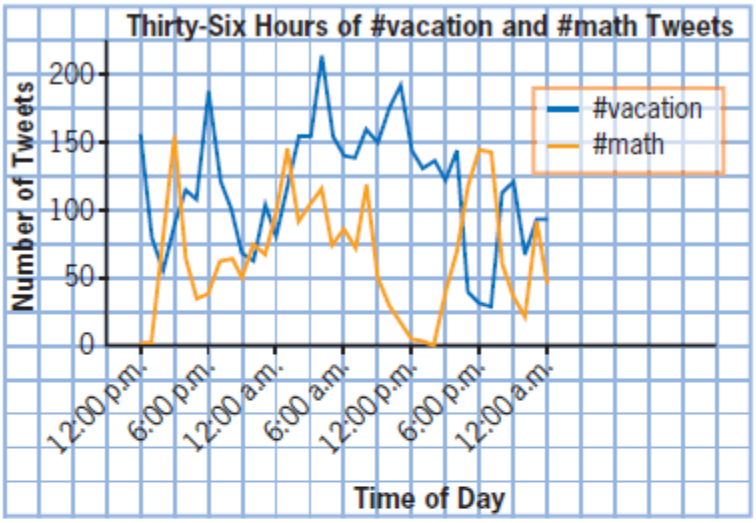
# Northview Collegiate

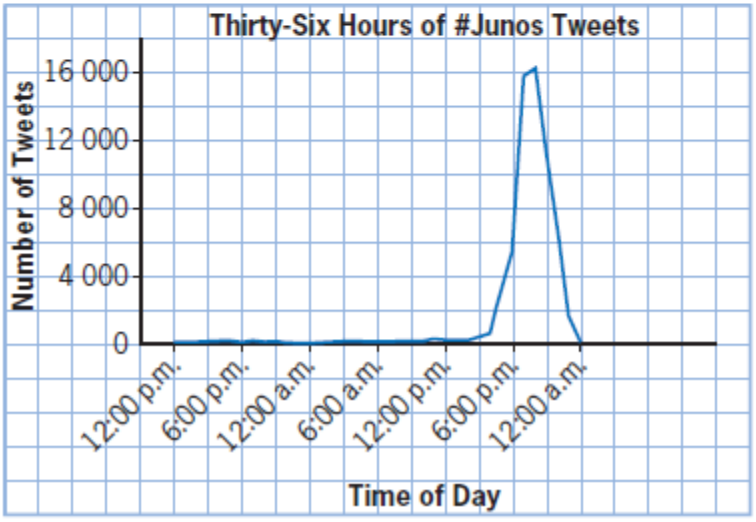
**Unit 3 Test Review** **Name:**

**Course Code: MDM4U** **Date:**

**1.**

The graphs show the number of tweets at various times of day that contain the hashtags #vacation, #math, and #Junos.



a) What do these graphs tell you about the frequency of tweets with each type of hashtag?

b) What do the data seem to indicate about #math and #vacation as Twitter topics?

c) The Juno Awards is the Canadian music industry's yearly award show. When do you think the show was broadcast?

d) Could these graphs be compared to each other as they are? Explain why or why not.

2.

In each case, identify the type of sample.

a) You want to find out if your town is in favour of starting a composting pickup service. You ask everyone on your street.

b) A university is polling its students. It selects 200 students at random in the same proportions as the enrollment in each department.

c) There are 139 swim clubs in Ontario. Swim Ontario conducts a survey to vote on its new logo. The organization randomly selects 10 swim clubs and surveys every member in each of those clubs.

d) A coach puts the names of all the basketball players into a hat and draws one name for a free basketball.

e) A questionnaire is sent to every ninth person on an alphabetical list of a store's credit card customers. The first person chosen from the list is picked randomly.

f) The student council invites all students to provide ideas for activities.

g) A marketing firm wants to collect information on certain products in a city of 800 000 people. The researchers randomly select 10 neighbourhoods. In each neighbourhood they randomly select five streets, and on each street they randomly select 10 households.

3.

What is the difference between a population and a sample? Use examples to explain.

4.

Describe how each pair of sampling methods are similar and different. Provide examples to support your answers.

**a)** multistage versus stratified

**b)** convenience versus voluntary

5.

A car dealership conducts a phone survey to determine customer satisfaction. The dealership will like to use a stratified sample based on the type of vehicle purchased.

| Type of Vehicle | Number of Customers |
|---|---|
| SUV/truck | 858 |
| Minivan | 1213 |
| Midsize car | 478 |
| Economy car | 987 |
| Sports car | 221 |

**a)** What is the population?

**b)** If the dealership wishes to conduct 250 surveys, how many calls should it make for each type of vehicle?

**c)** Why would the dealership choose to do a phone survey rather than mailing a survey to each customer?

**d)** What else can be done to ensure the survey results represent the population?

6.

Use the data to describe three sampling methods you could use to conduct a survey.

| Grade 9 | | Grade 10 | | Grade 11 | | Grade 12 | |
|---|---|---|---|---|---|---|---|
| Girls | Boys | Girls | Boys | Girls | Boys | Girls | Boys |
| 78 | 91 | 102 | 95 | 91 | 95 | 68 | 62 |
| Classes | | Classes | | Classes | | Classes | |
| 7 | | 8 | | 7 | | 7 | |

7.

A researcher interviews people as they leave the gym and finds that they get fewer colds compared to people who do not go to the gym.

**a)** Why is this an observational study?

**b)** What could be done to turn this into an experimental study?

8.

A botanist is studying the effects of acidity on rate of growth. She grows one group of plants using water with neutral pH. She grows each other group using water with increasingly acidic pH levels.

**a)** Which are the control and which are the experimental groups?

**b)** Why do you think groups of plants were used rather than one single plant for each pH level?

9.

In each case, identify the problem with the question and rewrite it so that it is more appropriate.

**a)** What is your favourite game system?

■ Xbox ■ PlayStation® ■ Wii™

**b)** Running a business is hard. Leadership training will help your business run smoother.

■ Agree fully ■ Somewhat agree ■ Agree a little

**c)** How important do you think speed and quality of service are?

■ Very important ■ Important ■ Modestly important
■ Of little importance ■ Unimportant

10.

In each of the following cases, determine whether the data are primary or secondary.

**a)** Your town sends a survey to each household and collects the data.

**b)** After collecting the survey from part a), your town publishes the average number of people per house on each street.

**c)** The newspaper reports the salary of every city council member.

**d)** A magazine lists the total number of home sales each month for the last year.

**e)**

| Person ID # | Age | Job | Hours Worked |
|---|---|---|---|
| 345 | 24 | Shipper | 38 |
| 231 | 38 | Custodian | 42 |
| 124 | 29 | Mail clerk | 40 |

f)

| Grade | Percent of Students Who Take the Bus to School | |
|---|---|---|
| | Male | Female |
| 9 | 78 | 82 |
| 10 | 85 | 80 |
| 11 | 74 | 81 |
| 12 | 65 | 64 |

11.

Identify the type of bias that may occur in the following situations.

**a)** A survey question asks, "How many words per minute can you read?"

**b)** A survey is sent to parents of school-age children that asks whether bus safety lanes should be installed.

**c)** A phone company surveys its customers via text message about which services people like the best.

**d)** A survey asks, "Now that the city is in debt, do you think the current mayor will win the next election?"

12.

Before heading on vacation to Mexico, you observe the actual high temperatures for seven days. The table shows the temperatures.

| Day | Temperature (°C) |
|---|---|
| 1 | 27 |
| 2 | 29 |
| 3 | 32 |
| 4 | 29 |
| 5 | 45 |
| 6 | 29 |
| 7 | 31 |

**a)** Determine the mean, median, and mode of the temperatures.

**b)** The weather report predicts that based on the previous seven-day forecast, the temperature on the day of your arrival should be 36 °C. Use the measures of central tendency in part a) to determine whether the weather report is accurate.

**c)** Is there an outlier in the data? How does it affect the measures of central tendency?

**d)** Which measure of central tendency would best represent the temperatures in this Mexican location? Explain.

13.

The mean playing times per game for the 22 hockey players on a team are given.

16.4, 18.3, 21.7, 18.5, 9.2, 17.9, 12.0, 15.2, 23.4, 20.5, 16.7, 13.4, 8.3, 17.9, 22.6, 18.1, 21.7, 14.6, 13.8, 24.3, 12.4, 17.4

**a)** Determine the 40th and 95th percentiles.

**b)** Determine the percentile rank of the player who averaged

**i)** 9.2 min per game

**ii)** 21.7 min per game

**iii)** 18.1 min per game

14.

A summer camp activity involves measuring the distance travelled by 50 turtles in 15 min. The table shows the results.

| Distance (m) | Frequency |
|---|---|
| 0–5 | 1 |
| 5–10 | 0 |
| 10–15 | 6 |
| 15–20 | 12 |
| 20–25 | 15 |
| 25–30 | 5 |
| 30–35 | 7 |
| 35–40 | 1 |
| 40–45 | 3 |

**a)** Determine the median, range, first and third quartiles, and interquartile range. Make a box and whisker plot of the data.

**b)** Describe the data in each zone of the plot.

**c)** Identify any outliers, if they exist.