

Worksheet 2-4: Interpreting Probability

Probability is closely related to statistics. People use statistics to make predictions about future events. Statistics involve gathering data from real-life events in order to make predictions about future events. Probability experiments involve simulating real-life events and using the results to make predictions.

1. Favourite Music

A local radio station surveyed 200 students from one high school to determine their favourite music. The results are shown in the table.

Music	Percent of Students
Rock	45
Rap	35
Country	20

(a) Express each percent as a decimal, and as a fraction in lowest terms.

(i) Rock

(ii) Rap

(iii) Country

(b) If there are 4000 high school students in the city, how many of them would you expect to like rock? rap? country?

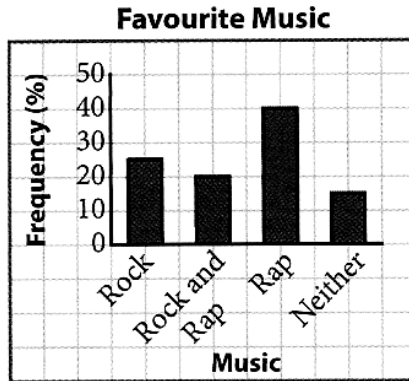
(i) Rock

(ii) Rap

(iii) Country

(c) Is it possible that the poll might not be accurate? What factors could have influenced the responses?

2. All students in a high school were asked if they like rock, rap, both rock and rap, or neither. The results are displayed on the graph.



A student from this same high school was chosen as the winner of a contest. Determine the probability that this student likes:

- (a) rock but not rap
 (b) either rock or rap, but not both
 (c) rock or rap or both
 (d) rap but not rock

3. A high school's girl's volleyball team has the following record: 7 wins, 4 losses, and 2 ties. A win is worth three points, a loss is worth zero points, and a tie is worth one point.

- (a) How many points does the team have after 13 games?



- (b) Predict how many points the volleyball team will have if the regular season has 20 games.

4. After half a season, a major league baseball player has a 0.300 batting average. Batting average is calculated as number of hits over number of official at bats.
- (a) If this player gets to bat 40 times in the next 10 games, how many hits would you expect him to get? For simplicity, assume he either gets a hit or makes an out.



- (b) Is it possible that your prediction in part (a) is not accurate? Explain.

5. A study by Health Canada has shown that, by age 14, one in four teenagers have tried smoking. Of those who try smoking, 36% become smokers.

- (a) What is the probability that a person has not tried smoking by age 14?

- (b) What percent of people who have tried smoking do not become smokers?

- (c) What percent of people who have tried smoking by age 14, but not become smokers?

- (d) How many Canadians do you estimate have tried or will try smoking by age 14, and become smokers? Assume the Canadian population is approximately 33 million people.

6. Canadian researchers have found that the number of women with multiple sclerosis (MS) has risen compared to the number of men who have the disease. For those born in 1930s, there were 1.9 females with MS for every male. However, for those born in the 1980s, there were now 3.2 women who have MS for every man who has it.

(a) For Canadians born in the 1930s, what percent of those who have MS are female?

(b) For Canadians born in the 1980s, what percent of those who have MS are female?

(c) Divide your answer in part (b) by your answer from part (a). Now divide 3.2 by 1.9. Which of these calculations appears to indicate a greater increase? Justify your response.

(d) Why do you suppose the statistics were presented using the numbers 1.9 and 3.2 instead of the percents?

Answers: **1.** (a) (i) 0.45, $\frac{9}{20}$, (ii) 0.35, $\frac{7}{20}$, (iii) 0.20, $\frac{1}{5}$, (b) (i) 1800, (ii) 1400, (iii) 800, (c) yes, factors can be type of music normally played by the radio station conducting the survey, school/family culture, and popular music teachers or bands within the school; **2.** (a) 25%, (b) 65%, (c) 85%, (d) 40%; **3.** (a) 23, (b) 35; **4.** (a) 12, (b) yes, The player could be injured or go into a slump and have fewer than 12 hits, or the player could go on a hot streak and have more than 12 hits; **5.** (a) $\frac{3}{4}$, (b) 64%, (c) 16%, (d) 2 970 000 (9%); **6.** (a) 65.5%, (b) 76.2%, (c) 1.16 vs. 1.68, the value 1.68 seems to indicate a greater increase, since the division compares raw scores, (d) An increase in the number of females with MS from 1.9 to 3.2 makes the increase seem dramatically larger than an increase from 65.5% to 76.2%.