

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

of students
90
70
40

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

(i) Rock

$$45\%$$

$$= 0.45$$

$$= \frac{45}{100}$$

$$= \frac{9}{20}$$

(ii) Rap

$$35\%$$

$$= 0.35$$

$$= \frac{35}{100}$$

$$= \frac{7}{20}$$

(iii) Country

$$20\%$$

$$= 0.2$$

$$= \frac{2}{10}$$

$$= \frac{1}{5}$$

$\rightarrow 20 \div 100$
 \downarrow
 0.2

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

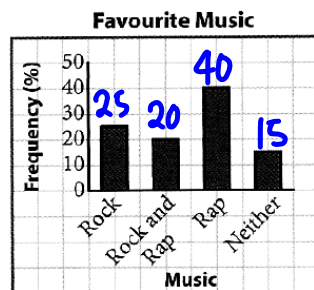
of Students

(i) Rock	(ii) Rap	(iii) Country
$4000 \times 45\%$	$4000 \times 35\%$	$4000 \times 20\%$
$= 4000 \times 0.45$	$= 4000 \times 0.35$	$= 4000 \times 0.2$
$= 1800$	$= 1400$	$= 800$

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

See answer key
200 = sample size

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.



Total = 100

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

$$P(\text{rock, not rap}) = \frac{25}{100} = 25\%$$

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

$$P(\text{rock or rap, not both}) = \frac{25 + 40}{100} = 65\%$$

- (c) rock or rap or both

$$P(\text{rock, or rap, or both}) = \frac{25 + 40 + 20}{100} = 85\%$$

- (d) rap but not rock

$$P(\text{rap, not rock}) = \frac{40}{100} = 40\%$$

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? $7+4+2=13$

$$\begin{aligned} \text{Points} &= 7(3) + 4(0) + 2(1) \\ &= 23 \end{aligned}$$

The team has 23 points.



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

$$P(\text{win}) = \frac{7}{13} \quad P(\text{tie}) = \frac{2}{13} \quad P(\text{loss}) = \frac{4}{13}$$

$$\begin{aligned} \# \text{ of games won} &= 20 \times \frac{7}{13} \\ &= 11 \text{ games won} \end{aligned}$$

$$\begin{aligned} \# \text{ of games tied} &= 20 \times \frac{2}{13} \\ &= 3 \text{ games} \end{aligned}$$

$$\begin{aligned} \text{Points} &= 11 \times 3 + 3 \times 1 \\ &= 36 \end{aligned}$$

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. $\frac{3}{10}$ $\frac{\text{hits}}{\text{bats}}$
- (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.

$$\frac{3}{10} \stackrel{\times 4}{=} \frac{?}{40} = 12 \quad \text{OR} \quad 40 \times 0.3 = 12$$



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

Yes, it is possible. There is no guarantee that the player will always perform the same way. Other factors may affect his performance.