

# Section 1-1

## Solving Problems by Inductive Reasoning

- Characteristics of Inductive and Deductive Reasoning
- Pitfalls of Inductive Reasoning

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## Characteristics of Inductive and Deductive Reasoning

**Inductive Reasoning**  
 Draw a general conclusion(\_\_\_\_\_) from repeated observations of specific examples.  
 \*There is no assurance that the observed conjecture is always true.

**Deductive Reasoning**  
 Apply general principles to specific examples. (can be used to prove Inductive Reasoning false with a counterexample)

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### Example: determine the type of reasoning

All math teachers have a great sense of humor. Patrick is a math teacher. Therefore, Patrick must have a great sense of humor.

**Solution**  
 Because the reasoning goes from general to specific, \_\_\_\_\_ reasoning was used.

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### Example: predict the product of two numbers

Use the list of equations and inductive reasoning to predict the next multiplication fact in the list:

$$37 \times 3 = 111 \quad 37 \times 6 = 222$$

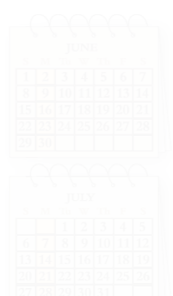
$$37 \times 9 = 333 \quad 37 \times 12 = 444$$

**Solution**  
 $37 \times 15 = \underline{\hspace{2cm}}$

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### Example: Use *Inductive Reasoning* to predict the next number in a sequence

A. Determine the *probable* next number in the list below.  
 2, 9, 16, 23, 30



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### Example: Use Inductive Reasoning to predict the next number in a sequence

B. Choose any number and follow the steps below.

- a) Multiply your number by 2.
- b) Add 6.
- c) Divide by 2.
- d) Subtract the number you started with from the new number.
- e) Record your result in a table.

\*Then, repeat the process using the original number, but change step b) Add 8. Repeat again, using the original number, but change step b) Add 10.

Use inductive reasoning to explain how to predict the final result.

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## Pitfalls of Inductive Reasoning

One can not be sure about a conjecture until a general relationship has been proven.

One \_\_\_\_\_ is sufficient to make the conjecture false.

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## Example: Deductive Reasoning

Find the length of the hypotenuse in a right triangle with legs 3 and 4. Use the Pythagorean  
Find the third leg.

*Answer:* \_\_\_\_\_

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What is 1 example of inductive reasoning that you have recently used in your life?

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