California Mathematics 4
Chapter 10
Resource Masters

Includes:

Chapter Resources
- Graphic Organizer
- Student-Built Glossary
- Family Letter
- Anticipation Guide
- Game

Leveled Lesson Resources
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- Skills Practice
- Homework Practice
- Problem-Solving Practice
- Enrich

Assessment Resources
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- Chapter Diagnostic Test
- Chapter Pretest
- 3 Quizzes
- Mid-Chapter Test
- Vocabulary Test
- Oral Assessment
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- Foldables Rubric
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- Answer Keys

All Answers Included
Grade 4 Chapter 10
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Teacher’s Guide to Using the
Chapter 10 Resource Masters

The Chapter 10 Resource Masters includes the core materials needed for Chapter 10. These materials include worksheets, extensions, and assessment options. The answers for these pages appear at the back of this booklet.

All of the materials found in this booklet are included for viewing and printing on the TeacherWorks Plus™ CD-ROM.

Chapter Resources

Graphic Organizer (page 1) This master is a tool designed to assist students with comprehension of grade-level concepts. You can use this graphic organizer in coordination with the appropriate lesson. While the content and layout of these tools vary, their goal is to assist students by providing a visual representation from which they can learn new concepts.

Student Glossary (page 2) This master is a study tool that presents the key vocabulary terms from the chapter. You may suggest that students highlight or star the terms they do not understand. Give this list to students before beginning Lesson 10-1. Remind them to add these pages to their mathematics study notebooks.

Anticipation Guide (page 6) This master is a survey designed for use before beginning the chapter. You can use this survey to highlight what students may or may not know about the concepts in the chapter. If feasible, interview students in small groups, asking them the interview questions in the guide. There is space for recording how well students answer the questions before they complete the chapter. You may find it helpful to interview students a second time, after completing the chapter, to determine their progress.

Game (page 7) A game is provided to reinforce chapter concepts and may be used at appropriate times throughout the chapter.

Resources for Lessons

Reteach Each lesson has an associated Reteach worksheet. In general, the Reteach worksheet focuses on the same lesson content but uses a different approach, learning style, or modality than that used in the Student Edition. The Reteach worksheet closes with computational practice of the concept.

Skills Practice The Skills Practice worksheet for each lesson focuses on the computational aspect of the lesson. The Skills Practice worksheet may be helpful in providing additional practice of the skill taught in the lesson. It also contains word problems that cover the skill. Spaces for students’ answers are provided on the worksheet.

Homework Practice The Homework Practice worksheet provides an opportunity for additional computational practice. The Homework Practice worksheet includes word problems that address the skill taught in the lesson. Spaces for students’ answers are provided on the worksheet.

Problem-Solving Practice The Problem-Solving Practice worksheet presents additional reinforcement in solving word problems that apply both the concepts of the lesson and some review concepts.

Enrich The Enrich worksheet presents activities that extend the concepts of the lesson or offer a historical or multicultural look at the lesson’s concepts. Some Enrich materials are designed to widen students’ perspectives on the mathematics they are learning.

Resources for Problem-Solving Lessons In recognition of the importance of problem-solving strategies, worksheets for problem-solving lessons follow a slightly different format. For problem-solving lessons, a two-page Reteach worksheet offers a complete model for choosing a problem-solving strategy. For each Problem-Solving Strategy lesson, Reteach and Practice
worksheets offer reinforcement of the strategy taught in the Student Edition lesson. In contrast, the Problem-Solving Investigation worksheets include a model strategy on the Reteach worksheets and provide problems requiring several alternate strategies on the Practice and Skills worksheets.

Assessment Options
The assessment masters in the Chapter 10 Resource Masters offer a wide variety of assessment tools for monitoring progress as well as final assessment.

Individual Progress Checklist This checklist explains the chapter’s goals or objectives. Teachers can record whether a student’s mastery of each objective is beginning (B), developing (D), or mastered (M). The checklist includes space to record notes to parents as well as other pertinent observations.

Chapter Diagnostic Test This one-page test assesses students’ grasp of skills that are needed for success in the chapter.

Chapter Pretest This one-page quick check of the chapter’s concepts is useful for determining pacing. Performance on the pretest can help you determine which concepts can be covered quickly and which specific concepts may need additional time.

Quizzes Three free-response quizzes offer quick assessment opportunities at appropriate intervals in the chapter.

Mid-Chapter Test This one-page chapter test provides an option to assess the first half of the chapter. It includes both multiple-choice and free-response questions.

Vocabulary Test This one-page test focuses on chapter vocabulary. It is suitable for all students. It includes a list of vocabulary words and questions to assess students’ knowledge of the words.

Oral Assessment This two-page test consists of one page for teacher directions and questions and a second page for recording responses. Although this assessment is designed to be used with all students, the interview format focuses on assessing chapter content assimilated by ELL students. The variety of approaches includes solving problems using manipulatives as well as pencil and paper.

Chapter Project Rubric This one-page rubric is designed for use in assessing the chapter project. You may want to distribute copies of the rubric when you assign the project and use the rubric to record each student’s chapter project score.

Foldables Rubric This one-page rubric is designed to assess the Foldables graphic organizer. The rubric is written to the students, telling them what you will be looking for as you evaluate their completed Foldables graphic organizer.

Leveled Chapter Tests
- Form 1 assesses basic chapter concepts through multiple-choice questions and is designed for use with on-level students.
- Form 2A is designed for on-level students and is primarily for those who may have missed the Form 1 test. It may be used as a retest for students who received additional instruction following the Form 1 test.
- Form 2B is designed for students with a below-level command of the English language.
- Form 2C is a free-response test designed for on-level students.
- Form 2D is written for students with a below-level command of the English language.
- Form 3 is a free-response test written for above-level students.
- Extended-Response Test is an extended response test for on-level students.

Student Recording Sheet This one-page recording sheet is for the standardized test in the Student Edition.

Cumulative Standardized Test Practice This three-page test, aimed at on-level students, offers multiple-choice questions and free-response questions.

Answers
The answers for the Anticipation Guide and Lesson Resources are provided as reduced pages with answers appearing in black. Full size line-up answer keys are provided for the Assessment Masters.
Use this graphic organizer to take notes on chapter 10: *Geometry: Solid and Plane Figures*.

**Fill in the missing information.**

<table>
<thead>
<tr>
<th>Shape</th>
<th>Name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Rectangle" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image2.png" alt="Square" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image3.png" alt="Rhombus" /></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image4.png" alt="Trapezoid" /></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This is an alphabetical list of new vocabulary terms you will learn in **Chapter 10: Geometry: Solid and Plane Figures**. As you study the chapter, complete each term’s definition or description. Remember to add the page number where you found the term. Add this page to your math study notebook to review vocabulary at the end of the chapter.

<table>
<thead>
<tr>
<th>Vocabulary Term</th>
<th>Found on Page</th>
<th>Definition/Description/Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>angle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>circle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>line</td>
<td></td>
<td></td>
</tr>
<tr>
<td>net</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Student-Built Glossary (continued)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>plane figure</strong></td>
<td></td>
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<tr>
<td><strong>polygon</strong></td>
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<tr>
<td><strong>solid figure</strong></td>
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</tbody>
</table>
Dear Family,

Today my class started Chapter 10: Geometry: Solid and Plane Figures. I will be learning to identify, describe, and classify solid and plane figures. I will also be learning to identify parts of circles. Here are my vocabulary words and an activity that we can do together.

Love, ______________

Key Vocabulary

**solid figure** A figure having the three dimensions; length, width, and thickness or depth.

**net** A flat pattern that can be folded to make a 3-dimensional figure.

**plane figure** A 2-dimensional figure that lies entirely within one plane such as a triangle or square.

**polygon** A closed plane figure formed using line segments that meet only at their endpoints.

**line** A straight set of points that go in opposite directions without ending.

**angle** A figure that is formed by two rays with the same endpoint.

**circle** A closed figure in which all points are the same distance from a fixed point called the center of the circle.

Activity

Go on a scavenger hunt around your house for items shaped like the following figures: cube; rectangular prism; cone; sphere; and cylinder.

Books to Read

*Sea Shapes*  
by Suse MacDonald

*Twizzlers Shapes* and Patterns by Jerry Pallotta

*Eight Hands Round*  
by Ann Whitford Paul
Estimada familia:

Hoy mi clase comenzó el Capítulo 10: Geometría: Las figuras sólidas y las figuras planas. Aprenderé a identificar, a describir, y a clasificar figuras sólidas y planas y también a identificar las partes del círculo. A continuación, están mis palabras de vocabulario y una actividad que podemos hacer juntos.

Cariños, ________________

**Vocabulario clave**

*figura sólida*  Figura sólida de tres dimensiones: largo, ancho y espesor de profundidad

*red patrón*  Unano que se puede doblar para formar una figura tridimensional

*figura plana*  Figura bidimensional que yace completamente en un plano como un triángulo o un cuadrado

*polígono*  Figura plana cerrada formada por segmentos de recta que sólo se unen en sus extremos

*recta*  Conjunto de puntos dispuestos rectamente en direcciones opuestas y sin fin

*ángulo*  Figura formada por dos rayos que comparten el mismo extremo

*círculo*  Figura cerrada en la cual todos los puntos equidistan de un punto fijo llamado centro del círculo

**Actividad**

Organicen una búsqueda de tesoros por la casa y encuentren objetos con formas de las siguientes figuras: (1) cubo; (2) prisma rectangular; (3) cono; (4) esfera y (5) cilindro. Hagan un cartel para anotar tus resultados, el cual incluya cuántos de cada figura encontraron.

**Libros recomendados:**

*Sea Shapes*  
de Suse MacDonald

*Twizzlers Shapes and Patterns*  
by Jerry Pallotta

*Eight Hands Round*  
de Ann Whitford Paul
# Anticipation Guide

*Number, Operations, and Algebraic Thinking*

## Before you begin Chapter 10

- Read each statement.
- Decide whether you agree (A) or disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (Not Sure).

### STEP 1

<table>
<thead>
<tr>
<th>STEP 1 A, D, or NS</th>
<th>Statement</th>
<th>STEP 2 A or D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A solid figure is a figure having three dimensions; length, width, and thickness or depth.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>A net is a flat pattern that can be folded to make a 3-dimensional figure.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>A plane figure is 3-dimensional.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>A figure that is formed by two rays with the same endpoint is a line.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>A straight set of points that go in opposite directions without ending is an angle.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>A circle is a closed figure in which all points are the same distance from a fixed point called the center of the circle.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>An octagon has 8 sides.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>A hexagon has 6 sides.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>A pentagon has 4 sides.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>A triangle has 3 sides.</td>
<td></td>
</tr>
</tbody>
</table>

## After you complete Chapter 10

- Reread each statement and complete the last column by entering an A (agree) or a D (disagree).
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a separate sheet of paper to explain why you disagree. Use examples, if possible.
Chapter 10 Game
Concentrate on Symmetry

You will need:
crayons of 2 different colors

Set

Give each player a crayon.

GO!

1. Take turns choosing a shape.

2. Name the shape and circle the line of symmetry. When all the lines of symmetry have been circled, the game is over.

3. Check to see that the correct line of symmetry has been circled. The player who has circled the most lines of symmetry correctly wins.
Solid figures are 3-dimensional. This means they are not flat. For example, a square is flat, but a cube is a solid figure.

To describe the shape of a solid figure, you use:

- **face**: a flat side
- **edge**: where 2 faces meet
- **vertex**: where 3 or more faces meet, like a corner

To describe this solid figure, you would say it is a cube. It has:

- 6 faces
- 12 edges
- 8 vertices

<table>
<thead>
<tr>
<th>Key Concept</th>
<th>Solid Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>cube</td>
<td>triangular prism</td>
</tr>
<tr>
<td>triangular pyramid</td>
<td>square pyramid</td>
</tr>
</tbody>
</table>

Identify each figure. Then tell the number of faces, edges, and vertices.

1. 
2. 

Identify the solid figure each net would make.

3. 
4.
Skills Practice
Solid Figures

Identify each figure. Then tell the number of faces, edges, and vertices.

1. 

2. 

3. 

4. 

5. 

6. 

Identify the solid figure each net makes.

7. 

8. 

Identify each figure. Then tell the number of faces, edges and vertices.

1. [Diagram of a rectangular prism]
   - Faces: ___
   - Edges: ___
   - Vertices: ___

2. [Diagram of a cube]
   - Faces: ___
   - Edges: ___
   - Vertices: ___

Identify the solid figure each net makes.

3. [Diagram of a net for a square pyramid]
   - Solid figure: ___

4. [Diagram of a net for a rectangular prism]
   - Solid figure: ___

5. This solid figure has 0 faces, 0 edges, and 0 vertices. What is it?
   - ___

Spiral Review

Divide. Use estimation to check.

6. \( 7 \div 3,720 \)

7. \( 50,250 \div 5 \)

8. Raul pays $1,008 total for lunch over 8 months. If he pays the same amount each month, how much does he pay each month?
   - ___
Problem-Solving Practice

Solid Figures

Solve.

1. Molly has a set of wooden blocks. This is one of her blocks. Tell how many faces, edges, and vertices the block has.

![Block Diagram]

2. Molly’s set of wooden blocks also has a block that is in the shape of a cylinder. How many bases does the cylinder block have? Describe the shape of the bases.

3. Natasha bought a large bead to hang from a necklace. The bead has 5 faces, 9 edges, and 6 vertices. What kind of figure was the bead?

4. Mel has a board game that uses 10 pieces shaped like the one below. How many bases does each game piece have? Describe the shape of the bases.

![Cone Diagram]

5. Iman and his father are making an end table for their living room. When they are done, the end table has 6 faces, 12 edges, and 8 vertices. What kind of figure did Iman and his father make?
Look at the net below.

What solid figure can you make from the net on this page? List two ways to name this solid figure.

Predict which numbers will be on opposite faces of the solid figure. Use these as factors to write three multiplication sentences and three addition sentences.

Cut out the net and create a solid figure to check your answers!

Challenge: Renumber the faces of the solid figure so the product of each set of opposite faces is 36.
A polygon is a closed 2-dimensional figure that has straight sides. These figures are not polygons.

<table>
<thead>
<tr>
<th>Open Figures</th>
<th>Closed Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Open Figures" /></td>
<td><img src="image" alt="Closed Figures" /></td>
</tr>
</tbody>
</table>

These figures are polygons.

- **quadrilateral**: 4 straight sides
- **triangle**: 3 straight sides
- **pentagon**: 5 straight sides
- **hexagon**: 6 straight sides
- **octagon**: 8 straight sides

Identify each polygon.

1. ![Hexagon](image)
2. ![Triangle](image)
3. ![Pentagon](image)
4. ![Square](image)
5. ![Octagon](image)
6. ![Rectangular Shape](image)
Tell whether each figure is open or closed. Is it a polygon? If so, classify the figure.

1. [Diagram]

2. [Diagram]

3. [Diagram]

4. [Diagram]

5. [Diagram]

6. [Diagram]

Draw the figure and identify it.

7. a 6-sided figure

8. an 8-sided figure
Homework Practice

Plane Figures

Identify each polygon.

1. ____________  2. ____________

3. ____________  4. ____________

Identify the shapes in the figure.

5. ____________

Tell whether the shape is a polygon.

6. ____________  7. ____________

Spiral Review

Identify each figure. Then tell how many faces, edges and vertices it has. (Lesson 10–1)

8. ____________________  9. ____________________

Identify the solid figure each net would make.

13. ____________________

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1. Nick and his brother are building a tree house. It will have 2 windows. One window is shaped like a square, and the other is shaped like a rectangle. What do these two shapes have in common?

2. Nick’s brother draws a 3-sided shape to show what the roof of the tree house will look like. Is it a polygon? If so, what kind of polygon?

3. Sara is playing a chalk game on the sidewalk. She draws a large quadrilateral first. Inside the quadrilateral, she draws the same figure 10 times. The figure is not a polygon. What figure did she draw?

4. Sara uses her chalk to draw a line diagonally through her quadrilateral. Now, instead of one quadrilateral, she has two of the same polygons. What shapes did she make?

5. For a homework assignment, Dina must find polygons around her town and draw them. She goes down to the harbor, where she sees a boat like the one below. She draws it, but the teacher says it is not a polygon. Why?

6. Sean used toothpicks to make the following shapes: 2 triangles, 3 pentagons, 4 quadrilaterals, and 6 hexagons. How many toothpicks did he use?
Enrich

Polygon Challenge

Use the figure above to follow the directions below.

1. Shade the part of the figure that is not a polygon.

2. Name the largest polygon that appears in the figure.

3. Count all the triangles. How many?

4. Name the polygon that appears inside the square.

5. Draw a pentagon inside one of the large triangles. Hint: You can use the sides of the triangle for some of the sides of the pentagon.

6. Count all the rectangles. How many?
Reteach

Problem-Solving Strategy

Find a Pattern

What shapes are missing?

Step 1. Understand

Be sure you understand the problem.
Read carefully.

What do you know?

• The shapes are in a pattern.

What do you need to find?

• You need to identify

Step 2. Plan

• Logical Reasoning
• Make a Graph
• Make a Table or List
• Guess and Check
• Work Backward
• Draw a Picture or Diagram
• Act It Out
• Find a Pattern
• Write an Equation
• Solve a Simpler Problem

Make a plan.
Choose a strategy.
Looking for a pattern will help you solve the problem.
Find shapes that look familiar. Look for a pattern to see how these shapes have been moved.

**Step 3. Solve**

**Carry out your plan.**

Look for shapes you know. What shapes do you see?

What is one way to describe how the figures moved?

**Step 4. Check**

**Is the solution reasonable?**

Reread the problem.

Did you answer the question? Yes _____ No _____

What other strategies could you use to solve the problem?

**Practice**

1. What shapes do you see in the pattern? Describe the missing shapes.

   ____________________________________________________________
Find a Pattern

1. What shapes do you see in the pattern below?

![Pattern Diagram]

2. Suppose you extend this design. You have a total of 20 small right triangles. How many rhombi will there be in all?

Mixed Strategy Review

Solve. Use any strategy.

3. Aaron buys 5 Picasso T-shirts for his family. A large T-shirt costs $15 and a small T-shirt costs $12. Aaron spends $69. How many large T-shirts does he buy? How many small T-shirts does he buy?

Strategy: 

4. On May 15, 1990, a painting by Van Gogh sold for $75,000,000. Two days later, a painting by Renoir sold for $4,000,000 less than that amount. How much did Renoir’s painting sell for?

Strategy:
1. ALGEBRA: Copy and complete the table. What is the pattern?

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>

Pattern? __________________________

2. Describe the pattern below. Then find the missing number.

1, 3, 9, ______________, 81

Spiral Review

Identify each shape.

3. __________

4. __________

5. __________

6. __________

Identify the shapes in the figure.

7. ______________

Tell whether the shape is a polygon.

8. ______

9. ______

10. ______
Pentadots are made with dots in the shape of a regular pentagon. It takes 5 dots to make a pentadot with 2 dots per side. It takes 10 dots to make a pentadot with 3 dots per side, 15 dots to make a pentadot with 4 dots per side, and so on.

1. Describe the pattern you see:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2. How many dots will be on each side if the total number of dots is 40? _____

3. How many dots does it take to make a pentadot with 17 dots per side? _____

4. Draw a “hexadot,” a hexagon with 2 dots per side.

5. How many dots does it take to make a hexadot with 3 dots per side? _____
**Reteach**

*Lines, Line Segments, and Rays*

<table>
<thead>
<tr>
<th>A line goes on forever in both directions</th>
<th>A line segment is part of a line. It has two endpoints.</th>
<th>A ray has one endpoint.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A line</td>
<td>A line segment</td>
<td>Parallel lines never meet.</td>
</tr>
<tr>
<td>A line segment</td>
<td>Intersecting lines meet.</td>
<td>Perpendicular lines form square corners.</td>
</tr>
</tbody>
</table>

**Identify each figure.**

1. \( \overrightarrow{LM} \)

2. \( \overrightarrow{TS} \)

3. \( \overrightarrow{MN} \)

4. \( \overrightarrow{JK} \)

**Describe each figure.**

5. \( \overrightarrow{AB} \)

6. \( \perp \)

7. \( \overleftrightarrow{GH} \)

8. \( \overleftrightarrow{WX} \)
Describe the figure.

1. \[ \text{ } \]

2. \[ \text{ } \]

3. \[ \text{ } \]

4. \[ \text{ } \]

5. \[ \text{ } \]

6. \[ \text{ } \]

7. \[ \text{ } \]

8. \[ \text{ } \]
Identify each figure.

1. \(X \rightarrow Y\)
2. \(V \rightarrow W\)
3. \(T \rightarrow U\)

Describe the figure.

4. \(C \rightarrow A \rightarrow D\)
5. \(E \rightarrow F\)
6. \(G \rightarrow H\)

Draw an example of each.

7. ray \(CD\)
8. line segment \(FG\)

Solve.

9. Melissa is planting flowers in a pattern. If she continues to plant a red, then pink, then yellow flower, what color will be the eighth flower? _____________

10. Describe the pattern below. Then find the missing number.

\[1, 4, 16, \underline{\quad}, 256\]
**Problem-Solving Practice**

*Lines, Line Segments, and Rays*

**Solve.**

1. During Hillary’s softball game, she ran from first base and stopped at second base. Did her path form a line, line segment, parallel lines, or intersecting lines?

2. Jenna looks at the letter T. Does the letter T form a line segment, parallel line segments, or perpendicular line segments?

3. Ryan’s ski instructor tells him that he should keep his skis parallel. Draw how Ryan’s skis should look.

4. Ryan accidentally crosses the tips of his skis and falls down. What word describes the type of line that Ryan’s crossed skis created?

5. Louis gets lost on the way to Josh’s house. He calls and says he is on Main Street. To get to Josh’s house from Main Street, Louis must turn left on First Avenue. Is First Avenue parallel to Main Street?

6. Josh lives at the corner of First Avenue and Maple Street. How might he describe the way the streets meet at his house?
Lines can be straight, curved, parallel, perpendicular, horizontal, or vertical. Line segments and rays have end points, and sometimes lines intersect. Read this sentence and decide whether it is true:

BF is not parallel to any other line in the figure.

That’s true. Now write five more statements that describe the figure. You may use the words in italics and other math vocabulary words that you know.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

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Angles are formed by two rays that have the same endpoint.

- A right angle forms a square corner.
- It measures 90°.
- It is formed by perpendicular lines.

- An acute angle is smaller than a right angle.
- It measures greater than 0° and less than 90°.

- An obtuse angle is bigger than a right angle.
- It measures greater than 90°, but less than 180°.

Identify each angle.

Classify each angle as right, acute, or obtuse. Use the corner of a sheet of paper to help you.

1.  
2.  
3.  
4.  
5.  
6.  
7.  
8.  

Complete.

9.  This triangle has 3 angles.
10. This kite has 2 angles and 2 angles.
11. This pentagon has 2 angles, 2 angles and 1 angle.
Skills Practice
Angles

Classify each angle as right, acute or obtuse.

1.

Classify each angle as right, acute or obtuse.

7.

Classify each angle as right, acute or obtuse.

8.
10–5

Homework Practice

Angles

Write the measure of the angle in degrees and as a fraction of a full turn.

1. 

2. 

Classify each angle as right, acute, or obtuse.

3. 

4. 

5. 

Spiral Review

Describe the figures. (Lesson 10–4)

6. 

7. 

8. 

9. 

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Solve.

1. Matt looks at the clock and sees that it is 12:55. What type of angle do the hands of the clock form?

2. Now the hour is 1:00. Matt wants to wait until the hands of the clock form a right angle. Until what hour must he wait?

3. The clock in Ms. Alston’s classroom reads 2:15. She tells the students that class will be over when the hands on the clock next form an obtuse angle, and the minute hand is pointing directly to a number on the clockface. What time will class be over?

4. Jake goes to a friend’s house at 2:30. He stays until the hands on the clock form an acute angle. What is the earliest time he could have left?

5. Elise set her alarm clock for 50 minutes after 2 on the morning she was leaving for her camping trip. She fell back asleep for 10 minutes. She finally left the house at 3:25. What type of angle did the hands on the clock form when her alarm went off?

What type of angle did the hands on the clock form when she woke up the second time? ________________

What type of angle did the hands on the clock form when she left the house? ________________

6. Elise left her house at 3:25. She arrived at the trail head at 6:00. In the time it took Elise to arrive at the campsite, how many times did the hands on a clock form right angles?
Imagine how the hands of the clock would appear at each time listed below. Think about each angle the hands would form as the minute hand moves in a clockwise direction away from the hour hand. Classify each angle by making a checkmark in one of the columns.

<table>
<thead>
<tr>
<th>Time</th>
<th>Acute</th>
<th>Obtuse</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Now fill in a time when the clock is at each given angle.

<table>
<thead>
<tr>
<th>Time</th>
<th>Acute</th>
<th>Obtuse</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
There are many ways to solve most math problems. You will decide which method works best for you when you read the problems.

Maria is trying to put her brother’s blocks the way they were when she found them. They were in a neat rectangle. Use the polygons below to form a rectangle:

<table>
<thead>
<tr>
<th>Understand</th>
<th>You know that you need to use the five polygons to form a rectangle. You need to find out how to arrange the polygons to form a rectangle.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan</td>
<td>Choose a strategy. This problem has pieces that need to be moved around to fit in a certain way. You could draw these pieces on paper, cut them out, and move them around to see how they fit. Use the act it out strategy to solve the problem.</td>
</tr>
<tr>
<td>Solve</td>
<td>Arrange the polygons in different ways until you form a rectangle:</td>
</tr>
<tr>
<td></td>
<td><img src="image" alt="Filled rectangle" /></td>
</tr>
<tr>
<td>Check</td>
<td>Look back at the problem. Check that your answer makes sense.</td>
</tr>
</tbody>
</table>
Use any method shown below to solve. Tell what method you used.

- Work backward
- Reasonable answers
- Act it out
- Guess and check
- Look for a pattern

1. A farmer has cows and chickens. Juan counted 296 legs in the farmyard. If there are 100 animals, how many are cows and how many are chickens?

   Strategy: ________________________________

2. Melissa has $20. She earns $9 a week babysitting. Is it reasonable to say she will be able to buy a bike that costs $150 in 15 weeks?

   Strategy: ________________________________

3. Drew bought his lunch for $6. Then he paid $8 for admission to the skate park. Then he paid $3 to ride the bus home. Now he has $2. How much money did Drew start with?

   Strategy: ________________________________

4. Abby paid for lunch with $15. She got back $4. If her salad cost $3, and her water cost $2, how much was the turkey sandwich?

   Strategy: ________________________________

5. Colin sold muffins for the school’s bake sale. He sold each muffin for $2. If he earned $48, how many muffins did he sell?

   Strategy: ________________________________
Use any method shown below to solve. Tell what method you used.

- Work backward
- Reasonable answers
- Act it out
- Guess and check
- Look for a pattern

1. A group of kids were riding bikes. Jessica counted 38 wheels. If there are 15 kids, how many are riding bikes with training wheels and how many are riding bikes without training wheels?

   Strategy: ________________________________

2. Nicholas practices lacrosse for 75 minutes a day during the week and 90 minutes a day on weekends. Is it reasonable to say that he practices lacrosse for 15 hours each week?

   Strategy: ________________________________

3. Kayla sat down to begin her homework at 4:15. After school, her bus ride home is 15 minutes. Then she had a snack and talked with her friends for 25 minutes. She also did her chores for 20 minutes before beginning her homework. What time does Kayla’s school end?

   Strategy: ________________________________

4. What are the next three animals in the pattern if this pattern continues?

   ![Pattern](image)

   Strategy: ________________________________

5. Tyler is bringing napkins for his grade’s picnic. There are 92 people coming to the picnic. He found napkins in packages of 12. How many packages does Tyler need to bring?

   Strategy: ________________________________
Use any method shown below to solve. Tell what method you used.

- Work backward
- Reasonable answers
- Act it out
- Guess and check
- Look for a pattern

1. Justin can run 2 blocks in 1 minute. If he is 8 blocks from home, is it reasonable to say he can run home in 5 minutes?

   Strategy: ____________________________

2. Sarah watched the band march by in a pattern. She saw a trumpet, flute, saxophone, drum, trumpet, flute, saxophone, drum pattern. What are the next three instruments she will see?

   Strategy: ____________________________

**Spiral Review**

Write the measure of the angle in degrees and as a fraction of a full turn. (Lesson 10–5)

3.  

   __________

4.  

   __________

Classify each angle as right, acute, or obtuse.

5. __________

6. __________
Problem-Solving Investigation: Pentomino Puzzle

Pentominoes are special figures made of five squares. They are named for letters in the alphabet that they look like. There are 12 different pentominoes that can be flipped and rotated.

Cut out the pentominoes pictured above and use them to completely cover the squares in the grid below. There are more than 1000 ways to solve the puzzle following these rules:

—Use all twelve pentominoes.
—Do not overlap any of the pentominoes.
—Do not leave any squares uncovered.
You can classify a triangle by the lengths of its sides or the measures of its angles.

An **equilateral triangle** has three sides of equal length.  

An **isosceles triangle** has at least two sides of equal length.  

A **scalene triangle** has no sides of equal length.  

An **acute triangle** has three acute angles (less than 90°).  

An **obtuse triangle** has one obtuse angle (greater than 90° and less than 180°).  

A **right triangle** has one right angle (exactly 90°).  

**Classify each triangle. Use isosceles, equilateral, or scalene and acute, right, or obtuse.**

1. 

   ![Triangle 1](image1)

   5 yd  
   3 yd  
   4 yd

2. 

   ![Triangle 2](image2)

   9 ft  
   9 ft  
   9 ft

3. 

   ![Triangle 3](image3)

   4 cm  
   12 cm  
   10 cm

---

4. Identify the term that does not belong with the other three.  
   **A. right**  
   **B. obtuse**  
   **C. scalene**  
   **D. acute**  
   **4. ____**

5. What kind of triangle has three sides of equal length?  
   **F. equilateral**  
   **G. scalene**  
   **H. right**  
   **J. acute**  
   **5. ____**

6. How many degrees does a straight line measure?
Skills Practice

Triangles

Classify each triangle. Use equilateral, isosceles, or scalene and right, acute, or obtuse

1. 
   \[ \begin{array}{c}
   8 \text{ cm} \\
   10 \text{ cm} \\
   6 \text{ cm}
   \end{array} \]

2. 
   \[ \begin{array}{c}
   4 \text{ in.} \\
   4 \text{ in.} \\
   4 \text{ in.}
   \end{array} \]

Define each term.

3. Scalene

4. Obtuse

5. Equilateral

Tell if each statement is true or false. Explain why.

6. Equilateral triangles are triangles where all three sides have different lengths.

7. Some right triangles are also equilateral triangles.

Problem Solving

Solve.

8. Sue’s half sandwich is 5 inches on one side, 3 inches on another, and 4 on the third side. What kind of triangle is it?
Homework Practice

Triangles

Classify each triangle. Use isosceles, equilateral, or scalene and acute, right, or obtuse.

1. 8 cm 10 cm
   6 cm

2. 8 yd 8 yd
   8 yd

3. 10 ft
   9 ft
   6 ft

4. 5 cm
   9 cm
   13 cm

Spiral Review

Use any strategy shown below to solve. (Lesson 10-6)

Tell what strategy you used.
- Work backward
- Reasonable answers
- Guess and check
- Look for a pattern
- Act it out

5. A number is multiplied by 3. Then 8 is subtracted from the product. The result is 4. What was the original number? _________

Strategy: ________________________________

6. Rebecca wants to bake banana bread, do her homework, call her friend, and clean her room before soccer practice. It takes 65 minutes to make banana bread, 35 minutes to do her homework, 20 minutes to call her friend, and 15 minutes to clean her room. Her soccer practice starts in 2 hours. Does she have enough time to do everything she wants to do? ____________

Strategy: ________________________________
Problem-Solving Practice

Triangles

Solve.

1. Jon’s garden has 3 sides. None are equal sides and there are no equal angles. What type of shape is his garden?

2. Santi has 3 sticks; two of them are 3 centimeters and one is 6 centimeters. Will he be able to make a triangle with them?

3. Brianne is making a design with geometric shapes. She draws a triangle that has 2 sides, 2 centimeters long. The triangle has 2 angles that are 70°. On a separate sheet of paper, draw a triangle like the one Brianne has drawn. What kind of triangle is it—isosceles, equilateral, or scalene?

4. If you draw an equilateral triangle and two sides are 3 inches what is the length of the third?

5. Bruno is making a drawing of the Pentagon. How many triangles will he need to draw to make this polygon, and how many sides will it have?

6. Alison is cutting out fabric. One side of the material is 10 feet, another side is 6 feet, and the third side is 8 feet. What shape is she cutting?
Triangles may be classified according to their interior angles: right, acute or obtuse. Triangles may also be classified according to their sides:

- Scalene triangles have no equal sides.
- Isosceles triangles have two equal sides.
- Equilateral triangles have three equal sides.

Draw and label at least one of each kind by connecting dots on this grid. (Your triangles may overlap, so use different colors.)
Reteach
Quadrilaterals

All quadrilaterals have 4 sides and 4 angles.

A square has 4 equal sides and 4 right angles.

A rhombus has 4 equal sides. Its opposite sides are parallel.

A rectangle has 4 right angles. Its opposite sides are equal and parallel.

A trapezoid has 1 pair of parallel sides.

A parallelogram has opposite sides that are equal and parallel.

Classify each quadrilateral in as many ways as you can.

1. __________

2. __________

3. __________

4. This quadrilateral has opposite sides that are equal and parallel.
   What quadrilateral is it? __________

5. True or false.
   A rectangle is a parallelogram. __________

6. How are a rhombus and a trapezoid similar?
   __________
Skills Practice
Quadrilaterals

Write the type of quadrilateral that best describes the shape.

1. [Diagram]

2. [Diagram]

3. [Diagram]

Tell if each statement is true or false. Explain why.

4. All rectangles are parallelograms.

5. All squares are rhombuses.

6. Some right triangles are also equilateral triangles.

Solve.

7. Sue’s desk has equal sides of 20 inches and 4 right angles.
   Nancy’s desk has two sides of 20 inches, two sides of 30 inches, and 4 right angles. Both say their desks are rectangles. Who is correct?

8. Mike makes a square out of wooden sticks. He pushes one corner of the square and makes a rhombus. How are the square and rhombus alike? How are they different?
Classify each quadrilateral in as many ways as possible.

1. _________
2. _________
3. _________
4. _________
5. _________
6. _________

Spiral Review
Classify each triangle. Use isosceles, equilateral, or scalene and acute, right, or obtuse. (Lesson 10–7)

7. _________
8. _________
9. _________
10. _________
11. _________
12. _________
Problem-Solving Practice
Quadrilaterals

Solve.

1. Bonnie draws a quadrilateral with 4 equal sides, and 4 right angles. What quadrilateral is it?

2. Santi’s wallet is in the shape of a rectangle. Two sides are 2 inches long. The other two sides are 3 inches long. Chaz’s wallet has the same measurements but is not a rectangle. What other shape could it be?

3. Marcus draws a quadrilateral that has 4 equal sides, but no right angles. What quadrilateral might it be?

4. Andy draws a square. Peter draws another shape that has 4 equal sides. Peter says his shape is square. Andy says it is not. What other shape might Peter have drawn?

5. Kelly draws a shape with 4 sides of equal length. The shape has 2 obtuse angles and 2 acute angles. What shape does Kelly draw?

6. Alison is cutting out fabric. The top of the material measures 1 ft, and the bottom measures 3 ft. Each side measures 2 ft. What shape is she cutting?
Choose the word “Some” or “All” to make each statement true.

1. ________ quadrilaterals have two parallel sides.

2. ________ parallelograms are rectangles.

3. ________ quadrilaterals are polygons.

4. ________ polygons are squares.

5. ________ rectangles have four right angles.

6. ________ squares are rectangles.

7. ________ trapezoids are quadrilaterals.

8. ________ rhombuses are squares.

9. ________ squares are parallelograms.

10. ________ trapezoids have four interior angles.
Reteach
Parts of a Circle

The **center** of a circle is in the middle. All points on the circle are the same distance from the center.

A **diameter** is a line segment that connects 2 points on the circle and goes through the center of the circle.

A **radius** is the distance from the center of a circle to every point on a circle.

**Identify the parts of a circle.**

1. 

2. 

3. 

4. 

5. 

6. 

7. **D**

8. **AD**

9. **AG**

**Name the parts of the circle.**
Skills Practice

Parts of a Circle

Identify the parts of a circle.

1. \( G, O, H \)
2. \( P, M \)
3. \( U, L \)

Use data from the circle for problems 4–9. Locate each pair of points on the circle. Name the line segments they create and classify them as parts of a circle.

4. A, D
5. E, B
6. D, F
7. A, F
8. A, C
9. A, B

Problem Solving

Solve.

10. Alan drew a line from one side to the other going through the center of a circle. What part of the circle did Alan draw?

11. Draw a circle. Then draw and label a diameter, a radius, and the center.
Homework Practice

Parts of a Circle

Identify the part of the circle shown.

1. ____________
2. ____________
3. ____________
4. ____________
5. ____________

Name the parts of the circle.

7. \( \overline{GH} \)
8. \( \overline{OK} \)
9. \( O \)
10. \( \overline{GO} \)

Spiral Review

Classify each quadrilateral in as many ways as possible. (Lesson 10-8)

11. ____________
12. ____________
13. ____________
14. ____________
15. ____________
16. ____________
Problem-Solving Practice

Parts of a Circle

Solve.

1. Beth looks at the clock when the school bell rings at 3:30. What part of a circle is the minute hand on the clock?

2. Beth notices that the clock has a straight crack on the left side. It reaches from the top to the bottom and through the center. What part of a circle is the crack?

3. Coach Spano wears a sports watch for soccer practice. She checks the time and sees that it is 6:00, time for practice to end. What is the part of a circle that is formed by the hands of the watch?

4. At soccer practice, the teammates stood in a circle and took turns kicking the ball to the person in the center. If the ball traveled in a straight line, what part of a circle did it make?

5. Joan made a pie that she cut into six pieces. She began by cutting the pie in half across the middle. What is the name of the line segment of her first cut?

6. After Joan cut the pie through the middle, she cut each half into 3 wedges. What part of a circle is one side of a wedge of the pie?
Enrich

The Ferris Wheel

George W. Ferris invented the first Ferris Wheel for the 1893 World’s Fair. Two great steel towers were connected by a 45 foot axle that held the wheel. The wheel’s diameter was about 250 feet and its circumference was about 800 feet. The ride cost fifty-cents and made more than $700,000.00 during the fair!

Follow these directions to make this diagram look more like a Ferris Wheel.

1. Draw a trapezoid around each × to represent seats on the Ferris Wheel.
2. Use a straight edge to draw four diameter lines that connect the seats across from each other.
   (Be sure each diameter passes through the center point.)
3. Name the curved line that connects all the seats. __________
4. What is a segment of that line called? __________
5. Use a straight edge to draw eight chords. Each chord should touch the circumference about half way between two seats.
**Individual Progress Checklist**

<table>
<thead>
<tr>
<th>B</th>
<th>D</th>
<th>M</th>
<th>Goal</th>
<th>Progress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Identify, describe, and classify solid and plane figures.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Identify lines, line segments, rays, and angles.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Identify parts of circles.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Identify and classify triangles and quadrilaterals.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Solve problems by looking for a pattern.</td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Chapter Diagnostic Assessment

Identify each solid figure.

1.  
2.  
3.  

4. Amelia and Sara are playing with marbles. Identify the solid figure the marbles represent. ____________

How many straight sides does each figure have?

5.  
6.  
7.  

8. Harold found a dollar in his pocket. How many sides does the dollar bill have? ____________

Tell whether each angle is greater than, is less than, or equal to a right angle

9.  
10.  
11.  

12. If an angle is 75°, is it greater than, less than or equal to a right angle? ____________
Fill in the blank.

1. A _________ has three sides.

2. A rhombus has _____ equal sides and opposite sides are _____________.

3. A shape with 8 sides is an ________________.

4. A quadrilateral with one pair of parallel sides is a ________________.

5. A ____________ has 6 sides.

6. A _____–sided shape is a pentagon.

7. A parallelogram has opposite sides that are _______ and ____________.

8. A _______ triangle is a triangle with one angle that is 90°

Describe the lines.

9. ________________

10. ___________________

Name the kind of angle.

11. ________________

12. ___________________

Identify parts of a circle.

13. ________________

14. ________________

15. ________________
Quiz 1 (Lessons 10-1 through 10-3)

Identify each figure. Then tell how many faces, edges, and vertices it has.

1. 
2. 

3. This solid figure has 2 faces, 2 edges, and 0 vertices. What is it? 

Identify the shapes in the figure.
4. 

Tell whether the shape is a polygon.
5. 
6. 

Solve. Use the look for a pattern strategy.
7. Describe the pattern below. Then find the missing number.
   64, 32, 16, ____, 4 ____________________
Quiz 2 (Lessons 10-4 through 10-6)

Identify the following.

1. \[ \begin{array}{c}
\text{W} \\
\text{X} \\
\text{Y} \\
\text{Z}
\end{array} \]

Describe the lines.

2. \[ \begin{array}{c}
\text{F} \\
\text{A} \\
\text{B} \\
\text{G}
\end{array} \]

3. \[ \begin{array}{c}
\text{L} \\
\text{K} \\
\text{J} \\
\text{M}
\end{array} \]

Write the measure of the angle in degrees and as a fraction of a full turn.

4. \[ \frac{1}{4} \]

Classify each angle as right, acute, or obtuse.

5. \[ \] 6. \[ \]

Use any strategy shown below to solve.

- Work backward
- Reasonable answers
- Act it out
- Guess and check
- Look for a pattern

7. Nicole is making bead bracelets. She needs 45 more blue beads. They come in packs of 12. How many packs does Nicole need to buy? \[ \]
Quiz 3 (Lessons 10-7 through 10-9)

Classify each triangle.

1. [Diagram of a triangle with sides 5 cm, 4 cm, and 3 cm]

2. [Diagram of an equilateral triangle with sides 6 in. each]

Classify each quadrilateral in as many ways as possible.

3. [Diagram of a trapezoid]

4. [Diagram of a rectangle]

Identify the part of the circle shown.

5. [Diagram of a circle with center marked]

6. [Diagram of a circle with diameter marked]

7. Michele draws an isosceles triangle with sides that are 3 cm and 6 cm. What could the measure of the third side be?

8. Ricardo gets to choose which field he searches for treasure. One has a radius of 100 ft. The other has a radius of 150 ft. Which field should Ricardo choose if he wants to search the smaller field?
Mid-Chapter Review (Lessons 10-1 through 10-5)

Circle the correct choice.

1. Identify this figure.

A. a cube  B. a cone  C. a rectangular prism  D. a square pyramid

2. Identify the following.

F. ray  G. line segment  H. line  J. perpendicular

3. This solid figure has 4 faces, 6 edges, and 4 vertices. What is it?

Tell whether the shape is a polygon.

4.

5.

Describe the following.

6.  

7.

Solve.

8. Describe the pattern below. Then find the missing number.

1, 7, 13, _____, 25
# Vocabulary Test

Match each word to its definition. Write your answers on the lines provided.

1. solid figure _____  
   **A.** a closed plane figure formed using line segments that meet only at their endpoints

2. net _____  
   **B.** a straight set of points that go in opposite directions without ending

3. plane figure_____  
   **C.** a figure that is formed by two rays with the same endpoint

4. polygon _____  
   **D.** a figure having the three dimensions; length, width, and height

5. line _____  
   **E.** a flat pattern that can be folded to make a 3-dimensional figure

6. angle _____  
   **F.** a 2-dimensional figure that lies entirely within one plane such as a triangle or square

7. circle _____  
   **G.** a closed figure in which all points are the same distance from a fixed point called the center of the circle
Oral Assessment

Go on a scavenger hunt around the classroom for items shaped like the following figures: (1) cube; (2) rectangular prism; (3) cone; (4) sphere; and (5) cylinder. If you can’t find the figure, draw it on paper and cut it out.

Read each question aloud to the student. Then write the student’s answers on the lines below the question.

1. Are these figures solid figures or plane figures?

2. Are these figures 2-dimensional or 3-dimensional?

3. Tell how you got your answer.

4. Are any of these figures a circle?

5. Are any of these figures a cube?

7. Tell how you got your answer.
8. Lin, Amanda and Ming are drawing quadrilaterals. Lin drew one with 4 right angles with opposite sides equal and parallel. What quadrilateral did he draw?

9. Amanda drew one with 4 right angles, with opposite sides parallel and all sides are equal in length. What quadrilateral did she draw?

10. Tell how you got your answer.

11. Ming drew one with opposite sides equal and parallel. What quadrilateral did he draw?

12. Tell how you got your answer.

13. Lin drew another one with 1 pair of parallel sides. What quadrilateral did he draw?

14. Tell how you got your answer.
# Chapter Project Rubric

<table>
<thead>
<tr>
<th>Score</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Student successfully completed the chapter project. Student demonstrated appropriate use of chapter information in completing the chapter project.</td>
</tr>
<tr>
<td>2</td>
<td>Student completed the chapter project with partial success. Student partially demonstrated appropriate use of chapter information in completing the chapter project.</td>
</tr>
<tr>
<td>1</td>
<td>Student did not complete the chapter project or completed it with little success. Student demonstrated very little appropriate use of chapter information in completing the chapter project.</td>
</tr>
<tr>
<td>0</td>
<td>Student did not complete the chapter project. Student demonstrated inappropriate use of chapter information in completing the chapter project.</td>
</tr>
</tbody>
</table>
## Foldables Rubric

### Geometry

#### Top Pocket Foldables

<table>
<thead>
<tr>
<th>Score</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| **3** | Student properly assembled Foldables graphic organizer according to instructions.  
Student recorded information related to the chapter in the manner directed by the Foldables graphic organizer.  
Student used the Foldables graphic organizer as a study guide and organizational tool. |
| **2** | Student exhibited partial understanding of proper Foldables graphic organizer assembly.  
Student recorded most but not all information related to the chapter in the manner directed by the Foldables graphic organizer.  
Student demonstrated partial use of the Foldables graphic organizer as a study guide and organizational tool. |
| **1** | Student showed little understanding of proper Foldables graphic organizer assembly.  
Student recorded only some information related to the chapter in the manner directed by the Foldables graphic organizer.  
Student demonstrated little use of the Foldables graphic organizer as a study guide and organizational tool. |
| **0** | Student did not assemble Foldables graphic organizer according to instructions.  
Student recorded little or no information related to the chapter in the manner directed by the Foldables graphic organizer.  
Student did not use the Foldables graphic organizer as a study guide and organizational tool. |
Chapter Test, Form 1

Read each question carefully. Write your answer on the line provided.

1. Classify the angle.

   A. acute  
   B. obtuse  
   C. right  
   D. straight  

2. Describe the drawing.

   I  L
   K  J

   F. $\overline{IJ} \perp \overline{LK}$
   G. $\overleftrightarrow{IJ} \perp \overleftrightarrow{LK}$
   H. $\overrightarrow{IJ}$ intersects $\overrightarrow{LK}$
   J. $\overrightarrow{IJ}$ intersects $\overrightarrow{LK}$

3. Classify the quadrilateral in as many ways as possible.

   A. rectangle, rhombus
   B. rectangle, parallelogram, rhombus, trapezoid
   C. rectangle, parallelogram, rhombus
   D. rectangle, parallelogram

4. Identify the polygon.

   F. pentagon  
   G. octagon  
   H. hexagon  
   J. triangle

5. What is the measure of the angle?

   A. $90^\circ$  
   B. $180^\circ$  
   C. $270^\circ$  
   D. $360^\circ$
Use the figure below for questions 6 and 7.

6. Identify the figure.
   F. triangular prism
   G. rectangular prism
   H. triangular pyramid
   J. square pyramid
   6. ____

7. How many faces, edges, and vertices does the figure have?
   A. 3 faces, 3 edges, 1 vertex
   B. 4 faces, 6 edges, 4 vertices
   C. 3 faces, 5 edges, 3 vertices
   D. 4 faces, 7 edges, 3 vertices
   7. ____

8. Which triangle is scalene and obtuse?
   F. 2 cm
   G. 5 in., 8 in., 7 in.
   H. 1 m
   J. 8 in., 3 in., 7 in.
   8. ____

Use the circle below for questions 9 through 11.

9. Point O is the
   A. diameter  B. radius  C. center  D. chord
   9. ____

10. Which names the diameter?
    F. $\overline{OH}$
    G. $\overline{GH}$
    H. $\overline{OK}$
    J. $\overline{GO}$
    10. ____

11. Which is not a radius?
    A. $\overline{GK}$
    B. $\overline{OH}$
    C. $\overline{OK}$
    D. $\overline{GO}$
    11. ____

12. A yield sign is an equilateral triangle. If one side measures 15 inches, what are the lengths of the other 2 sides?
    F. 5 in., 5 in.
    G. 5 in., 15 in.
    H. 15 in., 12 in.
    J. 15 in., 15 in.
    12. ____

Grade 4  66
Read each question carefully. Write your answer on the line provided.

1. Classify the angle.

A. acute  B. obtuse  C. right  D. straight  1. ____

2. Describe the drawing.

F. $\overline{MN} \perp \overline{OP}$  G. $\overline{MN} \parallel \overline{OP}$  H. $\overline{MN} \overrightarrow{OP}$  J. $\overrightarrow{MN}$  2. ____

3. Identify the polygon.

A. pentagon  B. octagon  C. hexagon  D. triangle  3. ____

4. What is the measure of the angle?

F. $90^\circ$  G. $180^\circ$  H. $270^\circ$  J. $360^\circ$  4. ____
Use the figure below for questions 5 and 6.

![Triangular Prism Diagram]

5. Identify the figure.
   A. triangular prism  
   B. rectangular prism  
   C. triangular pyramid  
   D. square pyramid  
   5. ____

6. How many faces, edges, and vertices does the figure have?
   F. 6 faces, 7 edges, 5 vertices  
   G. 5 faces, 9 edges, 6 vertices  
   H. 5 faces, 9 edges, 5 vertices  
   J. 6 faces, 8 edges, 6 vertices  
   6. ____

7. Which triangle is isosceles and acute?
   A.  
   B.  
   C.  
   D.  
   7. ____

8. Classify the quadrilateral in as many ways as possible.
   F. parallelogram, rhombus, trapezoid  
   G. trapezoid, rhombus  
   H. parallelogram, rhombus  
   J. trapezoid  
   8. ____

Use the circle below for exercises 9 through 11.

![Circle with Points]

9. Which is not a radius?
   A. $\overline{AF}$  
   B. $\overline{AB}$  
   C. $\overline{FB}$  
   D. $\overline{CF}$  
   9. ____

10. Which names the diameter?
    F. $\overline{ED}$  
    G. $\overline{AC}$  
    H. $\overline{FB}$  
    J. $\overline{AF}$  
    10. ____

11. Point F is the
    A. diameter.  
    B. radius.  
    C. center.  
    D. chord.  
    11. ____

Chapter 10
Chapter Test, Form 2B

Read each question carefully. Write your answer on the line provided.

1. What is the measure of the angle?

   \[ \text{A. } 90^\circ \quad \text{B. } 180^\circ \quad \text{C. } 270^\circ \quad 1. \] 

2. Name the angle.

   \[ \text{F. acute} \quad \text{G. obtuse} \quad \text{H. right} \quad 2. \] 

3. What shape is it?

   \[ \text{A. pentagon} \quad \text{B. octagon} \quad \text{C. hexagon} \quad 3. \] 

4. Name the quadrilateral in as many ways as you can.

   \[ \text{F. rectangle, trapezoid} \quad \text{G. square, rectangle, parallelogram} \quad \text{H. rectangle, parallelogram} \quad 4. \] 

5. Describe the drawing.

   \[ \text{A. } \overline{MN} \perp \overline{OP} \quad \text{B. } \overline{MN} \parallel \overline{OP} \quad \text{C. } \overline{MN} \parallel \overline{OP} \quad 5. \]
Use the figure for questions 6 and 7.

6. What is the figure?
   - **F.** triangular prism
   - **G.** triangular pyramid
   - **H.** square pyramid

7. Count the faces, edges, and vertices.
   - **A.** 6 faces, 7 edges, 5 vertices
   - **B.** 5 faces, 9 edges, 6 vertices
   - **C.** 5 faces, 9 edges, 5 vertices

8. Which triangle is isosceles and acute?
   - **F.** 2 cm 2 cm 5 cm
   - **G.** 3 m 1 m 3 m
   - **H.** 3 in. 3 in. 7 in.

Use the circle for questions 9 through 11.

9. Point F is the
   - **A.** diameter.
   - **B.** radius.
   - **C.** center.

10. Which is the diameter?
    - **F.** \( \overline{ED} \)
    - **G.** \( \overline{AC} \)
    - **H.** \( \overline{FB} \)

11. Which is not a radius?
    - **A.** \( \overline{AF} \)
    - **B.** \( \overline{AB} \)
    - **C.** \( \overline{FB} \)

12. How many vertices does a sphere have?
    - **F.** 2
    - **G.** 1
    - **H.** 0
Chapter Test, Form 2C

Read each question carefully. Write your answer on the line provided.

1. Classify the triangle as \textit{isosceles}, \textit{equilateral}, or \textit{scalene} and \textit{acute}, \textit{right}, or \textit{obtuse}.

\begin{center}
\begin{tikzpicture}
\draw (0,0) -- (3,0) -- (1.5,3) -- cycle;
\draw (0,0) -- (0,1.5);
\draw (1.5,0) -- (0,1.5);
\draw (1.5,3) -- (0,1.5);
\node at (0.75,1.5) {4 in.};
\node at (1.5,1.5) {4 in.};
\node at (0.75,0) {4 in.};
\end{tikzpicture}
\end{center}

\textbf{2.} Classify the angle as \textit{acute}, \textit{obtuse}, or \textit{right}.

\begin{center}
\begin{tikzpicture}
\draw (0,0) -- (1,1) -- (2,0) -- cycle;
\node at (1,0.5) {\phantom{0}};
\end{tikzpicture}
\end{center}

\textbf{3.} What is the measure of the angle?

\begin{center}
\begin{tikzpicture}
\draw (0,0) -- (1,1) -- (2,0) -- cycle;
\draw (1,0.5) -- (1,0);
\end{tikzpicture}
\end{center}

\textbf{4.} Describe the drawing.

\begin{center}
\begin{tikzpicture}
\draw (0,0) -- (1,1) -- (2,0) -- cycle;
\draw (1,0.5) -- (1,0);
\end{tikzpicture}
\end{center}

\textbf{5.} Identify the polygon.

\begin{center}
\begin{tikzpicture}
\draw (0,0) -- (1,0) -- (1,1) -- (0,1) -- cycle;
\end{tikzpicture}
\end{center}
Use the circle below for questions 6 through 8.

6. Identify one radius. ________________________
7. Identify the center. _____
8. Identify the diameter. _____
9. Classify the quadrilateral in as many ways as possible.

10. Draw a triangle that is isosceles and acute.

__________________________

Use the figure below for questions 11 and 12.

11. Identify the figure. ________________________
12. How many faces, edges, and vertices does the figure have?

__________________________
Chapter Test, Form 2D

Read each question carefully. Fill in the correct answer in the space provided.

Use the figure below for questions 1 and 2.

![Figure](image)

1. What is the figure? _________________________

2. Count the faces, edges, and vertices.
   _______________________________________________________________________

Use the circle for questions 3 through 5.

![Circle](image)

3. Name one radius. _________________________

4. Name the diameter. _________________________

5. Name the center. _________________________

6. Is the angle acute, obtuse, or right?
   _________________________

7. Describe the drawing.
   _______________________________________________________________________

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8. What is the measure of the angle?

\[ \quad \]

9. Tell about the drawing.

\[ \quad \]

10. Name the quadrilateral in as many ways as you can.

\[ \quad \]

11. Name the polygon.

\[ \quad \]

12. A sign has three sides. What polygon could it be?  

\[ \quad \]
Chapter Test, Form 3

Read each question carefully. Write your answer in the space provided.

1. Classify the triangle as isosceles, equilateral, or scalene and acute, right, or obtuse.

2. Classify the angle as acute, obtuse, or right.

3. What is the measure of the angle?

4. Identify the polygon. Classify it in as many ways as possible.

5. Identify the polygon.
Use the circle below for questions 6 through 8.

6. How many radii are shown in the circle? ____
7. Identify the diameter. ____
8. Identify the center. ____

Use the figure below for questions 9 and 10.

9. Identify the figure. __________________________

10. How many faces, edges, and vertices does the figure have? ______________________________________

11. Belle drew three polygons. The three polygons have a combined total of 15 sides. What polygons could Belle have drawn?
   __________________________________________________________________________________________
   __________________________________________________________________________________________

12. Are trapezoids also parallelograms? Explain why or why not.
   __________________________________________________________________________________________
   __________________________________________________________________________________________
   __________________________________________________________________________________________
Chapter Extended-Response Test

Demonstrate your knowledge by giving a clear, concise solution to each problem. Be sure to include all relevant drawings and justify your answers. You may show your solution in more than one way or investigate beyond the requirements of the problem. If necessary, record your answer on another piece of paper.

1. a. Explain the difference between plane and solid figures and draw an example of each.

b. Describe the terms: face, edge, and vertex. Draw a solid figure with each aspect labeled.

c. Name the 5 plane figures discussed in this chapter and draw an example of each of them.

2. Give the definition for line, ray, and line segment. Draw an example of each.

3. Explain the difference between an acute, obtuse, and right angle. Draw a picture of each.
Use this recording sheet with pages 426–427 of the Student Edition.

Read each question. Then fill in the correct answer.

1.  A  B  C  D

2.  F  G  H  J

3.  A  B  C  D

4.  F  G  H  J

5.  A  B  C  D

6.  F  G  H  J

7.  A  B  C  D

8.  F  G  H  J

9.  A  B  C  D

10. F  G  H  J
Test Example
Look at the figure below.

What is the name of the figure?
A. triangle  B. octagon
C. hexagon  D. pentagon

Read the Question
You need to name the figure shown.

Solve the Question
Count the number of sides and angles in the figure.
There are 6 sides and 6 angles.
Eliminate answer choices.
The only figure that has 6 sides and 6 angles is a hexagon.
So, the answer is C.

Choose the best answer.
1. Which figure below has two pairs of parallel sides?
   A. trapezoid
   B. triangle
   C. rectangle
   D. pentagon
   1 ___

2. Look at the figure below.

What is the name of the figure?
F. intersecting lines
   G. perpendicular lines
   H. parallel lines
   J. ray
   2 ___

3. Which is the best estimate for \(323 \div 8\)?
   A. 60
   B. 50
   C. 40
   D. 30
   3 ___
4. Which object below has the shape of a cube?

   F.  
   G.  
   H.  
   J.  

5. What is the name of the figure for the net shown below?

   A. square pyramid  
   B. triangular pyramid  
   C. square prism  
   D. triangular prism

6. What kind of triangle is shown below?

   F. isosceles  
   G. right  
   H. scalene  
   J. equilateral

7. Look at the circle.

   G  O  H  
   K

Which line segment is the radius?

   A. GH  
   B. OK  
   C. HK  
   D. GK
8. Look at the angle shown below.

What is the name of the angle?

F. acute  G. right  H. obtuse  J. straight

9. Larry has 5 crates filled with magazines. Each crate can hold 32 magazines. How many magazines does he have in all?
A. 120  B. 130  C. 140  D. 160

10. What is the value of \( y \)?

\[(16 \div 4) \times (12 - 6) = y\]

F. 24  G. 12  H. 10  J. 8

Write the best answer.

11. How would you describe two lines that will never meet?

12. What is a shape with 8 sides?

13. What is a quadrilateral with one pair of parallel sides?

14. How would you describe two lines that meet at a 90° angle?

15. What is the part of a circle that is twice its radius?

16. What is the name of an angle that is less than 90°?
### Anticipation Guide

**Number, Operations, and Algebraic Thinking**

#### Before you begin Chapter 10

- Read each statement.
- Decide whether you agree (A) or disagree (D) with the statement.
- Write A or D in the first column OR if you are not sure whether you agree or disagree, write NS (Not Sure).

#### After you complete Chapter 10

- Reread each statement and complete the last column by entering an A (agree) or a D (disagree).
- Did any of your opinions about the statements change from the first column?
- For those statements that you mark with a D, use a separate sheet of paper to explain why you disagree. Use examples, if possible.

<table>
<thead>
<tr>
<th>Statement</th>
<th>A, D, or NS</th>
<th>Step 1</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A solid figure is a figure having three dimensions; length, width, and thickness or depth.</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. A net is a flat pattern that can be folded to make a 3-dimensional figure.</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. A plane figure is 3-dimensional.</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. A figure that is formed by two rays with the same endpoint is a line.</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. A set of points that go in opposite directions is a plane.</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. A circle is a closed figure in which all points are the same distance from a fixed point called the center of the circle.</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. An octagon has 8 sides.</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. A hexagon has 6 sides.</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. A pentagon has 4 sides.</td>
<td>D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. A triangle has 3 sides.</td>
<td>A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Shape Name and Definition

#### Chapter 10: Geometry: Solid and Plane Figures

- **Rectangle**: A quadrilateral with four right angles.
- **Square**: A rectangle with four congruent sides.
- **Rhombus**: A parallelogram with four congruent sides.
- **Trapezoid**: A quadrilateral with one pair of parallel sides.

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Solid figures are 3-dimensional. This means they are not flat. For example, a square is flat, but a cube is a solid figure.

To describe the shape of a solid figure, you use:
- **face**: a flat side
- **edge**: where 2 faces meet
- **vertex**: where 3 or more faces meet, like a corner

To describe this solid figure, you would say it is a cube. It has:
- 6 faces
- 12 edges
- 8 vertices

### Key Concept

<table>
<thead>
<tr>
<th>Solid Figures</th>
<th>Cube</th>
<th>Triangular Prism</th>
<th>Rectangular Prism</th>
<th>Cone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangular Pyramid</td>
<td>Square Pyramid</td>
<td>Sphere</td>
<td>Cylinder</td>
<td></td>
</tr>
</tbody>
</table>

Identify each figure. Then tell the number of faces, edges, and vertices.

1. **Rectangular prism**: 6 faces, 12 edges, 8 vertices
2. **Cylinder**: 2 faces, 0 edges, 0 vertices
3. **Triangular prism**: 5 faces, 9 edges, 6 vertices
4. **Cube**: 6 faces, 12 edges, 8 vertices
5. **Cone**: 1 circular face, 0 edges, 1 vertex
6. **Sphere**: 0 faces, 0 edges, 0 vertices
7. **Triangular pyramid**: 4 faces, 6 edges, 4 vertices

Identify the solid figure each net would make.

3. **Triangular prism**
4. **Cylinder**
7. **Square pyramid**
8. **Cone**
Homework Practice
Solid Figures

Identify each figure. Then tell the number of faces, edges and vertices.

1. triangular prism; 5 faces, 9 edges, 6 vertices
2. rectangular prism; 6 faces, 12 edges, 8 vertices

Identify the solid figure each net makes.

3. square pyramid
4. rectangular prism

This solid figure has 0 faces, 0 edges, and 0 vertices. What is it? sphere

Problem-Solving Practice
Solid Figures

Solve.

1. Molly has a set of wooden blocks. This is one of her blocks. Tell how many faces, edges, and vertices the block has.

6 faces, 12 edges, 8 vertices

2. Molly’s set of wooden blocks also has a block that is in the shape of a cylinder. How many bases does the cylinder block have? Describe the shape of the bases.
2 circular bases

3. Natasha bought a large bead to hang from a necklace. The bead has 5 faces, 9 edges, and 6 vertices. What kind of figure was the bead?
triangular prism

4. Mel has a board game that uses 10 pieces shaped like the one below. How many bases does each game piece have? Describe the shape of the bases.
1 circular base

5. Iman and his father are making an end table for their living room. When they are done, the end table has 6 faces, 12 edges, and 8 vertices. What kind of figure did Iman and his father make?
Possible answers: cube or rectangular prism

Divide. Use estimation to check.

6. \( \frac{71,720}{531} \); 500 would be the estimate.

7. \( \frac{50,250}{5} \); 10,000 would be the estimate.

8. Raul pays $1,008 total for lunch over 8 months. If he pays the same amount each month, how much does he pay each month?
$126

Possible answers: cube or rectangular prism
Solid Figures

Look at the net below.

What solid figure can you make from the net on this page? List two ways to name this solid figure.

cube or rectangular prism

Predict which numbers will be on opposite faces of the solid figure. Use these as factors to write three multiplication sentences and three addition sentences.

Sample answers:

5 + 4 = 9,
6 + 9 = 15,
7 + 8 = 15,
5 × 4 = 20,
6 × 9 = 54,
7 × 8 = 56

Cut out the net and create a solid figure to check your answers!

Challenge: Renumber the faces of the solid figure so the product of each set of opposite faces is 36. Sample answers:

1. hexagon
2. triangle
3. pentagon
4. quadrilateral
5. octagon
6. quadrilateral

A polygon is a closed 2-dimensional figure that has straight sides. These figures are not polygons.

<table>
<thead>
<tr>
<th>Open Figures</th>
<th>Closed Figures</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVE</td>
<td>O</td>
</tr>
</tbody>
</table>

These figures are polygons.

quadrilateral
4 straight sides
pentagon
5 straight sides
hexagon
6 straight sides
octagon
8 straight sides

Identify each polygon.
Tell whether each figure is open or closed. Is it a polygon? If so, classify the figure.

1. open, not a polygon
2. closed, not a polygon
3. closed, polygon, quadrilateral
4. closed, polygon, pentagon
5. closed, polygon, quadrilateral
6. closed, polygon, triangle

Identify each polygon.
1. pentagon
2. quadrilateral
3. triangle
4. octagon

Identify the shapes in the figure.
5. 2 quadrilaterals, 3 triangles

Tell whether the shape is a polygon.
6. no
7. yes

Draw the figure and identify it.
7. a 6-sided figure
8. an 8-sided figure

Identify the solid figure each net would make.
13. triangular pyramid

Identify each figure. Then tell how many faces, edges and vertices it has. (Lesson 10-1)
8. cube; 6 faces; 12 edges; 8 vertices
9. cylinder; 2 faces; 0 edges; 0 vertices

Spiral Review
Identify each figure. Then tell how many faces, edges and vertices it has. (Lesson 10-1)
Problem-Solving Practice
Plane figures

1. Nick and his brother are building a tree house. It will have 2 windows. One window is shaped like a square, and the other is shaped like a rectangle. What do these two shapes have in common?
   both polygons, both quadrilaterals

2. Nick's brother draws a 3-sided shape to show what the roof of the tree house will look like. Is it a polygon? If so, what kind of polygon?
   yes; triangle

3. Sara is playing a chalk game on the sidewalk. She draws a large quadrilateral first. Inside the quadrilateral, she draws the same figure 10 times. The figure is not a polygon. What figure did she draw?
   Sample answer; circle

4. Sara uses her chalk to draw a line diagonally through her quadrilateral. Now, instead of one quadrilateral, she has two of the same polygons. What shapes did she make?
   triangle

5. For a homework assignment, Dina must find polygons around her town and draw them. She goes down to the harbor, where she sees a boat like the one below. She draws it, but the teacher says it is not a polygon. Why?
   because it is 3-dimensional

6. Sean used toothpicks to make the following shapes: 2 triangles, 3 pentagons, 4 quadrilaterals, and 6 hexagons. How many toothpicks did he use?
   73 toothpicks

Enrich
Polygon Challenge

Use the figure above to follow the directions below.

1. Shade the part of the figure that is not a polygon.
   circle

2. Name the largest polygon that appears in the figure.
   hexagon

3. Count all the triangles. How many?
   6

4. Name the polygon that appears inside the square.
   octagon

5. Draw a pentagon inside one of the large triangles. Hint: You can use the sides of the triangle for some of the sides of the pentagon.
   see dotted lines

6. Count all the rectangles. How many?
   6; 2 small, 2 medium, 1 large, 1 square
Find shapes that look familiar. Look for a pattern to see how these shapes have been moved.

Step 3. Solve
Carry out your plan.
Look for shapes you know. What shapes do you see?
triangles

What is one way to describe how the figures moved?
Sample answer: Right triangles have been reflected.

Step 4. Check
Is the solution reasonable?
Reread the problem.
Did you answer the question? Yes ______ No ______

What other strategies could you use to solve the problem?
Answers may vary. Possible answer: Act it out, Draw a diagram.

Practice

1. What shapes do you see in the pattern? Describe the missing shapes.
rectangles and square; one rectangle and one square
**Skills Practice**

**Problem-Solving Strategy**

**Find a Pattern**

1. What shapes do you see in the pattern below?
   - right triangle, rhombus

2. Suppose you extend this design. You have a total of 20 small right triangles. How many rhombi will there be in all?
   - 5 rhombi

**Mixed Strategy Review**

Solve. Use any strategy.

**Strategies may vary. Possible strategies are given.**

3. Aaron buys 5 Picasso T-shirts for his family. A large T-shirt costs $15 and a small T-shirt costs $12. Aaron spends $69. How many large T-shirts does he buy? How many small T-shirts does he buy?
   - 3 large T-shirts and 2 small T-shirts
   - Strategy: Guess and check.

4. On May 15, 1990, a painting by Van Gogh sold for $75,000,000. Two days later, a painting by Renoir sold for $4,000,000 less than that amount. How much did Renoir’s painting sell for?
   - $71,000,000
   - Strategy: Write an equation.

**Homework Practice**

**Problem-Solving Strategy: Look for a Pattern**

1. ALGEBRA: Copy and complete the table. What is the pattern?

<table>
<thead>
<tr>
<th>Input</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
</tr>
</tbody>
</table>

   Pattern? 6; 12; multiply by 4

2. Describe the pattern below. Then find the missing number.
   - multiply by 3; 27, 81

**Spiral Review**

Identify each shape.

- 3. pentagon
- 4. quadrilateral
- 5. Triangle
- 6. octagon

Identify the shapes in the figure.

- 7. 2 quadrilaterals, 3 triangles

Tell whether the shape is a polygon.

- 8. No
- 9. Yes
- 10. No
Pentadots are made with dots in the shape of a regular pentagon. It takes 5 dots to make a pentadot with 2 dots per side. It takes 10 dots to make a pentadot with 3 dots per side, 15 dots to make a pentadot with 4 dots per side, and so on.

1. Describe the pattern you see:
   Answers will vary but should reflect an understanding that it takes the number of dots per side minus one, times five. (DPS - 1) x 5
   For example (3 dots per side - 1) x 5 = 10 dots.

2. How many dots will be on each side if the total number of dots is 40? 9

3. How many dots does it take to make a pentadot with 17 dots per side? 80

4. Draw a “hexadot,” a hexagon with 2 dots per side.

5. How many dots does it take to make a hexadot with 3 dots per side? 12

Identify each figure.

1. \( \overrightarrow{LM} \)
2. \( \overrightarrow{TS} \)
3. \( \overrightarrow{MN} \)
4. \( \overrightarrow{KJ} \)

Describe each figure.

5. \( \overrightarrow{AB} \) intersects \( \overrightarrow{CD} \)
6. \( \overrightarrow{QR} \parallel \overrightarrow{PL} \)
7. \( \overrightarrow{GH} \perp \overrightarrow{EF} \)
8. \( \overrightarrow{XW} \parallel \overrightarrow{YZ} \)
Describe the figure.

1. \( \overline{AB} \)

2. \( \overleftrightarrow{IJ} \) intersects \( \overleftrightarrow{KL} \)

3. \( \overline{CD} \)

4. \( \overline{LM} \)

5. \( \overline{QR} \perp \overline{ST} \)

6. \( \overline{MN} \parallel \overline{OP} \)

7. \( \overleftrightarrow{QP} \) intersects \( \overline{MN} \)

8. \( \overrightarrow{GH} \parallel \overrightarrow{IJ} \)

Identify each figure.

1. \( \overline{XY} \)

2. \( \overline{VW} \)

3. \( \overline{TU} \)

4. \( \overline{AB} \perp \overline{CD} \)

5. \( \overline{EF} \parallel \overline{GH} \)

6. \( \overleftrightarrow{IJ} \) intersects \( \overleftrightarrow{KL} \)

Draw an example of each.

7. \( \text{ray } \overrightarrow{CD} \)

8. \( \text{line segment } \overline{FG} \)

Solve.

9. Melissa is planting flowers in a pattern. If she continues to plant a red, then pink, then yellow flower, what color will be the eighth flower? pink

10. Describe the pattern below. Then find the missing number.
    \[ 1, 4, 16, \text{ multiply by 4; } 64, 256 \]
**Problem-Solving Practice**

**Lines, Line Segments, and Rays**

**Solve.**

1. During Hillary's softball game, she ran from first base and stopped at second base. Did her path form a line, line segment, parallel lines, or intersecting lines?  
   **line segment**

2. Jenna looks at the letter T. Does the letter T form a line segment, parallel line segments, or perpendicular line segments?  
   **perpendicular line segments**

3. Ryan's ski instructor tells him that he should keep his skis parallel. Draw how Ryan's skis should look.  
   **check students' drawings**

4. Ryan accidentally crosses the tips of his skis and falls down. What word describes the type of line that Ryan's crossed skis created?  
   **intersecting**

5. Louis gets lost on the way to Josh's house. He calls and says he is on Main Street. To get to Josh's house from Main Street, Louis must turn left on First Avenue. Is First Avenue parallel to Main Street?  
   **no, they are probably perpendicular**

6. Josh lives at the corner of First Avenue and Maple Street. How might he describe the way the streets meet at his house?  
   **Possible answers: the streets intersect; the streets are perpendicular**

---

**Enrich**

**Line up**

Lines can be straight, curved, parallel, perpendicular, horizontal, or vertical. Line segments and rays have end points, and sometimes lines intersect. Read this sentence and decide whether it is true:

**BF is not parallel to any other line in the figure.**

That's true. Now write five more statements that describe the figure. You may use the words in italics and other math vocabulary words that you know.

**For example, • CG intersects AD. • AD and EH are parallel lines. • There are no curved lines in the figure. • AD is perpendicular to CG. • Line segment FG forms the base of a trapezoid.**
Angles are formed by two rays that have the same endpoint.

- A right angle forms a square corner. It measures 90°. It is formed by perpendicular lines.
- An acute angle is smaller than a right angle. It measures greater than 0° and less than 90°.
- An obtuse angle is bigger than a right angle. It measures greater than 90°, but less than 180°.

Classify each angle as right, acute, or obtuse. Use the corner of a sheet of paper to help you.

1. right
2. acute
3. obtuse
4. right
5. obtuse
6. acute
7. obtuse
8. acute

Identify each angle.

- This triangle has 3 acute angles.
- This kite has 2 acute angles and 2 obtuse angles.
- This pentagon has 2 acute angles, 2 obtuse angles, and 1 right angle.

Classify each angle as right, acute, or obtuse.

9. acute
10. obtuse
11. right

Complete.

12. acute
13. obtuse
14. right

Recognize angles as forming part of a larger figure.
Name __________________________ Date __________________

10–5

Homework Practice

Angles

Write the measure of the angle in degrees and as a fraction of a full turn.

1. A 90° angle is ¼ turn on a circle.
   
   90°; \(\frac{1}{4}\) turn

2. A 360° angle is one full turn on a circle.
   
   360°; 1 full turn

Classify each angle as right, acute, or obtuse.

3. obtuse

4. right

5. acute

Spiral Review

Describe the figures. (Lesson 10–4)

6. \(\overrightarrow{MN}\)

7. \(\overrightarrow{OP}\)

8. \(\overrightarrow{AB} \perp \overrightarrow{FG}\)

9. \(\overrightarrow{TU} \parallel \overrightarrow{VW}\)

Solve.

1. Matt looks at the clock and sees that it is 12:55. What type of angle do the hands of the clock form?
   
   acute

2. Now the hour is 1:00. Matt wants to wait until the hands of the clock form a right angle. Until what hour must he wait?
   
   3:00

3. The clock in Ms. Alston’s classroom reads 2:15. She tells the students that class will be over when the hands on the clock next form an obtuse angle, and the minute hand is pointing directly to a number on the clockface. What time will class be over?
   
   2:30

4. Jake goes to a friend’s house at 2:30. He stays until the hands on the clock form an acute angle. What is the earliest time he could have left?
   
   3:01

5. Elise set her alarm clock for 50 minutes after 2 on the morning she was leaving for her camping trip. She fell back asleep for 10 minutes. She finally left the house at 3:25. What type of angle did the hands on the clock form when her alarm went off?
   
   obtuse

What type of angle did the hands on the clock form when she woke up the second time?
   
   right

What type of angle did the hands on the clock form when she left the house?
   
   acute

6. Elise left her house at 3:25. She arrived at the trail head at 6:00. In the time it took Elise to arrive at the campsite, how many times did the hands on a clock form right angles?
   
   5 times
Imagine how the hands of the clock would appear at each time listed below. Think about each angle the hands would form as the minute hand moves in a clockwise direction away from the hour hand. Classify each angle by making a checkmark in one of the columns.

<table>
<thead>
<tr>
<th>Time</th>
<th>Acute</th>
<th>Obtuse</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:30</td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>4:30</td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>11:00</td>
<td></td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>12:15</td>
<td></td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>

Now fill in a time when the clock is at each given angle.

<table>
<thead>
<tr>
<th>Sample Answer</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>3:00</td>
<td></td>
</tr>
<tr>
<td>7:00</td>
<td></td>
</tr>
<tr>
<td>1:00</td>
<td></td>
</tr>
</tbody>
</table>

Enrich Time for Angles

Problem-Solving Investigation

There are many ways to solve most math problems. You will decide which method works best for you when you read the problems.

Maria is trying to put her brother’s blocks the way they were when she found them. They were in a neat rectangle. Use the polygons below to form a rectangle.

Understand

You know that you need to use the five polygons to form a rectangle. You need to find out how to arrange the polygons to form a rectangle.

Plan

Choose a strategy. This problem has pieces that need to be moved around to fit in a certain way. You could draw these pieces on paper, cut them out, and move them around to see how they fit. Use the act it out strategy to solve the problem.

Solve

Arrange the polygons in different ways until you form a rectangle:

Check

Look back at the problem. Check that your answer makes sense.
Use any method shown below to solve. Tell what method you used.

- Work backward
- Reasonable answers
- Guess and check
- Look for a pattern
- Act it out

1. A farmer has cows and chickens. Juan counted 296 legs in the farmyard. If there are 100 animals, how many are cows and how many are chickens?

   52 chickens, 48 cows

   Strategy: guess and check

2. Melissa has $20. She earns $9 a week babysitting. Is it reasonable to say she will be able to buy a bike that costs $150 in 15 weeks?

   Yes. $155 is close to $150

   Strategy: reasonable answers

3. Drew bought his lunch for $6. Then he paid $8 for admission to the skate park. Then he paid $3 to ride the bus home. Now he has $2. How much money did Drew start with?

   $19

   Strategy: work backward

4. Abby paid for lunch with $15. She got back $4. If her salad cost $3, and her water cost $2, how much was the turkey sandwich?

   $6

   Strategy: act it out

5. Colin sold muffins for the school’s bake sale. He sold each muffin for $2. If he earned $48, how many muffins did he sell?

   24 muffins

   Strategy: act it out

1. A group of kids were riding bikes. Jessica counted 38 wheels. If there are 15 kids, how many are riding bikes with training wheels and how many are riding bikes without training wheels?

   4 with training wheels, 11 without

   Strategy: guess and check

2. Nicholas practices lacrosse for 75 minutes a day during the week and 90 minutes a day on weekends. Is it reasonable to say that he practices lacrosse for 15 hours each week?

   No. 9.25 hours is not close to 15 hours

   Strategy: reasonable answers

3. Kayla sat down to begin her homework at 4:15. After school, her bus ride home is 15 minutes. Then she had a snack and talked with her friends for 25 minutes. She also did her chores for 20 minutes before beginning her homework. What time does Kayla’s school end?

   3:15

   Strategy: work backward

4. What are the next three animals in the pattern if this pattern continues?

   Rabbit, cat, dog

   Strategy: Look for a pattern

5. Tyler is bringing napkins for his grade’s picnic. There are 92 people coming to the picnic. He found napkins in packages of 12. How many packages does Tyler need to bring?

   8 packages

   Strategy: act it out
Homework Practice

Problem-Solving Investigation

Use any method shown below to solve. Tell what method you used.

- Work backward
- Reasonable answers
- Act it out
- Guess and check
- Look for a pattern

1. Justin can run 2 blocks in 1 minute. If he is 8 blocks from home, is it reasonable to say he can run home in 5 minutes?
   **Yes.** 4 minutes is close to 5 minutes.
   **Strategy:** sample answer: reasonable answers

2. Sarah watched the band march by in a pattern. She saw a trumpet, flute, saxophone, drum, trumpet, flute, saxophone, drum pattern. What are the next three instruments she will see?
   **Trumpet, flute, saxophone**
   **Strategy:** sample answer: look for a pattern

Spiral Review

Write the measure of the angle in degrees and as a fraction of a full turn. (Lesson 10–5)

3. A 90° angle is \(\frac{1}{4}\) turn on a circle.
   \(90°; \frac{1}{4}\) turn

4. A 180° angle is \(\frac{1}{2}\) turn on a circle.
   \(180°; \frac{1}{2}\) turn

Classify each angle as right, acute, or obtuse.

5. **Acute**
6. **Obtuse**

Enrich

Problem-Solving Investigation: Pentomino Puzzle

Pentominoes are special figures made of five squares. They are named for letters in the alphabet that they look like. There are 12 different pentominoes that can be flipped and rotated.

Cut out the pentominoes pictured above and use them to completely cover the squares in the grid below. There are more than 1000 ways to solve the puzzle following these rules:

- Use all twelve pentominoes.
- Do not overlap any of the pentominoes.
- Do not leave any squares uncovered.
You can classify a triangle by the lengths of its sides or the measures of its angles.

An **equilateral triangle** has three sides of equal length.

An **isosceles triangle** has at least two sides of equal length.

A **scalene triangle** has no sides of equal length.

An **acute triangle** has three acute angles (less than 90°).

An **obtuse triangle** has one obtuse angle (greater than 90° and less than 180°).

A **right triangle** has one right angle (exactly 90°).

Classify each triangle. Use **isosceles**, **equilateral**, or **scalene** and **acute**, **right**, or **obtuse**.

1. scalene, right

2. equilateral, acute

3. scalene, obtuse

4. Identify the term that does not belong with the other three.
   A. right  B. obtuse  C. scalene  D. acute  
   4. C

5. What kind of triangle has three sides of equal length?
   F. equilateral  G. scalene  H. right  J. acute  
   5. F

6. How many degrees does a straight line measure?
   180 degrees or 180°

**Define each term.**

3. Scalene has no sides of equal length

4. Obtuse has one obtuse angle

5. Equilateral has three sides of equal length

Tell if each statement is true or false. Explain why.

6. Equilateral triangles are triangles where all three sides have different lengths.
   False, all sides are the same length

7. Some right triangles are also equilateral triangles.
   False; an equilateral triangle is always an acute triangle

**Problem Solving**

Solve.

8. Sue's half sandwich is 5 inches on one side, 3 inches on another, and 4 on the third side. What kind of triangle is it?
   scalene, right
Classify each triangle. Use isosceles, equilateral, or scalene and acute, right, or obtuse.

1. Jon's garden has 3 sides. None are equal sides and there are no equal angles. What type of shape is his garden?
   - a scalene, right, or obtuse triangle

2. Sam has 3 sticks; two of them are 6 cm, and one is 10 cm. Will he be able to make a triangle with them?
   - no

3. Briane is making a design with geometric shapes. She draws a triangle that has 2 sides, 9 cm each, and a diagonal of 18 cm. On a separate sheet of paper, draw a triangle like the one Briane has drawn. What kind of triangle is it—equilateral, isosceles, scalene, or obtuse?

4. If you draw an equilateral triangle and two sides are 3 inches, what is the length of the third?
   - 3 inches

5. Bruno is making a drawing of the Pentagon. How many triangles will he need to draw to make this polygon, and how many sides will it have?
   - 5 triangles; 5 sides

6. Alison is cutting out fabric. One side of the material is 10 feet, another side is 6 feet, and the third side is 8 feet. What shape is she cutting?
   - scalene triangle or right triangle

Use any strategy shown below to solve. (Lesson 10-6)

Tell what strategy you used.
- Guess and check
- Work backward
- Reasonable answers
- Act it out

Check students' drawings, which should be labeled isosceles.
Tri This!

Triangles may be classified according to their interior angles: right, acute, or obtuse. Triangles may also be classified according to their sides:

- Scalene triangles have no equal sides.
- Isosceles triangles have two equal sides.
- Equilateral triangles have three equal sides.

Draw and label at least one of each kind by connecting dots on this grid. (Your triangles may overlap, so use different colors.)

Examples
- Right triangle is dotted
- Scalene is dashed
- Isosceles is solid
- Ask students to check any equilateral triangle with a ruler.

Classify each quadrilateral in as many ways as you can.

1. rectangle, parallelogram
2. trapezoid
3. parallelogram
4. This quadrilateral has opposite sides that are equal and parallel. What quadrilateral is it? a parallelogram
5. True or false. A rectangle is a parallelogram. true
6. How are a rhombus and a trapezoid similar? a rhombus's opposite sides are parallel. A trapezoid has 1 pair of parallel sides.
Answers (Lesson 10-8)

Possible answers given.

1. parallelogram
2. trapezoid
3. parallelogram and rhombus
4. parallelogram and rhombus
5. parallelogram and rhombus
6. parallelogram
7. parallelogram
8. parallelogram
9. parallelogram
10. parallelogram
11. parallelogram
12. parallelogram
13. parallelogram
14. parallelogram
15. parallelogram
16. parallelogram
17. parallelogram
18. parallelogram
19. parallelogram
20. parallelogram

Write the type of quadrilateral that best describes the shape.

1. quadrilateral
2. trapezoid
3. parallelogram
4. parallelogram
5. parallelogram
6. parallelogram
7. parallelogram
8. parallelogram
9. parallelogram
10. parallelogram
11. parallelogram
12. parallelogram
13. parallelogram
14. parallelogram
15. parallelogram
16. parallelogram
17. parallelogram
18. parallelogram
19. parallelogram
20. parallelogram

Tell if each statement is true or false. Explain why.

4. All rectangles are parallelograms. True; opposite sides of rectangles are parallel.
5. All squares are rhombuses. True; a square has 4 equal sides, and opposite sides are parallel.
6. Some right triangles are also equilateral triangles. False; an equilateral triangle is always an acute triangle.

Solve.

7. Sue's desk has equal sides of 20 inches and 4 right angles. Nancy's desk has two sides of 20 inches, two sides of 30 inches, and 4 right angles. Both say their desks are rectangles. Who is correct? Both; a square is also a rectangle.
8. Mike makes a square out of wooden sticks. He pushes one corner of the square and makes a rhombus. How are the square and rhombus alike? How are they different? Alike: Both have sides of equal length. Different: The square has 4 right angles. The rhombus has equal opposite angles.

Classify each quadrilateral in as many ways as possible.

1. parallelogram
2. trapezoid
3. parallelogram
4. parallelogram
5. parallelogram
6. parallelogram
7. parallelogram
8. parallelogram
9. parallelogram
10. parallelogram
11. parallelogram
12. parallelogram
13. parallelogram
14. parallelogram
15. parallelogram
16. parallelogram
17. parallelogram
18. parallelogram
19. parallelogram
20. parallelogram

Classify each triangle. Use isosceles, equilateral, or scalene and acute, right, or obtuse. (Lesson 10-7)

4. right scalene
5. right scalene
6. right scalene
7. right scalene
8. obtuse scalene
9. obtuse scalene
10. obtuse scalene
11. obtuse scalene
12. obtuse scalene
13. obtuse scalene
14. obtuse scalene
15. obtuse scalene
16. obtuse scalene
17. obtuse scalene
18. obtuse scalene
19. obtuse scalene
20. obtuse scalene
Solve.

1. Bonnie draws a quadrilateral with 4 equal sides, and 4 right angles. What quadrilateral is it?
   **square**

2. Santi's wallet is in the shape of a rectangle. Two sides are 2 inches long. The other two sides are 3 inches long. Chaz's wallet has the same measurements but is not a rectangle. What other shape could it be?
   **parallelogram**

3. Marcus draws a quadrilateral that has 4 equal sides, but no right angles. What quadrilateral might it be?
   **rhombus or parallelogram**

4. Andy draws a square. Peter draws another shape that has 4 equal sides. Peter says his shape is square. Andy says it is not. What other shape might Peter have drawn?
   **rhombus or parallelogram**

5. Kelly draws a shape with 4 sides of equal length. The shape has 2 obtuse angles and 2 acute angles. What shape does Kelly draw?
   **rhombus**

6. Alison is cutting out fabric. The top of the material measures 1 ft, and the bottom measures 3 ft. Each side measures 2 ft. What shape is she cutting?
   **trapezoid**

Choose the word “Some” or “All” to make each statement true.

1. **Some** quadrilaterals have two parallel sides.
2. **Some** parallelograms are rectangles.
3. **All** quadrilaterals are polygons.
4. **Some** polygons are squares.
5. **All** rectangles have four right angles.
6. **All** squares are rectangles.
7. **All** trapezoids are quadrilaterals.
8. **Some** rhombuses are squares.
9. **All** squares are parallelograms.
10. **All** trapezoids have four interior angles.
**Parts of a Circle**

The **center** of a circle is in the middle. All points on the circle are the same distance from the center.

A **diameter** is a line segment that connects 2 points on the circle and goes through the center of the circle.

A **radius** is the distance from the center of a circle to every point on a circle.

**Identify the parts of a circle.**

1. radius
2. center
3. diameter
4. radius
5. diameter
6. radius
7. center

**Name the parts of the circle.**

- 7. D **center**
- 8. AD **radius**
- 9. AC **diameter**

**Problem Solving**

10. Alan drew a line from one side to the other going through the center of a circle. What part of the circle did Alan draw? **diameter**

11. Draw a circle. Then draw and label a diameter, a radius, and the center. **Answer may vary.**
4MG3.2 Homework Practice
Parts of a Circle

1. diameter
2. diameter
3. center
4. radius
5. radius
6. diameter

Identify the part of the circle shown.

7. GH
8. OK
9. O
10. GO

Name the parts of the circle.

7. diameter
8. radius
9. center
10. radius

Problem-Solving Practice
Parts of a Circle

Solve.

1. Beth looks at the clock when the school bell rings at 3:30. What part of a circle is the minute hand on the clock?
   radius

2. Beth notices that the clock has a straight crack on the left side. It reaches from the top to the bottom and through the center. What part of a circle is the crack?
   diameter

3. Coach Spano wears a sports watch for soccer practice. She checks the time and sees that it is 6:00, time for practice to end. What is the part of a circle that is formed by the hands of the watch?
   diameter

4. At soccer practice, the teammates stood in a circle and took turns kicking the ball to the person in the center. If the ball traveled in a straight line, what part of a circle did it make?
   radius

5. Joan made a pie that she cut into six pieces. She began by cutting the pie in half across the middle. What is the name of the line segment of her first cut?
   diameter

6. After Joan cut the pie through the middle, she cut each half into 3 wedges. What part of a circle is one side of a wedge of the pie?
   radius
George W. Ferris invented the first Ferris Wheel for the 1893 World's Fair. Two great steel towers were connected by a 45-foot axle that held the wheel. The wheel's diameter was about 250 feet and its circumference was about 800 feet. The ride cost fifty-cents and made more than $700,000.00 during the fair!

1. Draw a trapezoid around each x to represent seats on the Ferris Wheel.
2. Use a straight edge to draw four diameter lines that connect the seats from one side of the wheel to the other. Each chord should touch the circumference about half-way between two seats.
3. Name the curved line that connects all the seats. (It is a segment of a circle.)
4. What is a segment of that line called? (Arc)
5. Use a straight edge to draw eight chords. Each chord should touch the circumference at a fixed point called the center of the circle.

Answers

1. solid figure
2. net
3. plane figure
4. polygon
5. line
6. angle
7. circle

Vocabulary Test

Match each word to its definition. Write your answers on the lines provided.

A. a closed plane figure formed using line segments that meet only at their endpoints
B. a straight set of points that go in opposite directions without ending
C. a figure that is formed by two rays with the same endpoint
D. a figure having the three dimensions: length, width, and height
E. a flat pattern that can be folded to make a 3-dimensional figure
F. a 2-dimensional figure that lies entirely within one plane such as a triangle or square
G. a closed figure in which all points are the same distance from a fixed point called the center of the circle

1. solid figure
2. net
3. plane figure
4. polygon
5. line
6. angle
7. circle

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Go on a scavenger hunt around the classroom for items shaped like the following figures: (1) cube; (2) rectangular prism; (3) cone; (4) sphere; and (5) cylinder. If you can’t find the figure, draw it on paper and cut it out.

Read each question aloud to the student. Then write the student’s answers on the lines below the question.

1. Are these figures solid figures or plane figures?
   They are solid figures.

2. Are these figures 2-dimensional or 3-dimensional?
   They are 3-dimensional.

3. Tell how you got your answer.
   I know solid figures have three dimensions; length, width and thickness or depth.

4. Are any of these figures a circle?
   No,

5. Are any of these figures a cube?
   Yes,

6. Tell how you got your answer.
   These shapes are solid, not plane figures.
   Cubes have 6 faces, 12 edges and 8 vertices.

7. Lin, Amanda and Ming are drawing quadrilaterals. Lin drew one with 4 right angles with opposite sides equal and parallel. What quadrilateral did he draw?
   square or rectangle

8. Amanda drew one with 4 right angles, with opposite sides parallel and all sides are equal in length. What quadrilateral did she draw?
   square

9. Ming drew one with opposite sides equal and parallel. What quadrilateral did he draw?
   parallelogram

10. Tell how you got your answer.
    I know a square has four right angles and all sides equal.

11. Tell how you got your answer.
    opposite sides are parallel and equal.

12. Lin drew another one with 1 pair of parallel sides. What quadrilateral did he draw?
    trapezoid

13. Tell how you got your answer.
    A trapezoid has only one pair of parallel sides.
# Chapter 10 Assessment Answer Key

## Chapter Diagnostic Assessment Page 54

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>cone</strong></td>
</tr>
<tr>
<td>2.</td>
<td><strong>rectangular prism</strong></td>
</tr>
<tr>
<td>3.</td>
<td><strong>pyramid</strong></td>
</tr>
<tr>
<td>4.</td>
<td><strong>sphere</strong></td>
</tr>
<tr>
<td>5.</td>
<td><strong>8 sides</strong></td>
</tr>
<tr>
<td>6.</td>
<td><strong>6 sides</strong></td>
</tr>
<tr>
<td>7.</td>
<td><strong>5 sides</strong></td>
</tr>
<tr>
<td>8.</td>
<td><strong>4 sides</strong></td>
</tr>
<tr>
<td>9.</td>
<td><strong>equal to</strong></td>
</tr>
<tr>
<td>10.</td>
<td><strong>greater than</strong></td>
</tr>
<tr>
<td>11.</td>
<td><strong>less than</strong></td>
</tr>
<tr>
<td>12.</td>
<td><strong>less than</strong></td>
</tr>
</tbody>
</table>

## Chapter Pretest Page 55

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<thead>
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<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>triangle</strong></td>
</tr>
<tr>
<td>2.</td>
<td><strong>4; parallel</strong></td>
</tr>
<tr>
<td>3.</td>
<td><strong>octagon</strong></td>
</tr>
<tr>
<td>4.</td>
<td><strong>trapezoid</strong></td>
</tr>
<tr>
<td>5.</td>
<td><strong>hexagon</strong></td>
</tr>
<tr>
<td>6.</td>
<td><strong>5</strong></td>
</tr>
<tr>
<td>7.</td>
<td><strong>equal</strong></td>
</tr>
<tr>
<td>8.</td>
<td><strong>parallel</strong></td>
</tr>
<tr>
<td>9.</td>
<td><strong>right</strong></td>
</tr>
<tr>
<td>10.</td>
<td><strong>ST (\perp) QR</strong></td>
</tr>
<tr>
<td>11.</td>
<td><strong>DE (\parallel) HI</strong></td>
</tr>
<tr>
<td>12.</td>
<td><strong>obtuse angle</strong></td>
</tr>
<tr>
<td>13.</td>
<td><strong>acute angle</strong></td>
</tr>
<tr>
<td>14.</td>
<td><strong>diameter</strong></td>
</tr>
<tr>
<td>15.</td>
<td><strong>radius</strong></td>
</tr>
</tbody>
</table>

## Quiz 1 Page 56

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<table>
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<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>triangular prism; 5 faces,</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td><strong>rectangular prism; 6 faces,</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td><strong>cylinder</strong></td>
</tr>
<tr>
<td>4.</td>
<td><strong>2 quadrilaterals</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td><strong>yes</strong></td>
</tr>
<tr>
<td>6.</td>
<td><strong>no</strong></td>
</tr>
<tr>
<td>7.</td>
<td><strong>8; divide by 2</strong></td>
</tr>
<tr>
<td>8.</td>
<td><strong>center</strong></td>
</tr>
</tbody>
</table>
Chapter 10 Assessment Answer Key

Quiz 2  
Page 57

1. $\overrightarrow{WX}$

2. $AB \perp FG$

3. $\overrightarrow{LM}$ intersects $\overrightarrow{JK}$

4. $270^\circ; \frac{3}{4}$ turn

5. acute

6. right

7. 4 packs

8. the field with a radius of 100 ft

Quiz 3  
Page 58

1. right scalene

2. acute equilateral

3. trapezoid

4. rectangle parallelogram

5. chord

6. radius

7. 3 or 6 cm

8. 19; add 6

Mid-Chapter Review  
Page 59

1. C

2. F

3. triangular pyramid

4. no

5. yes

6. $\overrightarrow{BC} \parallel \overrightarrow{GH}$

7. $\overrightarrow{LM}$ intersects $\overrightarrow{NP}$

8. 19; add 6
### Chapter 10 Assessment Answer Key

<table>
<thead>
<tr>
<th>Form 1</th>
<th>Page 65</th>
<th>Form 2A</th>
<th>Page 67</th>
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</thead>
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<tr>
<td>1. B</td>
<td>6. H</td>
<td>1. A</td>
<td></td>
</tr>
<tr>
<td>3. D</td>
<td>8. J</td>
<td>3. A</td>
<td></td>
</tr>
<tr>
<td>5. B</td>
<td>10. G</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. H</td>
<td>11. A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(continued on the next page)
Chapter 10 Assessment Answer Key

Form 2A (continued)  
Page 68

5. A
6. G
7. C
8. J
9. B
10. G
11. B
12. H

Form 2B  
Page 69

1. C
2. F
3. A
4. H
5. B
6. F
7. B
8. G
9. C
10. G
11. B
12. H

Page 70
1. equilateral and acute
2. acute
3. $270^\circ$
4. $\overrightarrow{MN}$ is parallel to $\overrightarrow{OP}$
5. pentagon
6. $\overrightarrow{AF}$, $\overrightarrow{FB}$, or $\overrightarrow{CF}$
7. F
8. $\overrightarrow{AC}$
9. trapezoid
10. Sample answer:

\[
\begin{array}{c}
\text{Sample answer:} \\
\includegraphics[width=2cm]{triangle.png}
\end{array}
\]

11. triangular prism
12. 5 faces, 9 edges, 6 vertices

(continued on the next page)
Chapter 10 Assessment Answer Key

Form 2D (continued)  
Page 74

8. \(270^\circ\)

9. \(\overrightarrow{WZ}\) intersects \(\overrightarrow{XY}\)

10. rectangle, parallelogram

11. octagon

12. triangle

Form 3  
Page 75

1. scalene and right

2. acute

3. \(180^\circ\)

4. quadrilateral, trapezoid

5. hexagon

6. 4

7. \(\overrightarrow{CE}\)

8. A

9. rectangular pyramid

10. 5 faces, 8 edges, 5 vertices

11. Sample answer: octagon, square, triangle

12. no; trapezoids only have one pair of parallel sides, and parallelograms must have 2 pairs of parallel sides

Page 76
# Chapter 10 Assessment Answer Key

## Page 77, Extended-Response Test

### Scoring Rubric

<table>
<thead>
<tr>
<th>Level</th>
<th>Specific Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>The student demonstrates a <strong>thorough understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student has responded correctly to the task, used mathematically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.</td>
</tr>
<tr>
<td>3</td>
<td>The student demonstrates an <strong>understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student’s response to the task is essentially correct with the mathematical procedures used and the explanations and interpretations provided demonstrating an essential but less than thorough understanding. The response may contain minor errors that reflect inattentive execution of the mathematical procedures or indications of some misunderstanding of the underlying mathematics concepts and/or procedures.</td>
</tr>
<tr>
<td>2</td>
<td>The student has demonstrated only a <strong>partial understanding</strong> of the mathematics concepts and/or procedures embodied in the task. Although the student may have used the correct approach to obtaining a solution or may have provided a correct solution, the student’s work lacks an essential understanding of the underlying mathematical concepts. The response contains errors related to misunderstanding important aspects of the task, misuse of mathematical procedures, or faulty interpretations of results.</td>
</tr>
<tr>
<td>1</td>
<td>The student has demonstrated a <strong>very limited understanding</strong> of the mathematics concepts and/or procedures embodied in the task. The student’s response to the task is incomplete and exhibits many flaws. Although the student has addressed some of the conditions of the task, the student reached an inadequate conclusion and/or provided reasoning that was faulty or incomplete. The response exhibits many errors or may be incomplete.</td>
</tr>
<tr>
<td>0</td>
<td>The student has provided a <strong>completely incorrect</strong> solution or uninterpretable response, or no response at all.</td>
</tr>
</tbody>
</table>
Chapter 10 Assessment Answer Key
Page 77, Extended-Response Test
Sample Answers

In addition to the scoring rubric found on page A32, the following sample answers may be used as guidance in evaluating open-ended assessment items.

1. **a.** A plane figure is a figure with length and width. A solid figure is a figure with length, width, and height.
   
   Example of a solid figure: 
   
   Example of a plane figure:

   ![Solid Figure](image)
   ![Plane Figure](image)

   **b.** A face is a flat side. An edge is where 2 faces meet. A vertex is where 3 or more faces meet.

   **c.** The 5 plane figures discussed in this chapter are: triangle, quadrilateral, pentagon, hexagon and octagon.

   ![Plane Figures](image)

2. **A line** is a straight set of points that go in opposite directions without ending. A **ray** is a part of a line that has one endpoint and extends indefinitely in one direction. A **line segment** is a part of a line between two endpoints.

   ![Line, Ray, Line Segment](image)

3. **An acute angle** measures less than 90°. An **obtuse angle** measures greater than 90°. A **right angle** measures exactly 90°.

   Example of an acute angle: 
   
   ![Acute Angle](image)

   Example of an obtuse angle: 
   
   ![Obtuse Angle](image)

   Example of a right angle: 
   
   ![Right Angle](image)
Chapter 10 Assessment Answer Key

STP
Page 79

Page 80

Page 81

1. C

4. G

8. H

9. D

10. F

11. They are parallel.

12. An octagon

13. A trapezoid

They are perpendicular.

14. The diameter

15. An acute angle

16. 

2. F

5. A

11. They are parallel.

12. An octagon

13. A trapezoid

They are perpendicular.

14. The diameter

15. An acute angle

16. 

3. C

6. G

11. They are parallel.

12. An octagon

13. A trapezoid

They are perpendicular.

14. The diameter

15. An acute angle

16. 
