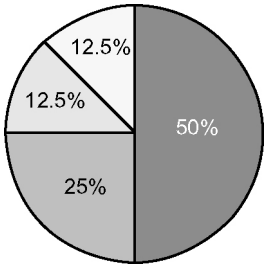
Chapter 5 Problems of the Week Answers

1. $\frac{1}{7} \times \frac{1}{7} \times \frac{1}{7} = \frac{1}{343}$ gives the probability for any 1 day of the week. Since there are 7 days of the week, the chances are $\frac{7}{343}$ or $\frac{1}{49}$.

2. a) Answers may vary. Example:

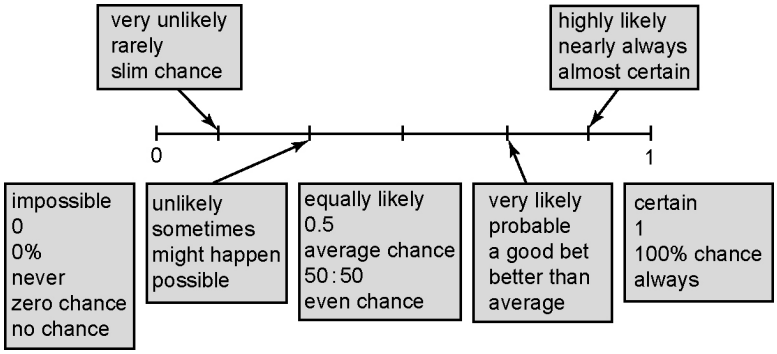


b) Each spin on the spinner would have the highest likelihood of landing on the 50% section, followed by the 25% section, with the least likelihood of landing on either of the two 12.5% sections.

3. a) $\frac{1}{8}$. There are 8 remaining spaces, so there is a 1 in 8 probability of putting an O in any one space.

b) Yes. Answers may vary. Example: The probability that the Xs are placed in three spaces in a row equals the probability that the Os are placed anywhere else. It is possible that no Os are placed in spaces that interfere with the Xs. Note: Students are not expected to determine this probability.

4. Answers may vary. Example:



5. a) $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{1024}$

b), c) If the coin is fair, the probability remains $\frac{1}{2}$ or 50%, regardless of the outcomes of any previous coin flips. Note: Students are not expected to determine the probability of 100 coin flips.

d) Look for an opinion and a supporting point that includes the world population as a factor. Example: If you assume a world population close to 7 billion people, the probability exists for 100 consecutive coin flips. Note that the chances of a coin landing heads 100 consecutive times is $1:2^{100}$. Compared to this, 7 billion is actually a fairly small number.

6. a) Answers will vary. The theoretical probability depends on the number of packages of gum produced with each different picture. Expect a reasonable estimate, and then have students test their prediction in part b).

b) Provide students with materials to carry out the simulation (e.g., spinner, slips of paper, a six-sided die). The results will vary from experiment to experiment, but as more students complete the experiment, the results should move closer to 15.

7. a) Fifty thumbtacks will land point up.

b) The results of the experiment will vary. Note: To ensure safety, have students place 10 thumbtacks in a transparent cup. Cover the cup with plastic wrap and use a rubber band to hold the wrap in place. Shake the cup and turn it upside down. Students can count the number of thumbtacks pointing up.

c) Many students may expect a probability of 50%. However, the more times the experiment is conducted, the more results will approach 70%.