

# 12-5 Study Guide and Intervention

## Adding Probabilities

**Mutually Exclusive Events** Events that cannot occur at the same time are called mutually exclusive events.

<b>Probability of Mutually Exclusive Events</b>	If two events, $A$ and $B$ , are mutually exclusive, then $P(A \text{ or } B) = P(A) + P(B)$ .
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This formula can be extended to any number of mutually exclusive events.

### Example 1

To choose an afternoon activity, summer campers pull slips of paper out of a hat. Today there are 25 slips for a nature walk, 35 slips for swimming, and 30 slips for arts and crafts. What is the probability that a camper will pull a slip for a nature walk or for swimming?

These are mutually exclusive events. Note that there is a total of 90 slips.

$$\begin{aligned} P(\text{nature walk or swimming}) &= P(\text{nature walk}) + P(\text{swimming}) \\ &= \frac{25}{90} + \frac{35}{90} \text{ or } \frac{2}{3} \end{aligned}$$

The probability of a camper's pulling out a slip for a nature walk or for swimming is  $\frac{2}{3}$ .

### Example 2

By the time one tent of 6 campers gets to the front of the line, there are only 10 nature walk slips and 15 swimming slips left. What is the probability that more than 4 of the 6 campers will choose a swimming slip?

$$\begin{aligned} P(\text{more than 4 swimmers}) &= P(5 \text{ swimmers}) + P(6 \text{ swimmers}) \\ &= \frac{C(10, 1) \cdot C(15, 5)}{C(25, 6)} + \frac{C(10, 0) \cdot C(15, 6)}{C(25, 6)} \\ &\approx 0.2 \end{aligned}$$

The probability of more than 4 of the campers swimming is about 0.2.

### Exercises

Find each probability.

- A bag contains 45 dyed eggs: 15 yellow, 12 green, and 18 red. What is the probability of selecting a green or a red egg?
- The letters from the words LOVE and LIVE are placed on cards and put in a box. What is the probability of selecting an L or an O from the box?
- A pair of dice is rolled, and the two numbers are added. What is the probability that the sum is either a 5 or a 7?
- A bowl has 10 whole wheat crackers, 16 sesame crackers, and 14 rye crisps. If a person picks a cracker at random, what is the probability of picking either a sesame cracker or a rye crisp?
- An art box contains 12 colored pencils and 20 pastels. If 5 drawing implements are chosen at random, what is the probability that at least 4 of them are pastels?

# 12-5 Study Guide and Intervention *(continued)*

## Adding Probabilities

### Inclusive Events

<b>Probability of Inclusive Events</b>	If two events, $A$ and $B$ , are inclusive, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ .
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**Example** What is the probability of drawing a face card or a black card from a standard deck of cards?

The two events are inclusive, since a card can be both a face card and a black card.

$$\begin{aligned}
 P(\text{face card or black card}) &= P(\text{face card}) + P(\text{black card}) - P(\text{black face card}) \\
 &= \frac{3}{13} + \frac{1}{2} - \frac{3}{26} \\
 &= \frac{8}{13} \text{ or about } 0.62
 \end{aligned}$$

The probability of drawing either a face card or a black card is about 0.62

### Exercises

Find each probability.

1. What is the probability of drawing a red card or an ace from a standard deck of cards?
2. Three cards are selected from a standard deck of 52 cards. What is the probability of selecting a king, a queen, or a red card?
3. The letters of the alphabet are placed in a bag. What is the probability of selecting a vowel or one of the letters from the word QUIZ?
4. A pair of dice is rolled. What is the probability that the sum is odd or a multiple of 3?
5. The Venn diagram at the right shows the number of juniors on varsity sports teams at Elmwood High School. Some athletes are on varsity teams for one season only, some athletes for two seasons, and some for all three seasons. If a varsity athlete is chosen at random from the junior class, what is the probability that he or she plays a fall or winter sport?

