3.1 Sets & Set Diagrams

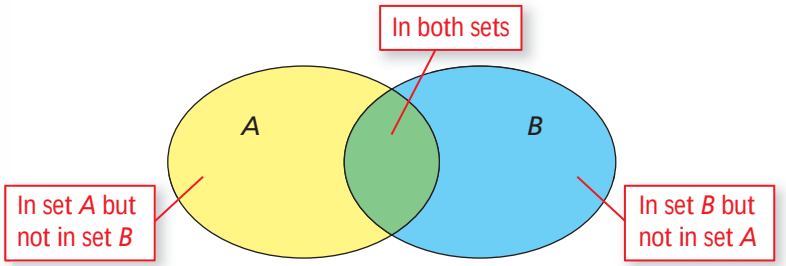
- Use a union of two sets to represent *or*.
- Use an intersection of two sets to represent *and*.
- Use the complement of a set to represent *not*.

The Union of Two Sets

Analyzing a statement is often easier when you can visualize the statement. In mathematics, you can use sets and **set diagrams** to visualize statements that deal with "belonging to a group" or "having a characteristic."

Finding the Union of Two Sets

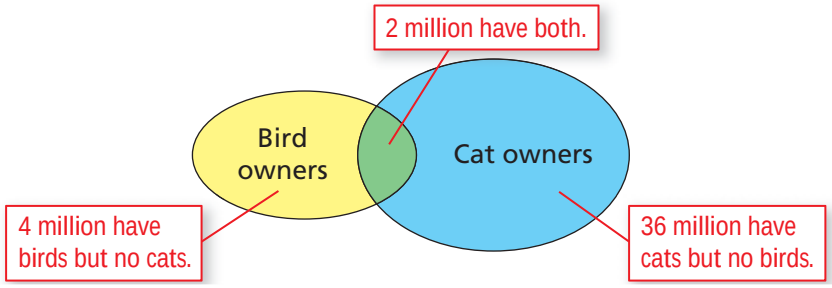
The **union** of set A and set B is everything that is in set A *or* set B. A set diagram for the union of two sets is shown below.



EXAMPLE 1 **Drawing a Set Diagram**

There are about 6 million households in the United States that have 1 or more birds as pets. There are about 38 million households that have 1 or more cats as pets. Suppose about 2 million households have *both* birds and cats as pets. Use a set diagram to determine how many households have a bird *or* a cat as a pet.

SOLUTION



So, 42 million households (4 + 2 + 36) have a bird or a cat as a pet.

Study Tip

Notice that a union of two sets is used as a visual for the word *or*. In logic, *or* is considered to be the "inclusive or," meaning that it includes one case, or the other case, or *both*.

Checkpoint

Help at Math.andYOU.com

There are about 120 million women (18 years old or older) in the United States. Of these, about 5.7 million rode a motorcycle during the past year. In all, about 25 million Americans rode a motorcycle during the past year. Draw a set diagram that shows this information. Label each region.