



5-8 Using Logical Reasoning (Pages 255–257)

When you reason, sometimes you make a conclusion based on what happened in the past. At other times, you use a rational rule to make a conclusion.

<p>Inductive and Deductive Reasoning</p>	<ul style="list-style-type: none"> • Inductive reasoning makes a rule after observing or seeing several examples. • Deductive reasoning uses a rule to make a conclusion.
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EXAMPLE

DeMarco notices that $(0)(0) = 0$ and $(1)(1) = 1$. He concludes that any number multiplied by itself equals that number. Did he use inductive or deductive reasoning? Was his conclusion correct? Explain.

He used inductive reasoning, but his conclusion was not correct. The pattern he observed is true for 0 and 1, but it is not true for any other numbers, so it is not true in general.

PRACTICE

- Beth knows that multiplying two whole numbers that end in 8 will give a product that ends in 4. She concludes that the product of 78 and 218 will end in 4. Is she using inductive or deductive reasoning?
- Robins have nested under Ray's carport for 3 years. He expects that they will nest there again this year. Is this inductive or deductive reasoning?
- Study the products at the right.

	$15 \cdot 15 = 225$	$(1 \cdot 2 = 2)$
a. Describe a pattern that can help you predict the value of $85 \cdot 85$.	$25 \cdot 25 = 625$	$(2 \cdot 3 = 6)$
	$35 \cdot 35 = 1225$	$(3 \cdot 4 = 12)$
b. To find the pattern, are you using inductive or deductive reasoning?	$45 \cdot 45 = 2025$	$(4 \cdot 5 = 20)$

c. Explain why you cannot use this pattern to predict $35 \cdot 75$.
- Produce** Granny Smith apples are on sale for \$0.79 per pound. How much will 10 pounds of Granny Smith apples cost? Did you use inductive or deductive reasoning?



5. **Standardized Test Practice** What comes next in this sequence?

$\rightarrow, \leftarrow, \downarrow, \uparrow, \Rightarrow, \Leftarrow, \underline{?}, \underline{?}$

A \downarrow, \uparrow

B \uparrow, \downarrow

C $\uparrow\uparrow, \downarrow\downarrow$

D $\downarrow\downarrow, \uparrow\uparrow$

Answers: 1. deductive 2. inductive 3. a. Focus on the number before the 5 in the original number. Take that number, increase it by 1 and multiply. Write the product, and then write the digits 2 and 5. b. inductive c. This does not follow the pattern of multiplying identical factors whose last digit is 5. 4. \$7.90; deductive 5. D