What You’ll Learn

Scan Lesson 2-1. List two headings you would use to make an outline of this lesson.

1. ________________________________
   ______________________________________________________

2. ________________________________
   ______________________________________________________

Active Vocabulary

New Vocabulary Fill in each blank with the correct term or phrase.

*inductive reasoning* ▶ _________ that uses a number of specific _________ to arrive at a ____________

*conjecture* ▶ the ___________ that is reached within inductive reasoning

*counterexample* ▶ an example that __________ a ___________

Vocabulary Link *Conjecture* is a word that is used in everyday English. Find the definition of *conjecture* using a dictionary. Write how the definition of conjecture can help you remember the mathematical definition of *conjecture*.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________
Main Idea

Make Conjectures

Sequence the steps of making a conjecture with algebraic terms or geometric terms.

Details

Find Counterexamples

Write a statement in which you can make a true conjecture. Then write another statement in which you can make a false conjecture. Provide a counterexample of the false conjecture.

True Conjecture: ________________________________

_________________________________________________________________

_________________________________________________________________

False Conjecture: ________________________________

_________________________________________________________________

_________________________________________________________________

Helping You Remember

Write a short sentence that can help you remember why it only takes one counterexample to prove that a conjecture is false.

_________________________________________________________________

_________________________________________________________________
What You’ll Learn  Skim the Examples for Lesson 2-2. Predict two things you think you will learn about logic.

1. ______________________________________________________
   ______________________________________________________

2. ______________________________________________________
   ______________________________________________________

Active Vocabulary  New Vocabulary  Match the term with the correct definition by drawing a line between the two.

- **truth table**: a sentence that is either true or false
- **disjunction**: two or more statements joined by *and* or *or*
- **statement**: a compound statement that uses the word *or*
- **truth value**: the value of a statement as either true or false
- **conjunction**: statement with the opposite meaning and opposite truth
- **negation**: a compound statement that uses the word *and*
- **compound statement**: convenient method to determine the truth value of statement

Vocabulary Link  *Negation* is a word used in everyday English as well as in mathematics. Look up *negation* in the dictionary. Explain how the English definition can help you remember how *negation* is used in mathematics.
Main Idea

Determine Truth Values
pp. 97–99

Fill in the blanks to summarize negations, conjunctions, and disjunctions. Write a description of each term.

Details

Model the situation using a Venn diagram.

At Terrace Middle school, 68 students play basketball, 77 play volleyball, 19 play soccer and basketball, and 27 play all three sports. If 13 students play both volleyball and basketball, how many students play just basketball?

Helping You Remember

Prefixes can often help you remember the meaning of words or distinguish between similar words. Use your dictionary to find the meanings of the prefixes con and dis and explain how these meanings can help you remember the difference between a conjunction and disjunction.
What You’ll Learn

Skim Lesson 2-3. Predict two things you will learn based on the headings and the Key Concept box.

1. ______________________________________________________
   ______________________________________________________

2. ______________________________________________________
   ______________________________________________________

Active Vocabulary

New Vocabulary
Write the definition next to each term.

conditional statement ▶

if-then statement ▶

converse ▶

hypothesis ▶

inverse ▶

contrapositive ▶

logically equivalent ▶

related conditionals ▶

conclusion ▶
Main Idea

If-Then Statements
pp. 105–107

Details

Identify the hypothesis and conclusion of each conditional statement. Circle the hypothesis and underline the conclusion.

1. ____________ if the sum of its digits is divisible by 9.

2. If the measure of an angle is less than 90 degrees, it is an acute angle.

Related Conditionals
pp. 107–108

Fill in the organizer for related conditionals.

Helping You Remember

When working with a conditional statement and its three related conditional, what is an easy way to remember which statements are logically equivalent?

________________________________________________________________________

________________________________________________________________________
2-4 Deductive Reasoning

What You’ll Learn
Scan the text in Lesson 2-4. Write two facts you learned about deductive reasoning as you scanned the text.

1. ______________________________________________________
   ______________________________________________________
   ______________________________________________________

2. ______________________________________________________
   ______________________________________________________
   ______________________________________________________

Active Vocabulary
New Vocabulary Write the correct term next to each definition.

allows you to draw conclusions from two true conditional statements when the conclusion of one statement is the hypothesis of the other

uses facts, rules, definitions, or properties to reach logical conclusions from given statements

form of deductive reasoning that states that if all the facts are true, then the conclusion reached is also true

Vocabulary Link Syllogism is a word used in everyday English as well as in mathematics. Look up syllogism in the dictionary. Explain how the English definition can help you remember how syllogism is used in mathematics.

____________________________________________________
____________________________________________________
____________________________________________________
____________________________________________________
Main Idea

**Law of Detachment**
pp. 115–117

Identify the steps to validate the two conclusions by completing the graphic organizer.

- If the light bulb is broken, the lamp will not work.
- Jackson’s lamp will not work.
- Jackson’s light bulb is broken.

Details

<table>
<thead>
<tr>
<th>Identify the hypothesis.</th>
<th>Identify the conclusion.</th>
</tr>
</thead>
</table>

Analyze the conclusion.

**Law of Syllogism**
pp. 117–118

Match the portions of each statement with the correct term by drawing a line to connect the two. Then write the true conditional statement and the valid conclusion using the Law of Syllogism.

- $p$: you buy bread
- $q$: you walk to the store
- $r$: you can make toast

Helping You Remember

A good way to remember something is to explain it to someone else. Suppose that a classmate is having trouble remembering the Law of Detachment. In your own words, explain what the Law of Detachment means?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
What You’ll Learn

Scan the text under the Now heading. List two things you will learn about in this lesson.

1. ______________________________________________________
   ______________________________________________________

2. ______________________________________________________
   ______________________________________________________

Active Vocabulary

New Vocabulary Fill in each blank with the correct term or phrase.

*postulate* ➤ a __________ that is accepted as __________ without __________

*proof* ➤ a logical __________ in which each statement you make is __________ by a statement that is __________ as __________

*deductive argument* ➤ a logical __________ of __________ that link the __________ to what you are trying to prove

*theorem* ➤ a __________ or conjecture that has been __________

*paragraph proof* ➤ writing a __________ to explain why a __________ for a given situation is __________

*informal proof* ➤ same as __________

*axiom* ➤ same as __________
Main Idea

Points, Lines, and Planes
pp. 125–126

Write a postulate of points, lines, and planes. Then model the postulate.

Details

Paragraph Proofs
pp. 126–127

Sequence the steps in the proof process by completing the organizer.

Steps in the Proof Process

Step 1: List the ____________; draw a ______ if possible.

Step 2: State the ______ or conjecture to be ________.

Step 3: Create a ______________ by forming a ________ of statements linking the given to what you are trying to prove.

Step 4: Justify each ________ with a reason. Reasons include definitions, algebraic ________, postulates, and ________.

Step 5: State what has been ________.
What You’ll Learn  
Skim the lesson. Write two things you already know about algebraic proof.

1. 

2. 

Active Vocabulary  
Review Vocabulary  
Write the definition next to the term. (Lesson 2-4)

deductive reasoning ➤

New Vocabulary  
Match the term with its definition by drawing a line to connect the term.

algebraic proof  
same as formal proof

two-column proof  
contains statements and reasons in two columns

formal proof  
uses a group of algebraic steps to solve problems and justify each step.

Vocabulary Link  
Proof is a word that is used in everyday English. Find the definition of proof using a dictionary. Explain how the English definition can help you remember how proof is used in mathematics.
Write a 2-column proof by completing each step.

Given: $\frac{8}{3} + x = 6 - \frac{1}{3}x$  Prove: $x = 2 \frac{1}{2}$

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{8}{3} + x = 6 - \frac{1}{3}x$</td>
<td></td>
</tr>
<tr>
<td>$3\left(\frac{8}{3} + x\right) = 3\left(6 - \frac{1}{3}x\right)$</td>
<td></td>
</tr>
<tr>
<td>$8 + 3x = 18 - x$</td>
<td>Addition Prop of Equality</td>
</tr>
<tr>
<td>$8 + 4x = 18$</td>
<td>Simplify.</td>
</tr>
<tr>
<td>$8 + 4x - 8 = 18 - 8$</td>
<td>Substitution Prop of Equality</td>
</tr>
<tr>
<td>$\frac{4}{4}x = \frac{10}{4}$</td>
<td></td>
</tr>
<tr>
<td>$x = \frac{10}{4}$ or $2\frac{1}{2}$</td>
<td></td>
</tr>
</tbody>
</table>

Match the property with its example by drawing a line to connect the example.

**Symmetric Property**  
If $ST = WX$, and $WX = YZ$, then $ST = YZ$.

**Reflective Property**  
If $\angle C = \angle D$, then $\angle D = \angle C$.

**Transitive Property**  
$\angle A = \angle A$
Scan the text in Lesson 2-7. Write two facts you learned about proving segment relationships.

1. ______________________________________________________
   ______________________________________________________

2. ______________________________________________________
   ______________________________________________________

Review Vocabulary  Write the definition next to each term.  
(Lessons 2-1 and 2-3)

inductive reasoning ▶

conditional statement ▶

converse ▶

contrapositive ▶

counterexample ▶

conjecture ▶

inverse ▶
Main Idea

**Ruler Postulate**

pp. 142–143

Use the Model and Fill in each blank to summarize the *Segment Addition Postulate*.

If \( P, Q, \) and \( R \) are __________, then point __ is between __ and __ if and only if __ + ___ = \( PR \).

**Segment Congruence**

pp. 143–144

Complete the graphic organizer to prove the statement below.

**Helping You Remember**

A good way to keep the names straight in your mind is to associate something in the name of the postulate with the content of the postulate. How can you use this idea to distinguish between the Rule Postulate and the *Segment Addition Postulate*?
What You’ll Learn

Scan Lesson 2-8. List two headings you would use to make an outline of this lesson.

1. ______________________________________________________
   ______________________________________________________

2. ______________________________________________________
   ______________________________________________________

Active Vocabulary

Review Vocabulary  Fill in each blank with the correct term or phrase. (Lessons 1-4 and 1-5)

complementary angles ➤ two ________ angles with measures that have a sum of __________

adjacent angles ➤ angles with a common _____

supplementary angles ➤ two ________ angles with measures that have a sum of __________

interior ➤ the region of a plane ________ an angle

exterior ➤ the region of a plane ________ an angle

acute angle ➤ an angle with a measure of _____________________

obtuse angle ➤ an angle with a measure of ______________________
Main Idea

Supplementary and Complementary Angles
pp. 149–150

Congruent Angles
pp. 151–153

Details

Compare and contrast the Angle Addition Postulate and the Segment Addition Postulate by completing the Venn diagram.

Write a two-column proof to prove the statement by completing the chart.

Given: $m\angle 2 = 90$

$\angle 1 \cong \angle 3$

Prove: $m\angle 1 = 45$

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
</table>
| 1. $m\angle 2 = 90$
  $\angle 1 \cong \angle 3$ |         |
| 2. $m\angle 3 = m\angle 1$ |         |
| 3. $m\angle 1 + m\angle 3 + m\angle 2 = 180$ |         |
| 4. $m\angle 1 + m\angle 1 + 90 = 180$ |         |
| 5. $m\angle 1 + m\angle 3 + 90 - 90 = 180 - 90$ |         |
| 6. $m\angle 1 + m\angle 1 = 90$ |         |
| 7. $\frac{m\angle 1 + m\angle 1}{2} = 90 \div 2$ |         |
| 8. $m\angle 1 = 45$ |         |