

# 2-1 Study Guide and Intervention

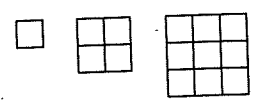
## Inductive Reasoning and Conjecture

**Make Conjectures** A **conjecture** is a guess based on analyzing information or observing a pattern. Making a conjecture after looking at several situations is called **inductive reasoning**.

**Example 1** Make a conjecture about the next number in the sequence 1, 3, 9, 27, 81.

Analyze the numbers:  
 Notice that each number is a power of 3.  
 1    3    9    27    81  
 $3^0$   $3^1$   $3^2$   $3^3$   $3^4$   
 Conjecture: The next number will be  $3^5$  or 243.

**Example 2** Make a conjecture about the number of small squares in the next figure.



*Observe a pattern:* The sides of the squares have measures 1, 2, and 3 units.  
*Conjecture:* For the next figure, the side of the square will be 4 units, so the figure will have 16 small squares.

**Exercises**

Describe the pattern. Then make a conjecture about the next number in the sequence.

- 5, 10, -20, 40, -80, multiply by -2 each time
- 1, 10, 100, 1000, 10,000 multiply by 10 each time
- 1,  $\frac{6}{5}$ ,  $\frac{7}{5}$ ,  $\frac{8}{5}$ ,  $\frac{9}{5}$  add  $\frac{1}{5}$  each time

Make a conjecture based on the given information. Draw a figure to illustrate your conjecture.

4.  $A(-1, -1)$ ,  $B(2, 2)$ ,  $C(4, 4)$

A, B, and C are collinear

5.  $\angle 1$  and  $\angle 2$  form a right angle.

$\angle 1$  and  $\angle 2$  are complementary

6.  $\angle ABC$  and  $\angle DBE$  are vertical angles.

$\angle ABC \cong \angle DBE$

7.  $\angle E$  and  $\angle F$  are right angles.

$\angle E \cong \angle F$

6  $\angle E$  and  $\angle F$  are supplementary

**2-1**

**Study Guide and Intervention** (continued)

**Inductive Reasoning and Conjecture**

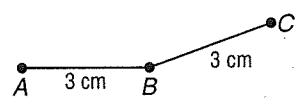
**Find Counterexamples** A conjecture is false if there is even one situation in which the conjecture is not true. The false example is called a **counterexample**.

**Example** Determine whether the conjecture is *true* or *false*.  
If it is false, give a counterexample.

Given:  $\overline{AB} \cong \overline{BC}$

Conjecture:  $B$  is the midpoint of  $\overline{AC}$ .

Is it possible to draw a diagram with  $\overline{AB} \cong \overline{BC}$  such that  $B$  is not the midpoint? This diagram is a counterexample because point  $B$  is not on  $\overline{AC}$ . The conjecture is false.

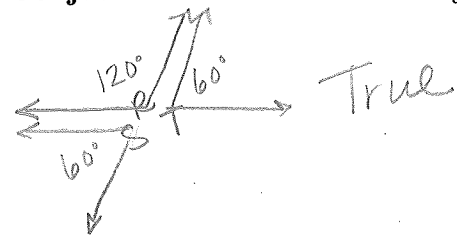
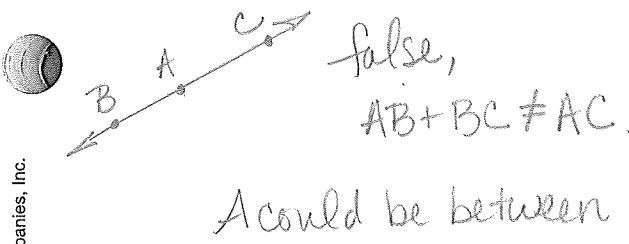


**Exercises**

Determine whether each conjecture is *true* or *false*. Give a counterexample for any false conjecture.

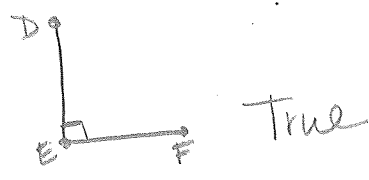
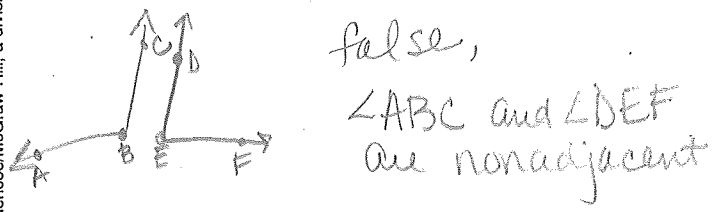
1. Given: Points  $A, B,$  and  $C$  are collinear.  
Conjecture:  $AB + BC = AC$

2. Given:  $\angle R$  and  $\angle S$  are supplementary.  
 $\angle R$  and  $\angle T$  are supplementary.  
Conjecture:  $\angle T$  and  $\angle S$  are congruent.



3. Given:  $\angle ABC$  and  $\angle DEF$  are supplementary.  
Conjecture:  $\angle ABC$  and  $\angle DEF$  form a linear pair.

4. Given:  $\overline{DE} \perp \overline{EF}$   
Conjecture:  $\angle DEF$  is a right angle.



Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.

Lesson 2-1