

Knowledge	Thinking	Application	Communication
18%	11%	42%	29%

## MPM 1D Chapter 2 - DATA MANAGEMENT PROJECT

*-Jensen-*

42

Your task is to complete the following 3 objectives in order to display a thorough understanding of how to gather, organize and interpret data as described in the relations curriculum expectations. You will work individually for this project. All material must be your own intellectual property, except for the secondary data that I will provide you with.

Your project must have a title page. Your final submission must be well organized and all questions must be numbered. The graphs can be drawn neatly on graph paper, or they can be produced using a computer software.

Your graphs must have an:

- underlined title
- labeled axes (with units)
- proper scale

### **Objective 1: Collect, plot and analyze primary data [17]**

You are to create a survey that shows a correlation. The survey can be based on any topic. You are to follow these steps:

Questions 1 through 5 will be done in a group. However, each individual is responsible for recording the information in their final report.

- 1) Make a hypothesis. (ie. Your height increases with age) [1T]
- 2) Define the independent variable (age) [1K]
- 3) Define the dependent variable (height) [1K]
- 4) Gather the data in an organized chart. [2C]
- 5) Graph the data using a scatter plot. Choose an appropriate scale and title the axes. [3C]
- 6) Comment about the correlation (strong, weak, positive, negative) and draw a line or curve of best fit. If there is no correlation, explain why this may be. [3A]
- 7) Use your line or curve of best to make an estimation. Clearly identify this on your graph and state whether your estimation was an interpolation or extrapolation. [3A]
- 8) Discuss any bias or outliers within your data. [1K]
- 9) If you wanted to get a larger sample of data from students at King's, how could you use a random sampling method (systematic random or stratified random) to do so? Explain in detail how you could do so. [2T]

## Objective 2: Analyzing Secondary Data [12]

1) Using the data collected from statistics Canada below, you are to create **two** scatter plots on **one graph** and draw a **line** of best fit, or a **curve** of best fit for each set of data: [6C]

Scatter plot 1: Life expectancy for Males vs Year

Scatter plot 2: Life expectancy for Females vs Year (use a different colour for this data)

Use a legend to clearly identify which data points belong to which gender.

Year	Male Life Expectancy	Female Life Expectancy
1921	59	61
1931	60	62
1941	63	66
1951	66	71
1961	68	74
1971	69	76
1981	72	79
1991	75	81
2001	77	82
2011	79	84

2) In one paragraph, describe the correlation of age and year. Does it differ between males and females? [2C]

3) Use your line or curve of best fit to estimate the life expectancy of females in the year 1988. Make sure to mark this estimation on your graph. Is this estimate an interpolation or extrapolation? [2A]

4) Use your line or curve of best fit to estimate the life expectancy of males and females in the year 2021. Make sure to mark this estimation on your graph. Is this estimate an interpolation or extrapolation? [2A]

### Objective 3 Part a): Learning about Mean, Median and Mode

The following section is a lesson on mean, median and mode. You do not have to do any work. Simply read through the following examples. The percentage marks for a test are shown below:

53	77	59	53	39	49
60	71	30	54	83	88
74	82	59	21	16	33
36	46	91	25	66	

There are three common statistics which provide us with valuable information about how the class is progressing.

**Mean:** The mean is the mathematical name for the average. To find the mean of the above data we would add all of the marks together and then divide by the number of marks.

**Median:** The median is the middle number when the data is listed in order from lowest to highest.

**Mode:** The mode is the value that occurs most often. Sometimes there is more than one mode and sometimes there is no mode.

**Example 1:** Calculate the mean, median, and mode for the above test marks

**STEP 1:** Put the marks in order from lowest to highest

16	33	49	59	71	83
21	36	53	59	74	88
25	39	53	60	77	91
30	46	54	66	82	

**STEP 2:** Find the sum of all of the marks  
Sum = 1265

**STEP 3:** Calculate the mean

$$\text{Mean} = \frac{\text{sum}}{\text{number of marks}} = \frac{1265}{23} = 55$$

**STEP 4:** Find the median (this is the middle number when the marks are ordered from lowest to highest)  
Median = 54

**Note:** If the total number of marks were even (say 24), we would have to take the average of the middle two marks (ie. the 12<sup>th</sup> and 13<sup>th</sup> mark)

**Note:** The location of the median mark can be determined using the formula  $\frac{n+1}{2}$  where  $n$  represents the number of data values.

**STEP 5:** Find the mode  
Mode = 53 and 59 because both of these marks appear twice (more than any other mark)

### **Objective 3 Part b): Learning about Mean, Median and Mode [13]**

Make sure to show all of your work in an organized solution for each of the following questions.

- 1) Define Mean [1K]
- 2) Define Median [1K]
- 3) Define Mode [1K]
- 4) What is the first step you take to find the median of a group of numbers? [1K]
- 5) Is it necessary to put the data in order when finding the mean? [1K]
- 6) The batting averages of the Ninesville Peewees were 0.263, 0.309, 0.350, 0.207, 0.256, 0.278, 0.378, 0.283, 0.274, and 0.229. Find the following:
  - a) The median batting average. [1A]
  - b) The mean of the batting averages. [1A]
- 7) The classified section had used cars advertised at \$3500, \$2460, \$3150, \$4800, \$6400, \$3700, \$2950, \$3390, \$4300, \$7600, \$5190, and \$4320. Find the mean and median cost of these used cars. [2A]
- 8) A teacher recorded quiz marks for students in the following table:

Mark (Out Of 10)	Number Of Students
0	1
1	3
2	4
3	3
4	2
5	9
6	5
7	12
8	8
9	6
10	3
<b>Total</b>	<b>56</b>

- a) State the mode for the set of data shown. [1A]
- b) Find the mean mark. [1A]

- 9) The following table shows last week's daily temperatures for St. Catharines, Ontario. If the average weekly temperature was 11 °C, what was the temperature on Wednesday? [2T]

Day	Temperature °C
Monday	11
Tuesday	13
Wednesday	?
Thursday	10
Friday	10
Saturday	8
Sunday	10