one in which everyone has an equal chance of being chosen.

In a set of data, the **range** is the distance between the lowest value and the highest value.

The range in the above Math marks is 88 – 62 = 26.

The **median** is the value that is in the mid-point of all the values in a set of data.

When the above Math marks are put in ascending order of 62%, 70%, 79%, 81%, 88%, and 88%, the midpoint is between 79% and 81%. Therefore, the median is 80%.

The **mean** is the average value of a set of data. To find the mean of a set of numbers you need to do two things. First, find the sum of all the numbers. Second, divide the sum by the number of values in the set. The mean or average given is the "middle" value of a set of numbers.

a. Find the sum of the above set of Math marks:

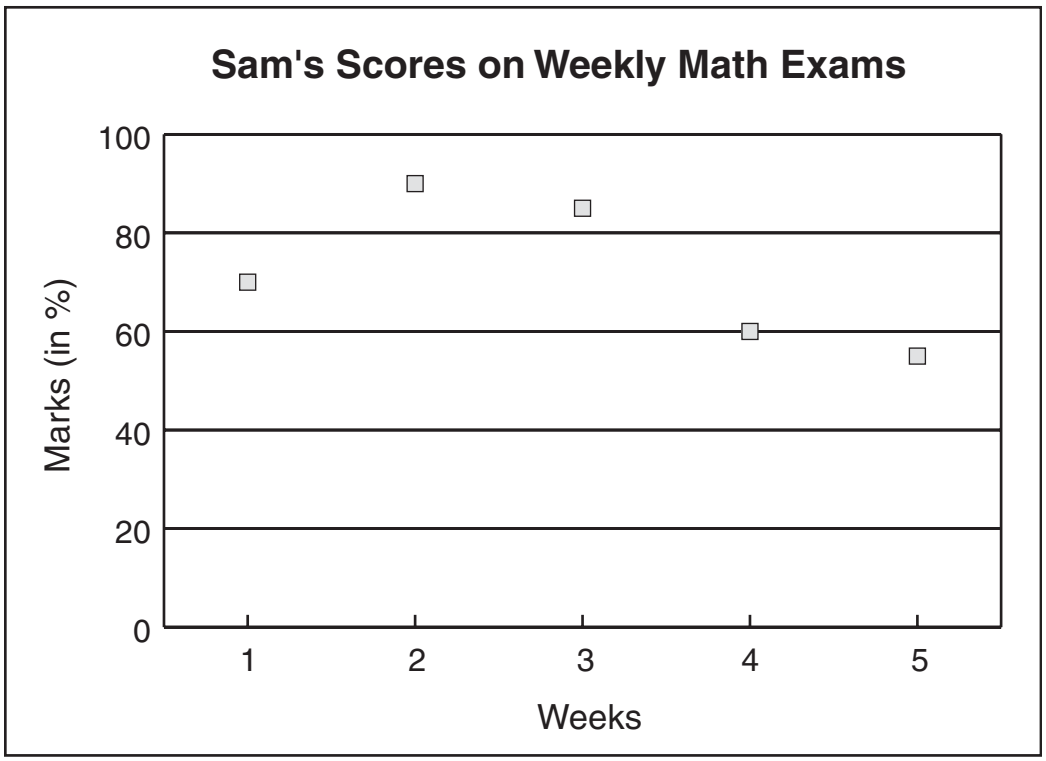
62 + 70 + 79 + 81 + 88 + 88 = 468.

b. There are six values in this set. Therefore, divide 468 by 6 and the answer is 78. Therefore, the mean is 78%.

The **mode** is the most frequently occurring value in a set of data. The mode in the above Math marks is 88% because 88% appears more than any other number.

A **scatter plot** is a group of values plotted on a graph.

Sam's marks over 5 weeks are 70%, 90%, 85%, 60%, and 55%.

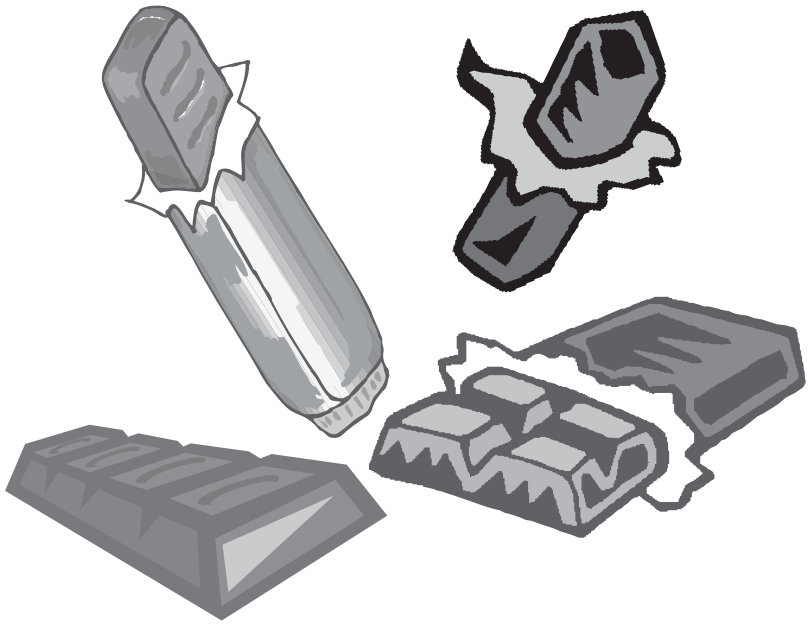


A **line plot** is a group of values plotted on a line. The line plot below shows how twelve bags with varying numbers of chocolate bars in them are plotted. No bags are empty. One bag has 1 bar, four bags have 2 bars each, two bags have 3 bars each, four bags have 4 bars each, and one bag has 5 bars.

The Number of Chocolate Bars in Each Bag

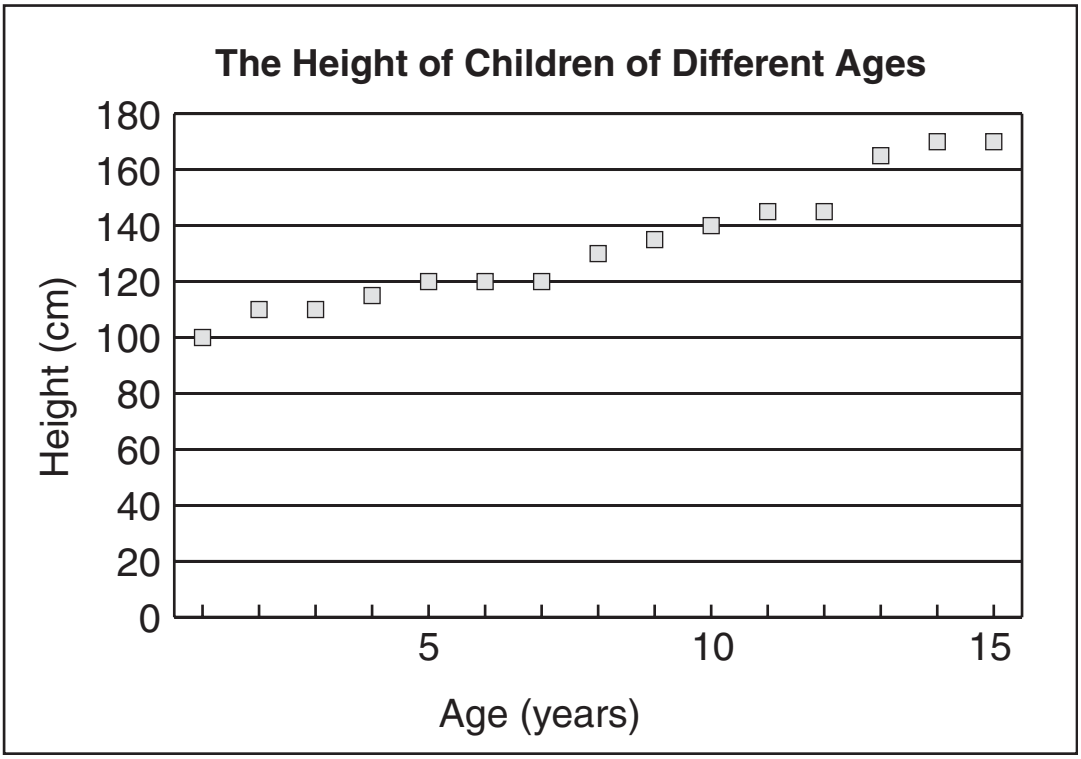
		X		X			
		X		X			
		X	X	X			
	X	X	X	X	X		
0	1	2	3	4	5	6	7

Number of Bars



Questions

1. Use this scatter plot to answer the questions below. All the values in this set of data end in 0 or 5. For example, the first 5 values are 100, 110, 110, 115, and 120.



a. What is the title of the scatter plot?

The Height of Children of Different Ages

b. What is the heading of the vertical axis?

Height (cm)

c. What is the heading of the horizontal axis?

Age (years)

d. How many children are included in this survey?

15 children

e. What is the height range of this set of data?

100 cm to 170 cm = 70 cm (Approximately)

f. What is the median of this set of data?

135 cm

g. What is the mode of this set of data?

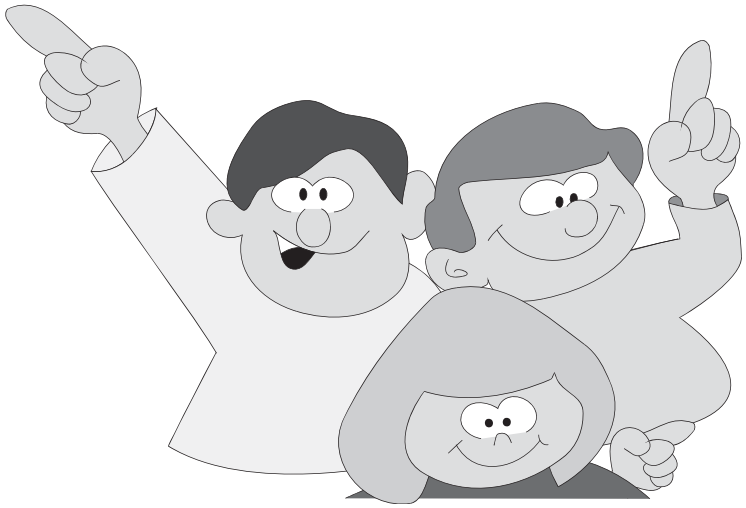
120 cm

h. What is the mean of this set of data? (Find the sum of the set of data, and then divide by 15.)

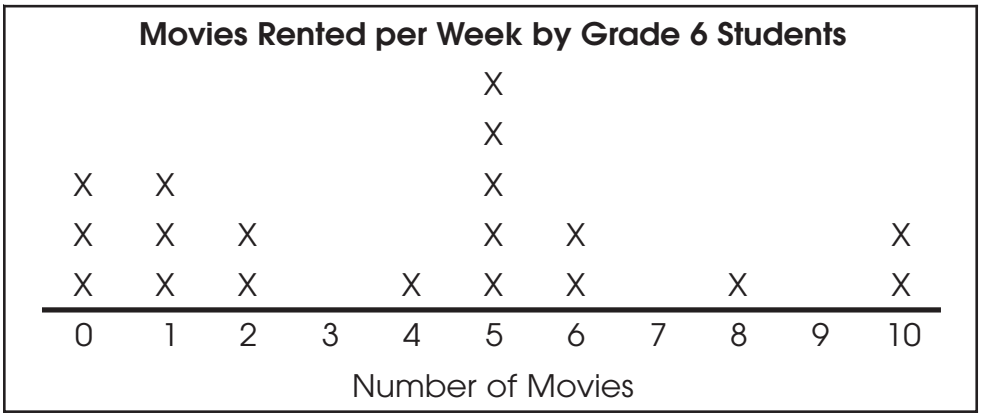
100 + 110 + 110 + 115 + 120 + 120 +120 + 130 + 135 + 140 +

145 + 145 +165 + 170 + 170 = 1995 ÷ 15 = 133 cm

$$\textbf{Mean} = \frac{1995}{15} = 133 \text{ cm}$$



2. Use this line plot to answer the questions below.



a. What is the title of the line plot?

Movies Rented per Week by Grade 6 Students

b. How many students are in the survey?

19 Students

c. What is the range of this set of data?

0 to 10 movies rented per week = 10

d. What is the median of this set of data?

5 movies per week

e. What is the mode of this set of data?

5 movies per week

f. What is the mean of this set of data?

4 movies per week is the mean

Stem and Leaf Plots

Another method of organizing a large set of data is by using a **stem and leaf plot**.

> The heights jumped by students in a high jump competition were 130 cm, 150 cm, 146 cm, 128 cm, 130 cm, 142 cm, 138 cm, and 164 cm.

The **stem** is the first 2 digits of the number.

The **leaf** is the last digit of the number.

These are graphed as follows

Stem	Leaf
12	8
13	0, 0, 8
14	2, 6
15	0
16	4

The **range** is the difference between highest and lowest: 164 – 128 = 36

The **median** is the midpoint in the list. In this case, that is the point between the first four and the last four numbers.

128, 130, 130, 138, ____, 142, 146, 150, 164

The MEDIAN is 140.

The **mode** is the most common number. In this case the mode is 130 because that number appears two times and all others appear once.

The **mean** is the average of the scores.

128 + 130 + 130 + 138 + 142 + 146 + 150 + 164 = 1 128

$1128 \div 8 = 141$

The mean is 141 cm.

Questions

1. Draw a stem and leaf plot to organize the following set of data concerning height of students in a Grade 6 class. Use your stem and leaf plot to answer the questions below.

Height of Students (in cm)

150	142	137	152	149	144	147	154	130	144	
145	147	158	139	140	131	153	141	147	150	145

Stem	Leaf
13	7, 0, 9, 1
14	9, 4, 7, 4, 5, 7, 0, 1, 7, 5, 2
15	0, 2, 4, 8, 3, 0

a. What is the range of this set of data?

158 - 130 = 28 cm

b. What is the mode of this set of data?

147 cm

c. What is the median of this set of data?

145 cm

d. What is the mean of this set of data?

3045 ÷ 21 = 145 cm

2. Draw a stem and leaf plot to organize the following set of data consisting of student math marks. Use your stem and leaf plot to answer the questions below.

Student Math Marks (in %)

97	81	62	90	76	83	52	69	95	54	88	71	88	74
81	83	71	70	69	73	75	65	81	82	66	67	93	86

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

a. What is the range of this set of data?

97 - 52 = 45 marks or 45 %

b. What is the mode of this set of data?

81 %

c. What is the median of this set of data?

Between 75 % and 76 % = 75.5 %

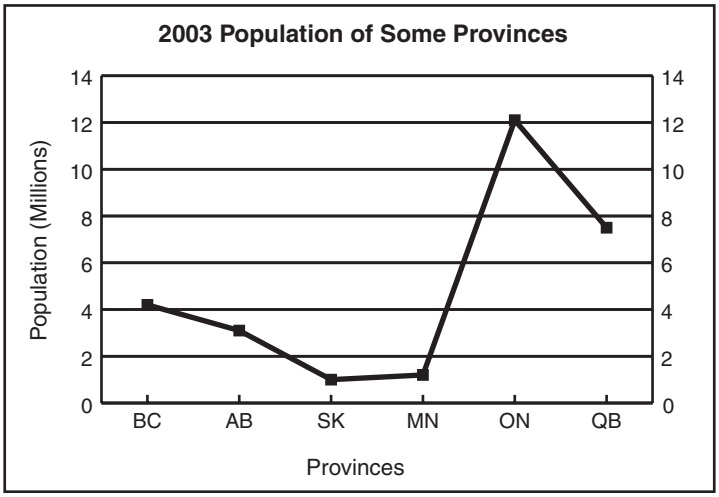
d. What is the mean of this set of data?

2142 ÷ 28 = 76.5%

Getting Information from Graphs and Charts

1. Use the chart and graph to answer the questions below.

Population of Provinces (in millions)	
British Columbia	4.2
Alberta	3.1
Saskatchewan	1
Manitoba	1.2
Ontario	12.1
Quebec	7.5



a. What is the range of this set of data?

12.1 - 1 = 11.1 million people

b. What is the median of this set of data?

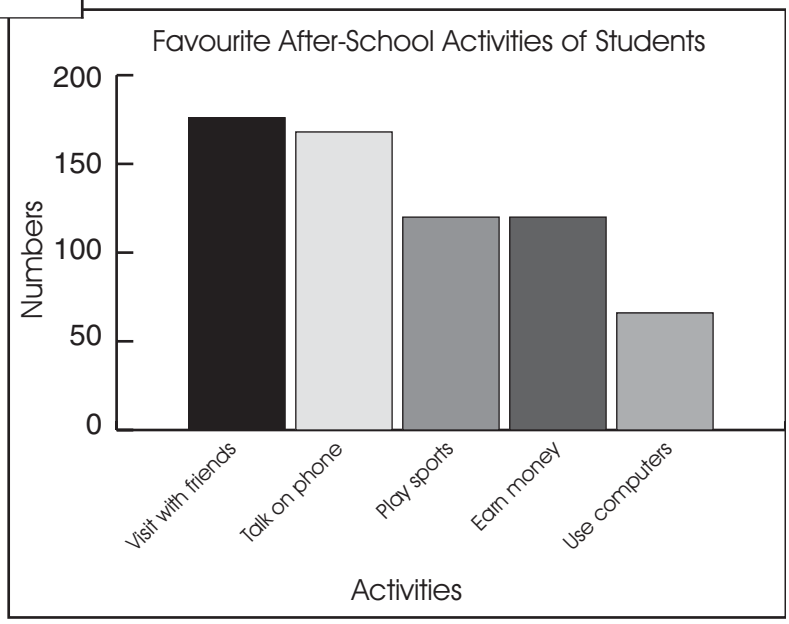
1 , 1.2 , 3.1 , 4.2 , 7.5 , 12.1 so 4.2 + 3.1 = 7.4 ÷ 2 = 3.65 million

c. What is the mean of this set of data?

29.1 million ÷ 6 = 4.85 million

2. Use the chart and graph to answer the questions below.

Favourite After-School Activities of Students	
Activities	**Number of Students**
Visit with friends	176
Talk on phone	168
Play sports	120
Earn money	120
Use computers	66



a. What is the range of this set of data?

176 - 66 = 110 students

b. What is the mode of this set of data?

120 students

c. What is the median of this set of data?

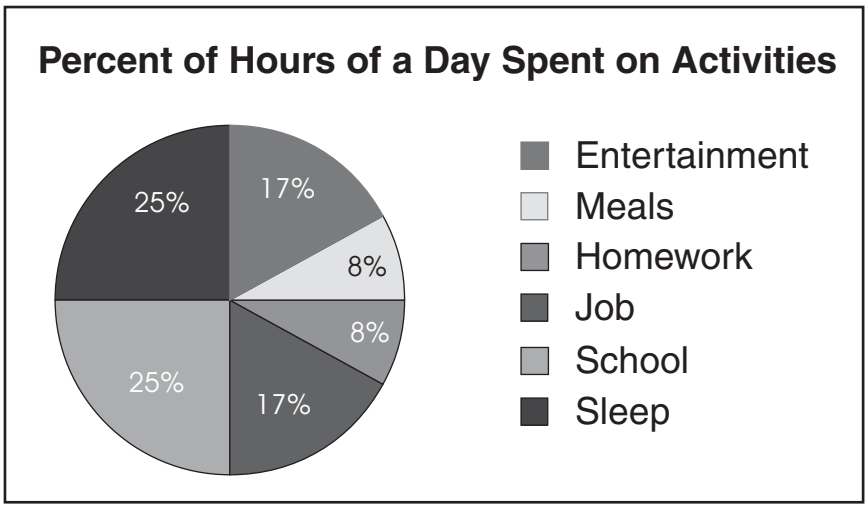
Between 120 - 168 -144

d. What is the mean of this set of data?

650 ÷ 5 = 130 students

3. Use the chart and graph to answer the questions below.

Activities	Number of Minutes
Sleep	250
School	250
Job	170
Homework	80
Meals	80
Entertainment	170



a. What is the range of this set of data?

250 - 80 = 170 minutes

b. What is the median of this set of data?

170 minutes

c. What is the mean of this set of data?

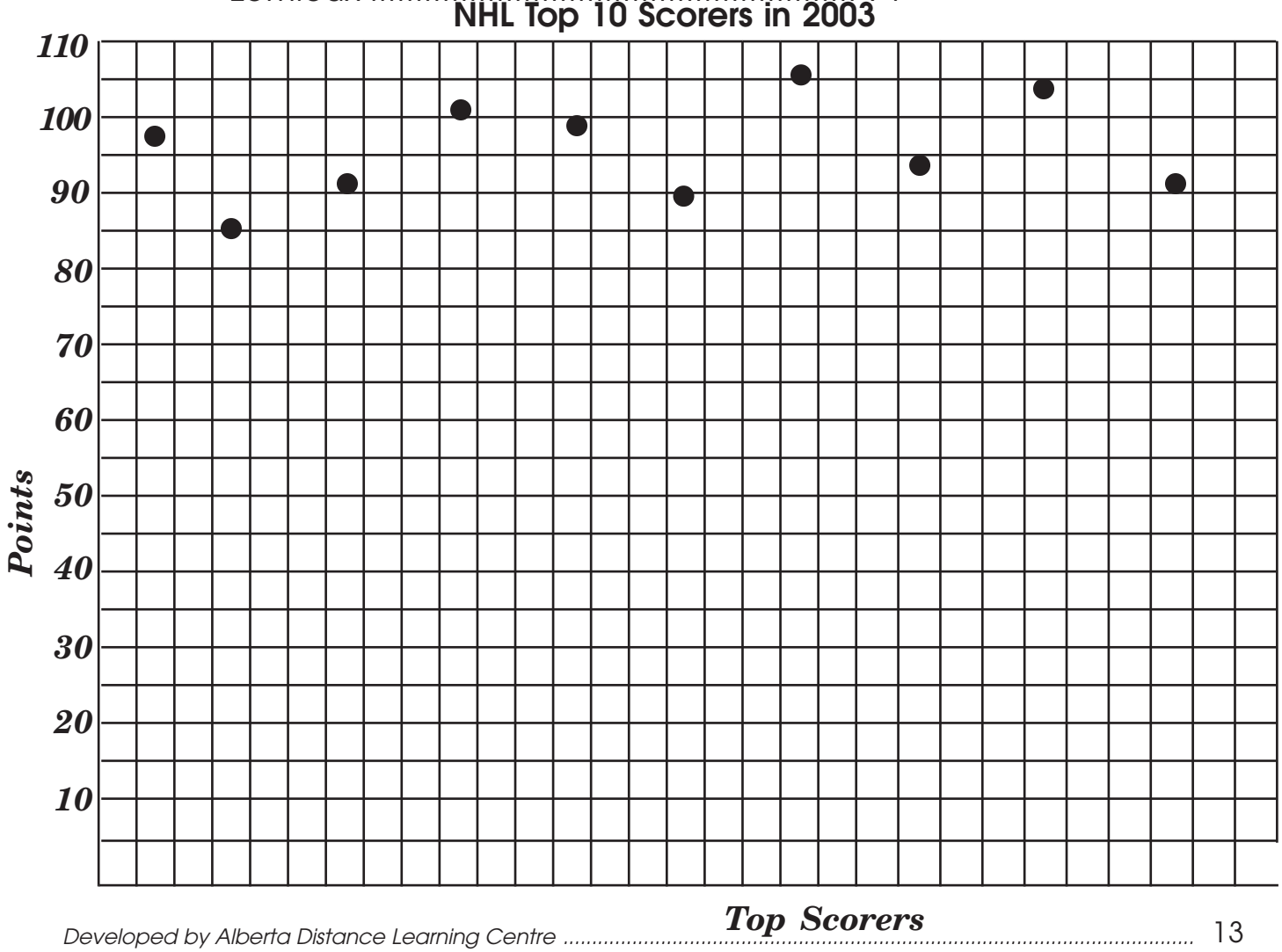
1000 ÷ 6 = 167 minutes

Homework Assignment

1. Draw a scatter plot showing the information in the chart below. Your title will be NHL Top 10 Scorers in 2003. You do NOT have to put the name of the players on your scatter plot.

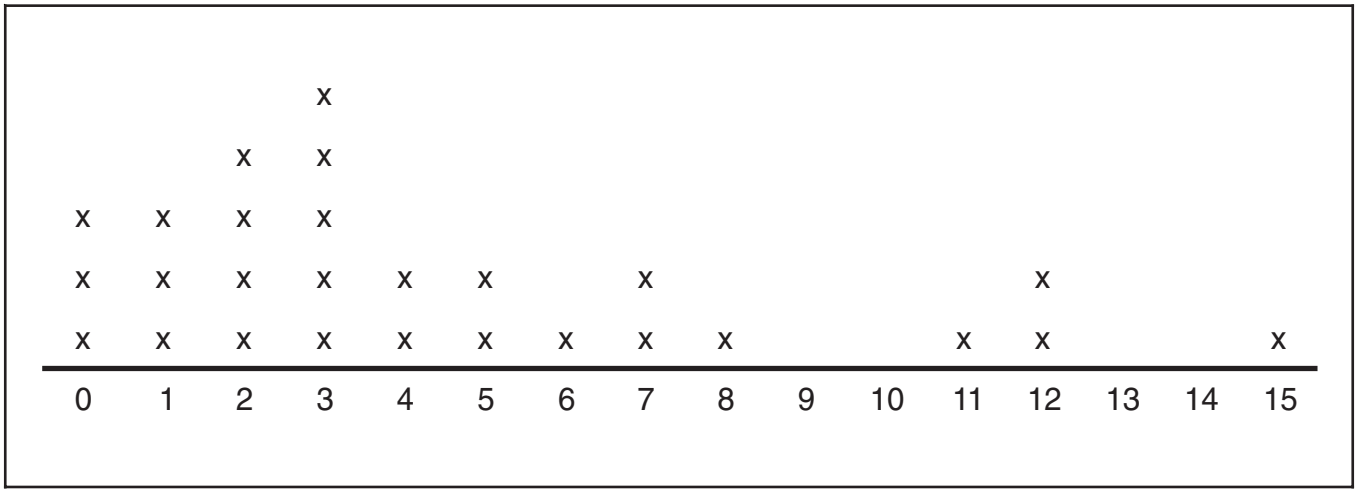
Name	Points
Bertuzzi	97
Palfy	85
Murray	92
Thornton	101
Hejduk	98
Heatley	89
Forsberg	106
Demitra	93
Naslund	104
LeMieux	91

Check for accuracy

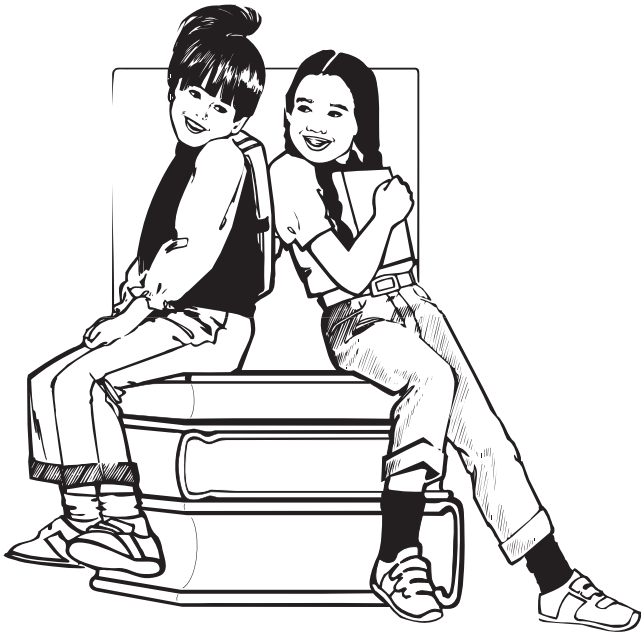


2. Draw a line plot showing the following data (Title: The Number of Times Students Eat at a Fast Food Outlet in a Month)

5	2	1	3	2	5	11	0	1	3	2	0	1	15
6	2	3	7	12	0	7	3	3	4	4	8	12	



Check for accuracy



3. Use the stem and leaf plot to answer the questions below. The numbers are the marks on a final Social Studies exam.

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

a. How many students wrote the exam?

27 Students

b. What is the range in this set of data?

98 - 45 = 53

c. What is the median of this set of data?

78

d. What is the mode of this set of data?

77

e. What is the mean of this set of data?

1890 ÷ 27 = 70

Self-Evaluation

Ask yourself some important questions. Write your answers in sentences for your teacher.

1. In this lesson, what part of your work was **excellent**?

2. In this lesson, what part of your work **needs improvement**?

3. If you want help for some of the work in this lesson, ask your teacher in this space.