11.3 Probability in Society

MathLinks 9, pages 430–439

Key Ideas Review

Unscramble the words to complete each of the following sentences.

1. A _____ _____ can make survey results inaccurate.
   DESBIA   PELSMA

2. If a sample represents the population, you can _____ the
   ELIZERAENG
   results to the population.

3. You can use _____ probability and _____
   LATPEREXINEM   CALORETTHEI
   probability to help make decisions based on probability.

Check Your Understanding

4. A computer chip factory samples chips as they come off the assembly line. A random sample shows that 1 chip out of every 40 is defective. In a run of 3200 chips, the quality manager predicts that 80 chips will be defective.

   a) What assumptions did the quality manager make in her prediction?

   b) Is her prediction reasonable? Justify your answer.

5. A playing card factory samples every 200th deck of cards for damage. The sample shows a 0.20% probability of damage. How many decks of cards would you expect to be damaged in the daily production of 100 000 decks of cards? Include any assumptions you made in your prediction.

6. A manufacturer makes the following claim about the lifetime of its batteries.

   Each battery has a lifetime of 100 h.

   Carla and Pedro tested 20 batteries to check the claim. Five batteries lasted less than 100 h and two batteries lasted exactly 100 h. The rest lasted longer than 100 h. The students predicted that 25% of the batteries made by the company would not meet the claim.

   a) Did the sample lead the students to make a false prediction? Explain.

   b) If the prediction is false, explain what you would change to make the prediction more accurate.

7. A school with 5400 students is electing a student council president. A reporter for the student newspaper polled 100 people. The table shows that 45% chose candidate A, 15% chose candidate B, and the rest chose candidate C.

a) According to the poll, how many students will choose each candidate?

Candidate A	Candidate B	Candidate C	Total
45%	15%		100%
			5400

b) What is the experimental probability for candidate C? What is the theoretical probability that a voter will choose candidate C? What assumptions did you make?

Experimental probability:

Theoretical probability:

Assumptions:

c) The reporter predicts that candidate C will win the election. Do you agree with her prediction? Explain your reasoning.

8. Cody records the scores from his ten most recent golf games.

Game	Score
1	70
2	69
3	71
4	73
5	74
6	72
7	73
8	75
9	78
10	74

a) Calculate Cody's mean score based on all ten games.

b) Use the first three game scores as a sample. Calculate the mean.

c) Use the last three game scores as a sample. Calculate the mean to the nearest hundredth.

d) Compare the mean from each sample to the mean for all games. Are the samples a good predictor for Cody's overall score? Explain.

9. Karen read an article claiming that 1 out of every 6 people is born with blue eyes. She predicts that 10 people in a sample of 100 people will have blue eyes. She tested the prediction by rolling a die 100 times for each of 8 trials. Here are the results.

Trial	Blue Eye Colour	Other Eye Colour
1	17	83
2	13	87
3	15	85
4	10	90
5	10	90
6	18	82
7	17	83
8	18	82

Do these experimental results confirm Karen's prediction or the article's claim? Show your thinking.