

Reteaching 9-7

Probability of Multiple Events

OBJECTIVE: Finding probabilities of multiple events

MATERIALS: Colored pencils

Example

Find the probability. A cage at the pet store contains ten white mice. Out of the ten, there are four females and six males. There are also ten black mice, of which six are female and four are male. Suppose you reach into the cage and randomly pick one mouse. What is the probability that the one you selected is female or black?

Step 1: Make a table of possibilities. These are events that can happen at the same time. The events are not mutually exclusive.

Step 2: Find $P(\text{female})$ by putting a circle around each female mouse.

$$P(\text{female}) = \frac{10}{20} = \frac{1}{2}$$

Step 3: Find $P(\text{black})$ by putting an "X" through each black mouse.

$$P(\text{black}) = \frac{10}{20} = \frac{1}{2}$$

Step 4: Find the events that have both a circle and an "X."

$$P(\text{female and black}) = \frac{6}{20} = \frac{3}{10}$$

Step 5: Use the formula $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ to find $P(\text{female or black})$.

$$\frac{10}{20} + \frac{10}{20} - \frac{6}{20} = \frac{14}{20} = \frac{7}{10}, \text{ or } 70\%$$

The probability that you select a mouse that is female or black is 70%.

| | | | |
|-----|-----|-----|-----|
| ⓕ w | ⓕ w | ⓕ w | ⓕ w |
| m w | m w | m w | m w |
| m w | m w | ⓕ ✕ | ⓕ ✕ |
| ⓕ ✕ | ⓕ ✕ | ⓕ ✕ | ⓕ ✕ |
| m ✕ | m ✕ | m ✕ | m ✕ |

Exercises

Find the probability of each event.

- Use the information from the example above to find the probability of selecting a mouse that is either white or male. Use the same table, but use a pencil of a different color.
- A bag of marbles contains 13 marbles that are opaque and 32 marbles that are translucent. Of the opaque marbles, 3 are red, 5 are blue, and 5 are green. Of the translucent marbles, 8 are red, 12 are blue and 12 are green. What is the probability that you randomly pick a marble that is red or opaque?
- Use the table you constructed for Exercise 2 and a different color marker to find the probability that you randomly pick a marble that is green or translucent.