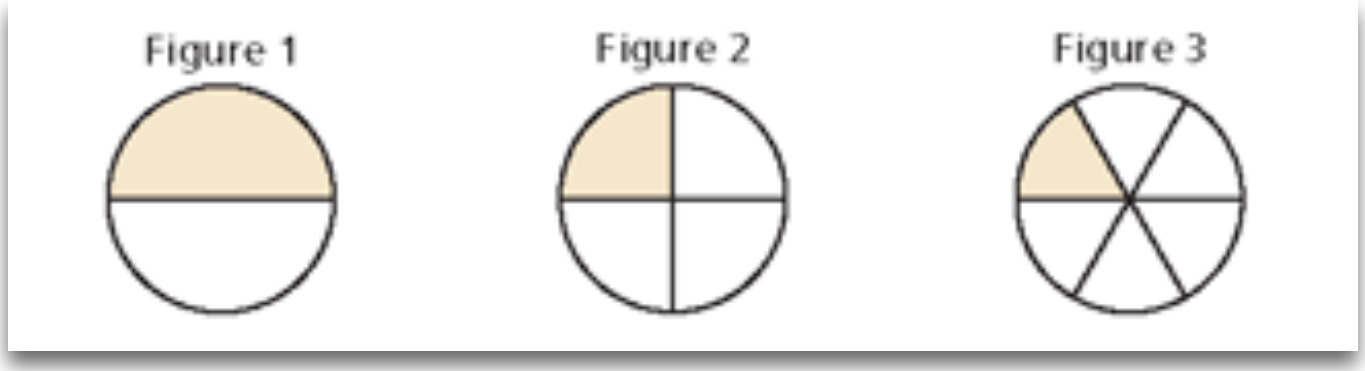
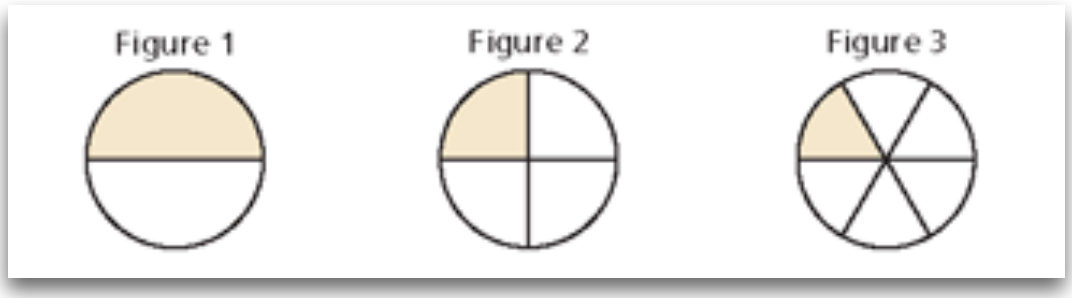


Figure 1
Figure 2
Figure 3



VOCABULARY

- conjecture
- inductive reasoning
- counterexample
- deductive reasoning

LEARNING TARGETS

- I can use inductive reasoning
- I can use deductive reasoning

2.2 Inductive and Deductive Reasoning

Vocabulary: Conjecture and Inductive Reasoning

- A **conjecture** is an unproven statement that is based on observations. You use **inductive reasoning** when you find a pattern in specific cases and then write a conjecture for the general case.

Example

- Numbers such as 3, 4, and 5 are called consecutive integers. Make and test a conjecture about the sum of any three consecutive integers.

Vocabulary: Counterexample

- To show that a conjecture is true, you must show that it is true for all cases. You can show that a conjecture is false, however, by finding just one *counterexample*. A **counterexample** is a specific case for which the conjecture is false.

Example

- A student makes the following conjecture about the sum of two numbers. Find a counterexample to disprove the student's conjecture.
  - **Conjecture:** The sum of two numbers is always more than the greater number.

Vocabulary: Deductive Reasoning

- **Deductive reasoning** uses facts, definitions, accept properties, and the laws of logic to form a logical argument. This is different from inductive reasoning, which uses specific examples and patterns to form a conjecture.

Core Concepts: Laws of Logic

Law of Detachment

If the hypothesis of a true conditional is true, then the conclusion is also true.

Law of Syllogism

If hypothesis p, then conclusion q.

If hypothesis q, then conclusion r.

If these statements are true,

If hypothesis p, then conclusion r.

then this statement is true.

Example

- If two segments have the same length, then they are congruent. You know that BC = XY. Using the Law of Detachment, what statement can you make?

Example

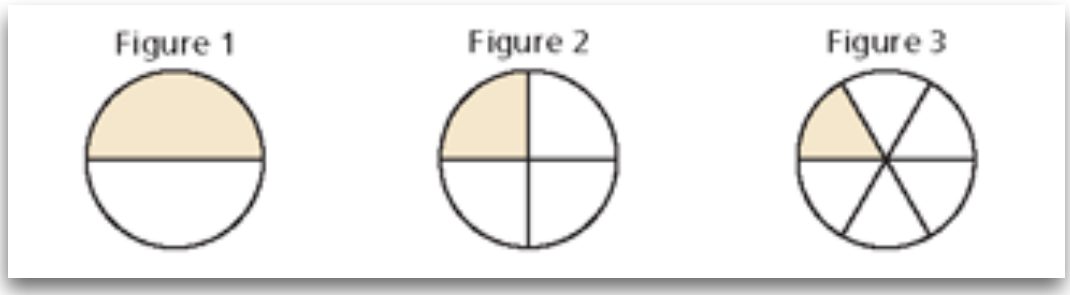
- If possible, use the Law of Syllogism to write a new conditional statement that follows from the pair of true statements.

    - If a polygon is regular, then all angles in the interior of the polygon are congruent

    - If a polygon is regular, then all its sides are congruent.

Example

- If possible, use the Law of Syllogism to write a new conditional statement that follows from the pair of true statements.
    - If $x > 5$, then $x^2 > 25$.
    - If $x^2 > 25$, then $x^2 > 20$.



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