

**Chapter 15, Review Problem 6.**

**False.** For every group of two people from this club, there is a corresponding group of six people — the six people not chosen for the group of two — and vice versa. In other words, both lists are exactly the same length.

**Comment:** Both lists include  $28 = \binom{8}{2} = \binom{8}{6}$  possible committees, but you don't need to know the formula to answer the question correctly.

**Chapter 15, Review Problem 10:**

You would prefer to draw *without* replacement, because if you draw without replacement, you are *guaranteed* to draw 3 red and 2 green tickets. If you draw with replacement this is not guaranteed.

*No calculations necessary.*

**Chapter 16, Review Problem 4.**

**Observation:** The chance of rolling a  $\square$  is  $1/6 \approx 16.67\%$ .

- By the law of averages, the more you roll the die, the more likely it is that the percentage of  $\square$ s you see will be close to 16.67%, which is *less than* 20%. So in this case, fewer rolls (60) is better.
- By the law of averages, the more you roll the die, the more likely it is that the percentage of  $\square$ s you see will be close to 16.67%, which is *more than* 15%. So in this case, more rolls (600) is better.
- By the law of averages, the more you roll the die, the more likely it is that the percentage of  $\square$ s you see will be close to 16.67%, which is between 15% and 20%. So in this case, more rolls (600) is better.
- While it is true that the more you roll the die, the more likely it is that the percentage of  $\square$ s you see will be *close to* 16.67%, it is also true that the probability that you see *exactly* 16.67%  $\square$ s *decreases* the more you roll. I.e., in this case fewer rolls (60) is better.

**Chapter 16, Review Problem 9.**

Option (B) gives a better chance of winning.

**Explanation:** The proportion of red marbles in the box is  $p > 0.5$ . According to the law of large numbers ('law of averages'), the more times you draw from the box (at random, with replacement), the closer the percentage of red marbles that you draw is likely to be to  $p \cdot 100\%$  which is more than 50%. I.e., the the bigger the number of draws, the more likely it is that more red marbles will be drawn than blue marbles.