

Unit : Math Unit 11

Lesson: Lessons 11-1 to 11-9

Skill/ Strategy: Understanding attributes of and measuring two-dimensional and three-dimensional figures

Unit Enduring Understanding		
<ol style="list-style-type: none"> Two- and three-dimensional objects can be described, classified, and analyzed by their attributes. An object in a plane or in space can be oriented in an infinite number of ways while maintaining its size or shape. An object's location on a plane or in space can be described quantitatively. Linear measure, area, and volume are fundamentally different but may be related to one another in ways that permit calculation of one given the other. 		
<p>Key Standard CCSS Math Content.3.G.A.1 Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g. quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.</p> <p>Additional Standard(s) CCSS.Math.Content.3.G.A.2 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into four parts with equal area, and describe the area of each part as $\frac{1}{4}$ of the area of the shape.</p>	<p>Objective(s) 11-1 Identify, classify, and describe three-dimensional figures. 11-2 Identify and classify two-dimensional geometric figures. 11-3 Solve a problem by solving a simpler problem. 11-4 Identify geometric patterns and use them to make predictions and solve problems. 11-5 Identify congruent two-dimensional figures. 11-6 Choose the best strategy to solve a problem. 11-7 Identify symmetry in figures. 11-8 Locate and name points on a number line. 11-9 Find ordered pairs of numbers on a coordinate grid.</p>	<p>Essential Question(s)</p> <ol style="list-style-type: none"> How are measurement and counting related? How does what we measure effect how we measure? How can space be defined through numbers/measurement? Why do we compare, contrast, and classify objects? How do decomposing and recomposing shapes help us build our understanding of mathematics? How can transformations be described mathematically?
<p>Key Vocabulary Congruent, line of symmetry, number line, polygon, quadrilateral, symmetry, three-dimensional figure,</p>		

Appendix H

two-dimensional figure, pentagon, hexagon, octagon, triangle, cube, rectangular solid, cone, pyramid, cylinder, sphere, pattern, coordinate grid, ordered pair

Resources

Soup can, geometric solids, shape cut-outs (squares, rectangles, triangles, and hexagons), toothpicks pattern blocks leveled worksheets, daily reteach, 5 – Minute Check, Problem of the Day, dot paper, safety scissors, colored pencils, crayons, number lines, grid paper, index cards

Associated Literature - "Captain Invincible and the Space Shapes", "Shape Up! Fun With Triangles and Other Polygons", "Light, Sight, and Colors So Bright", "Round Trip", "Pattern Fish", "The King's Commissioners", "As The Crow Flies"

Know	Understand	Do
<p>Shapes can be sorted according to their attributes.</p> <p>Quadrilaterals are polygons with four sides.</p> <p>Rectangles, rhombi, and squares are a particular type of quadrilateral (parallelograms).</p>	<p>Shapes in different categories may share attributes and the shared attributes can define a larger category.</p>	<p>Reason with shapes and their attributes.</p> <ol style="list-style-type: none">1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and square as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. <p>CC.3.G.1</p> <ul style="list-style-type: none">• Identify rhombus, rectangle, square, etc as examples of quadrilaterals• Draw examples of quadrilaterals that do not belong to any subcategory not rhombi, rectangles, or squares, etc) such as trapezoids and/or various sizes and shapes of

		<p>convex and concave quadrilaterals.)</p> <p>6. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into four parts with equal area, and describe the area of each part as $\frac{1}{4}$ of the area of the shape.</p> <p><u>CC.3.G.2</u></p> <p>This standard should not be taught in isolation, but in conjunction with fractions.</p> <p>Connections to other Domains &/or Clusters: Develop understanding of fractions as numbers.</p> <ol style="list-style-type: none"> 1. Understand a fraction $\frac{1}{b}$ as the quantity forms by 1 part when a whole is partitioned into b equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$. CC.3.NF.1
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<p><u>Activating Strategy</u></p> <p>11-1 – Display a variety of magazines on the carpet asking students to choose one. Explain that we will be learning about shapes in this chapter. Encourage students to look through their magazine tearing out pictures that show a particular shape. Have students share the shapes they find with the class labeling and discussing each shape.</p> <p>11-2 – Introduce and read aloud “Shape Up!” discussing the skill related to the book creating an opportunity for the students to learn about and discuss what they know about two-dimensional shapes. Display a variety of two-dimensional shapes in the circle allowing students to discuss them and share their knowledge.</p> <p>11-3 – Introduce and read aloud “Round Trip”. Flip the book and complete. Discuss the idea of mirror images or opposites. Ask volunteers to tell what would happen to two-dimensional and three-dimensional figures in a “mirror-test”.</p> <p>Review the Problem-Solving Strategy steps having students provide the steps explaining each.</p> <p>11-4 – Place connecting cubes in the circle asking each student to create a pattern using the cubes. Have each student display and describe their pattern reviewing what makes a pattern and what must take</p>
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place to be a pattern. Introduce and read aloud, "Pattern Fish". Relate the concepts in the book to the patterns that the students created.

11-5 – Read aloud, "Shape Up!" Introduce the term *congruent* and explain its meaning. Distribute materials to each student and ask the student to create three different polygons on the paper. They can choose from triangles or quadrilaterals or they can create their own shape. Instruct students that they must use straight lines, and rulers for accurate work. Then have students swap papers with a neighbor and draw three shapes that are congruent to the ones already created on the paper.

11-6 – Display a word problem on the whiteboard. Ask students to think of possible strategies that could be used to solve the problem. After getting a variety of responses, ask students what operation would be best to solve the problem? Allow several students to give their opinion and explain why they chose that operation.

11-7 – Before reading, introduce students to the term *symmetry*. Read "Round Trip" to the students. Tell students that they are going to create their own symmetrical piece of artwork. Introduce the term: *line of symmetry*. Tell students that they can either fold their paper vertically or horizontally to create a line of symmetry. Allow student time to create their artwork, and cut along the line of symmetry. Collect both halves of student work, shuffle, and redistribute two different pieces to each student. Students must now find a match for each piece of artwork.

11-8 – Read and discuss "The King's Commissioners". Discuss the wonderful illustrations as it is read. Talk about how the advisors counted the Commissioners. Ask students if there is a right way and a wrong way to count them? Make a number line that goes from 0-47 (the number of Commissioners). Let students explore ways to count the commissioners. (By 1's, 2's, 3's, etc.) Ask if there are some ways that are easier than others and why? Let students make a list of "Commissioners" for the classroom. This could include the Commissioner of Books, the Commissioner of Homework Collection, etc.

11-9 – Read aloud "As the Crow Flies". Talk about the difference between road maps and the maps the animals used in the story. (The road maps use highways and directions and the maps the animals used in the story use landmarks.) Show a coordinate grid and talk about how it is a special kind of map that uses ordered pairs to locate data on a grid.

Teaching Strategies

Explore 4-1 Identify Geometric Figures and Spatial Reasoning

Introduce the chapter discussing and allowing students to share their prior knowledge about geometric figures and giving their opinions about how two- and three-dimensional figures differ. Discuss the difference between the concepts of "flat" versus "dimension". Display a variety of two- dimensional and three –dimensional figures allowing students to interact with them and explore their attributes. Review student pg. 464 completing the Real-World examples. Complete chapter "Quick-Check" as a group with discussion. (*CCSS.Math.Practice.MP3 Construct viable arguments and critique the reasoning of others*)

Lesson 11-1 Three-Dimensional Figures

Introduce lesson objective and vocabulary discussing the importance of being able to identify, classify, and describe three-dimensional figures. Choose a student to summarize what they heard the lesson would cover. Introduce and read "Captain Invincible and the Space Shapes". Have students identify cubes, rectangular solids, spheres, prisms, pyramids, cones, and cylinders. Discuss attributes such as sides, faces, and vertices. Have all students stand allowing each to sit only after they each share something they have learned in the lesson so far. Using the three-dimensional figures on the carpet, allow students time to "turn and talk" to share their knowledge of the attributes discussed. Ask higher

level questions to evaluate student level of understanding. Review as a group the chapter information on student pgs. 467-469 with discussion. Allow students to review the work packet and centers and ask any questions they might have prior to completed center-based work.

During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 8,9,10,11.

Lesson 11-2 Two-Dimensional Figures

Introduce lesson objective and vocabulary, discussing the definition for each word with student support. Complete "5-Minute Check", and "Problem of the Day" as a group. Review the importance of being able to identify and classify two-dimensional geometric figures. Introduce and read "Shape Up! Fun with Triangles and Other Polygons", identifying polygons, triangles, quadrilaterals, pentagons, hexagons, and octagons. Discuss the common attributes such as number of sides, vertices, and angles. Assign students plane figures. Have students discuss the figure's common and uncommon attributes with a partner. Ask a variety of questions to stimulate conversation and scaffold learning. TM pg.472. Review as a group the chapter information on student pgs. 472-475 with discussion. Allow students to review the work packet and centers and ask any questions they might have prior to completed center-based work.

During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 13,14,15,16.

Lesson 11-3 Problem-Solving Strategy (Solve a Simpler Problem)

Complete "5-Minute Check" and "Problem of the Day" with interactive discussion involving all students. Introduce and read "Round Trip". Flip the book, and complete discussion of the idea of mirror images and opposites. Ask volunteers to tell what would happen to two-dimensional and three-dimensional figures in a "mirror test". Discuss that because these figures are symmetrical, they will always look the same. Demonstrate concept further using mirrors and the word TAM and the number 18. Pose the question in Activity Choice 1 TM pg. 476 Ask students "What problem-solving strategy could you use to solve the problem?" Use four-step problem-solving strategy process discussing what steps could be used and what steps would be simpler to solve the problem. Complete the problems in the chapter lesson pgs. 476-477. Ask several students to summarize what was required to solve the problems. Complete several problems in the activity packet as a group having students take the "teaching" lead before splitting out to center-based and small group activities. During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 18, 19, 20, 22.

Lesson 11-4 Identify and Extend Geometric Patterns

Complete "5-Minute Check" and "Problem of the Day" with interactive discussion involving all students. Introduce and read "Pattern Fish". As patterns are discovered, have students decide what the pattern is and label it. (Ex. AB, AAB, ABC, etc.) Discuss the different kinds of patterns found in the book. Pose the question in Activity Choice 1 TM pg. 478. Read the information in the chapter lesson pgs. 478-481. Ask several students to summarize what helps to define a pattern and how you know how to build one. Distribute whiteboards to allow students to create patterns having a partner describe and label the pattern they made. Complete several problems in the activity packet as a group having students take

the “teaching” lead before splitting out to center-based and small group activities. During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 23, 24, 26, 27. Complete ***Formative Assessment, TM pg. 481, assessing student ability to identify, label, and extend patterns. Students will meet proficiency with $\frac{3}{4}$ correct.***

Complete Mid-Chapter Check as a summative assessment during student Lab period.

Lesson 11-5 Identify Congruent Figures

Complete “5-Minute Check” and “Problem of the Day” with interactive discussion involving all students. Reread “Shape Up! Introduce the term congruent and explain its meaning. Distribute materials to each student and ask the students to create three different polygons on his/her paper. They may choose from triangles, quadrilaterals, or create their own shape. Instruct students that they must use straight lines, and rulers for accurate work. Have students swap papers with a neighbor and they must draw three new shapes that are congruent to the ones their friends created. Introduce the lesson 11-5 work by completing Activity choice 1 having students fold a piece of paper in half then in half again. Ask a variety of questions to assess student understanding of congruency. Interact with the information in the chapter pgs. 484-485. Have students “Walk Across the Pond” to explain congruence to a student across the circle from them. Complete several problems in the activity packet as a group having students take the “teaching” lead before splitting out to center-based and small group activities. During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 29, 31, 32.

Formative Assessment TM pg.485 assessment focused on student understanding of congruence.

Lesson 11-6 Problem-Solving Investigation: Choose A Strategy

Complete “5-Minute Check” and “Problem of the Day” with interactive discussion involving all students. Pose the question in Activity Choice 1 TM pg. 486 Ask students “What some of the possible strategies that could be used to solve the problems?” Pose several other problems having students brainstorm ways to solve the problem, sharing and explaining their thought process. Interact with the lesson information pgs. 486-487. Complete several examples as a group having students take on the “teaching” lead before solving the remainder of the problems independently. During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 33, 34, 35.

Formative Assessment TM pg.487 assessment focused on student ability to pick a reasonable strategy to solve a problem.

11-7 Symmetry

Complete “5-Minute Check” and “Problem of the Day” with interactive discussion involving all students. Introduce the term “symmetry”. Reread “Round Trip” telling students that they are going to create their own symmetrical piece of artwork. Explain the term “line of symmetry”. Explain that students may either fold their paper vertically or horizontally to create a line of symmetry. Allow students time to create their artwork, and cut along the line of symmetry. Collect both halves of student work, shuffle

and redistribute the different pieces to each student. Students must now find a match for each piece of artwork. Ask students to look at a triangle and figure out how many lines of symmetry the triangle has. Question students as to how they came up with their answer defending their thought process and listening to others thoughts and opinions. Complete lesson problems pgs. 488-490 as a group with discussion and student participation in leadership roles. Have several students summarize what is required to complete problems involving symmetry. Complete several examples as a group having students take on the "teaching" lead before solving the remainder of the problems independently. During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 38, 39, 40, 42.

CCSS.Math.Practice.MP3, CCSS.Math.Practice.MP2

Lesson 11-8 Whole Numbers on a Number Line

Complete "5-Minute Check" and "Problem of the Day" with interactive discussion involving all students. Share the objective for the lesson allowing students to share their prior knowledge about numbers lines and how they have used them in the past. Read "The King's Commissioners" aloud. Talk about how the advisors counted the Commissioners. Is there a right way and a wrong way to count them? Make a number line that goes from 0-47 (the number of commissioners). Let students explore ways to count the commissioners. (By 1's 2's, 3's, etc.) Are some ways easier than others? Lastly, let students make a list of "Commissioners" for the classroom. This could include the Commissioner of Books, the Commissioner of Homework Collection, etc. Complete lesson problems pgs. 492-493 as a group with discussion and student participation in leadership roles. Encourage several students to summarize ways to use number lines for different problems. Complete several examples as a group having students take on the "teaching" lead before solving the remainder of the problems independently. During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing teacher assigned work. Student work packet will include pgs. 43, 44, 46, 47.

Formative assessment TM pg.493 focused on student ability to locate and label numbers on a number line. Proficiency equates to $\frac{3}{4}$ correct answers.

Lesson 11-9 Ordered Pairs

Complete "5-Minute Check" and "Problem of the Day" with interactive discussion involving all students. Share the objective for the lesson allowing students to share their prior knowledge about ordered pairs. Extend conversation with explanation to ensure all students have a basic understanding of ordered pairs. Read the book "As the Crow Flies". Talk about the difference between road maps and the maps the animals used in the story. (The road maps use highways and directions and the maps the animals used in the story used landmarks.) Show a coordinate grid and talk about how it is a special kind of map that uses ordered pairs to locate data on a grid. Review what ordered pairs are and how they might be used on a number line. Complete lesson problems pgs. 492-493 as a group with discussion and student participation in leadership roles. Encourage several students to summarize ways to use number lines for different problems. Complete several examples as a group having students take on the "teaching" lead before solving the remainder of the problems independently. During the extended period of the class, students will receive individual instruction and/or small group instruction on their level. Students will complete practice work, or work on problems on the computer, or with interactive centers to be completed independently or with a partner. Student will have choice in their activity after completing

teacher assigned work. Student work packet will include pgs. 48, 49, 51, 52.
Formative Assessment TM pg. 497 focused on the location and labeling of ordered pairs on a grid.
Proficiency will be measured at $\frac{3}{4}$ correct responses.

Problem Solving in Art

Introduce and discuss the objective of the lesson encouraging students to make the connection between art and the skills they have learned in this unit to solve problems. Ask students to share what they know about botanical gardens and why they might be important? Extend conversation to brainstorm how do the gardeners know where to put plants in a botanic garden? Complete real-world examples applying skills to solve the problems.

Review Chapter using Study Guide and Review

Chapter Test – Summative Assessment

Assessments

Summarizing

Teacher summary of lessons and concepts
 Student summary of lesson parts and problem solving throughout lessons
 Teacher and student summaries of strategy use and implementation

Formative

5 – Minute Check
 Problem of the Day
 Skill practice sheets
 Mini-Assessment checks (Teacher made)
 Formative assessments in chapter lessons
 Teacher observation and monitoring of student responses

Summative

End of Chapter Test
 End of Unit Test

Lesson Priorities:

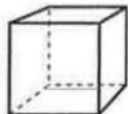
- a) **Multisensory** – all lessons provide students with the use of whiteboards, markers, erasers, and manipulatives associated with the skill or concept of the lesson
- b) **Art-Infusion** – the use of music (Jack Hartmann) skills based songs, art materials where applicable (array drawings, picture math problems)
- c) **Movement** – “Turn and Talk”, “Across the Pond”, Partner work, Center activities, hands-on activities, movement around the room, changes in activity placement, clapping patterns
- d) **Differentiation of Instruction** – Higher level questioning at different levels, center based activities available at different levels, small group instruction geared to the levels of different students, skills practice expectations may be changed according to different students and their abilities, assessments may be changed according to student expectations

- e) **Identification of higher level questions** – Higher level questions and questioning techniques will be infused throughout lessons driven by student responses or areas that need further investigation or explanation. Questioning will be differentiated for specific students at their variety of levels
- f) **Technology** – student interaction with IXL, Fun Brain, Math Adventures, Math Tool Chest, Teacher and student use of the ELMO/Projector to interact with or manipulate hands-on materials to represent and solve problems, use of computers to research or assist in defining or expanding knowledge of math concepts or skills

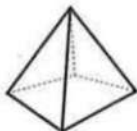
Expansion and Extension Activities for Early Finishers – Students may choose to extend or expand their math learning through making a choice to use math manipulatives associated with the unit to create and interact with multiplication problems, complete problems on a chosen computer program, read math related texts, create and solve problems on a whiteboard, create arrays and create the associated problems,

Reteach*Three-Dimensional Figures*

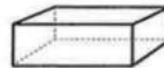
The objects you see around you are solid figures. A solid, or three-dimensional figure, is a figure that has length, width, and depth.



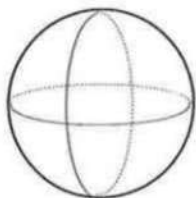
cube



pyramid

rectangular
prism

cylinder



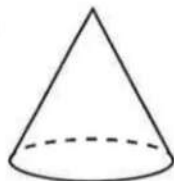
sphere



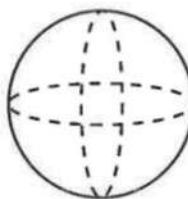
cone

Identify each three-dimensional figure.

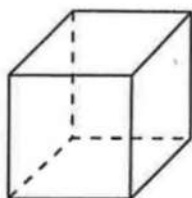
1.



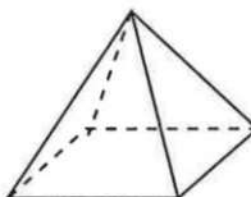
2.



3.

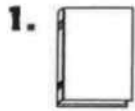


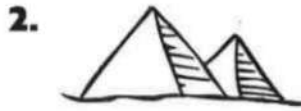
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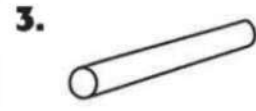


11-1

Name _____ Date _____

Skills Practice*Three-Dimensional Figures***Identify each three-dimensional figure.**

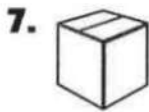






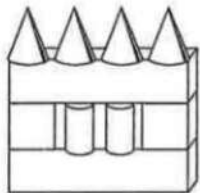










10. Identify the figures that were used to build this house.

11. Name 3 things in your classroom that are shaped like a rectangular prism.

Name _____ Date _____

11-1**Homework Practice***Three-Dimensional Figures***Identify each three-dimensional figure.**

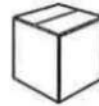
1.



2.



3.



4. Luisa was trying to describe the item used to hold her morning orange juice. What solid figure would you consider a juice glass to be?

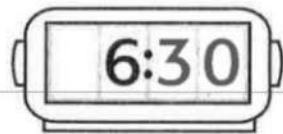
5. Ella was exercising with a large round yoga ball. What solid figure would you consider a yoga ball to be?

Spiral Review**Write the time each digital or analog clock shows. (Lesson 10-8)**

6.



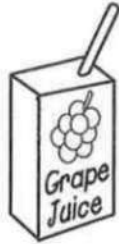
7.



8. Adam's piano lessons start at 6:00. They end one hour later. What time do they end? _____

11-1

Name _____ Date _____

Problem-Solving Practice*Three-Dimensional Figures***Solve. Use the art for Exercises 1–2.**

1. Penny had a drink in a container shaped like a rectangular prism. What did Penny drink?

2. What is the shape of the orange juice container?

3. Lorena was searching for the perfect pine tree. If the tree were perfect, it might be in this solid shape. What would it be?

4. Ricky traced around the bottom of a box shaped like a pyramid. What shape did Ricky draw?

5. Which of these pencil parts is shaped like a cylinder? a cone?



6. Hector kept his toys neatly stored in his toy chest. What solid figure would you consider his toy chest to be?

11-2

Reteach

Two-Dimensional Figures

A polygon is a closed two-dimensional figure with straight sides.

These are polygons.

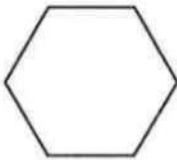


These are **not** polygons.

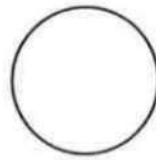


Circle the polygons below.

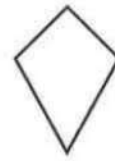
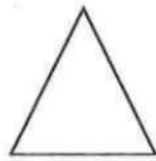
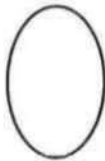
1.



2.



3.

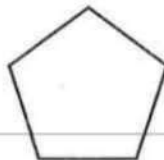


Identify each two-dimensional figure.

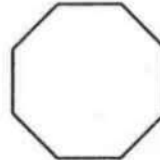
4.



5.



6.

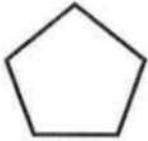


11-2

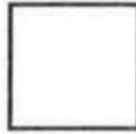
Name _____ Date _____

Skills Practice*Two-Dimensional Figures***Identify each two-dimensional figure.**

1.



2.



3.



4.



5. It has 6 sides.

6. It has 4 sides. All sides may not be equal.

7. It has 3 sides.

8. It has 8 sides.

9. It has 4 equal sides.

10. It has 5 sides.

Solve.

11. The library at Ladew Mansion in Maryland has 8 sides. What is the shape of the library?

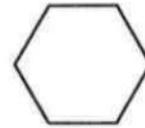
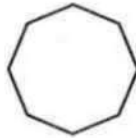
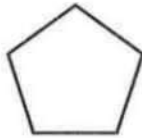
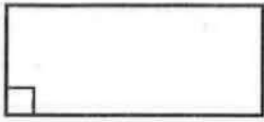
12. A kitchen tile has 4 equal sides. What is the shape of the tile?

11-2

Homework Practice

Two-Dimensional Figures

Identify each two-dimensional figure.



1. _____ 2. _____ 3. _____ 4. _____

Fill in the blank with the correct term:

5. Each line segment in a polygon is called a _____.
6. A _____ is a closed plane figure with three or more line segments.
7. A _____ begins and ends at the same point.
8. A _____ is a flat figure.

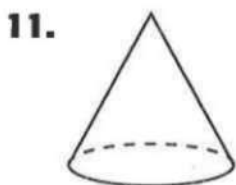
Solve.

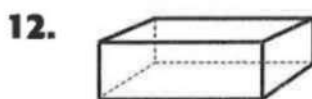
9. Eve is setting the dinner table with dishes, placemats, napkins, and utensils. What are some of the polygons she may be seeing on her table?

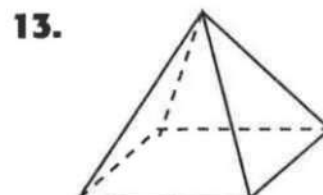
10. Carlos was admiring the city skyline. Do you think the building tops were open figures or closed figures? Explain your answer.

Spiral Review

Identify each three-dimensional figure. (Lesson 11-1)







11-2

Name _____ Date _____

Problem-Solving Practice*Two-Dimensional Figures***Solve.**

1. Each tile on a floor has 6 sides and 6 angles. What shape is each of the tiles?

2. What is the shape of the stop sign?



3. Peter made a hexagon using 6 toothpicks. He now wants to change the hexagon into an octagon. How many more toothpicks does he need?

4. Is a circle a polygon? Why or why not?

5. Four students were asked to name the figure below. Each student answered differently, but each was correct. What were the students' answers?



6. Lana drew a design using the same number of hexagons and octagons. The design has a total of 42 sides. How many hexagons are in the design?

_____ hexagons

11-3

Name _____ Date _____

Reteach*Problem-Solving Strategy: Solve a Simpler Problem*

A family of 2 adults and 3 children each order a sandwich and a drink in the museum cafeteria. Sandwiches cost \$4 each and drinks are \$1. How much does lunch cost in all?

<p>Step 1 Understand</p>	<p>Be sure you understand the problem. Read carefully.</p> <p>What do you know?</p> <ul style="list-style-type: none"> • There are _____ people in the family. • They buy _____ sandwiches for _____ each and _____ drinks for _____ each. <p>What do you need to know?</p> <ul style="list-style-type: none"> • You need to find how much _____
<p>Step 2 Plan</p> <ul style="list-style-type: none"> • Solve a Simpler Problem 	<p>Make a plan. Choose a strategy.</p> <p>Make up a problem similar to the one you need to solve, but use simpler or easier numbers. Then solve the real problem the same way.</p>
<p>Step 3 Solve</p>	<p>Carry out your plan. Solve this simpler problem.</p> <p>5 sandwiches cost $5 \times$ _____ or _____.</p> <p>5 drinks cost $5 \times$ _____ or _____.</p>

Name _____ Date _____

11-3**Reteach***Problem-Solving Strategy (continued)*

	<p>The total amount is _____ + _____ = _____.</p> <p>Now solve the real problem the same way.</p> <p>5 sandwiches cost $5 \times$ _____ or _____.</p> <p>5 drinks cost $5 \times$ _____ or _____.</p> <p>The total amount is _____ + _____ = _____.</p>
<p>Step 4 Check</p>	<p>Is the solution reasonable? Reread the problem.</p> <p>Is your answer reasonable? Yes No</p> <p>Did you answer the question? Yes No</p> <p>What other strategies could you use to solve the problem?</p> <p>_____</p>

Solve. Use the *solve a simpler problem* strategy.

1. The Wilsons buy 2 adult's tickets for \$5 each and 3 children's tickets for \$3 each. How much money do they spend in all?
- _____

2. Virginia buys 3 model airplanes for \$7 each, 2 tubes of paint for \$3 each, and 2 tubes of glue for \$2 each. How much money does she spend in all?
- _____

11-3

Name _____ Date _____

Skills Practice*Problem-Solving Strategy: Solve a Simpler Problem***Solve. Use the *solve a simpler problem* strategy.**

1. Tickets to the Science Center cost \$7 for adults and \$4 for children. How much does a family of 2 adults and 4 children pay for tickets?
- _____

2. The Yuen family stops in the gift shop. Science Center pens cost \$4. Science Center buttons cost \$2. How much does it cost to buy 2 pens and 3 buttons?
- _____

3. Workers at the Science Center rope off a rectangular space. The space has sides of 6 meters and 9 meters. How much rope do they need?
- _____

4. Lana's home is 1 mile away from the bus stop. The ride from the bus stop to the Science Center is 6 miles. Lana walks to the bus stop and takes the bus to the Science Center. She returns home the same way. How many miles does she travel in all?
- _____

5. Nell, Barry, Chet, and Jill are in line for a movie on Alexander Graham Bell. The first person in line is a boy. Barry is ahead of Nell, but not ahead of Jill. List the names in order from first to last in line.
- _____

6. Write a problem that you could use the solve a simpler problem strategy to solve. Share it with others.
- _____
- _____
- _____

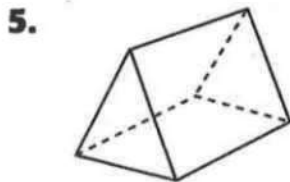
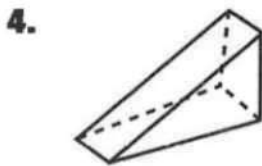
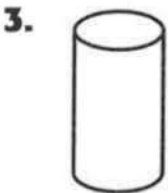
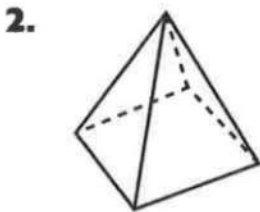
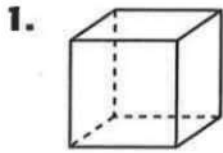
11-3

Enrich

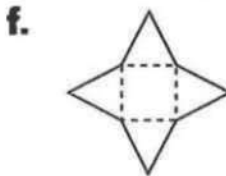
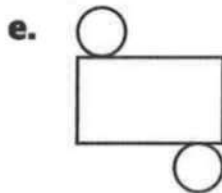
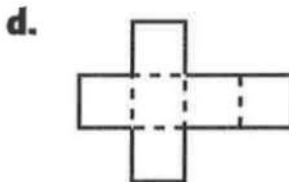
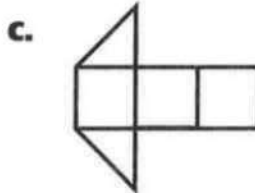
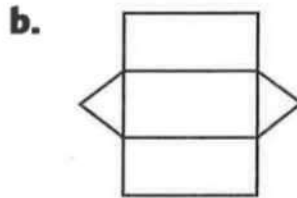
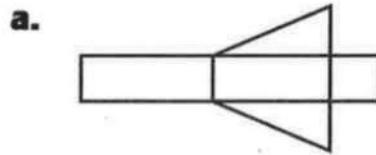
Matching Shapes to Nets

Match each three-dimensional figure to the plans used to make it. These plans are called nets. Hint: there is one more net than figures.

Figures



Nets



6. Tell how you were able to match each three-dimensional figure to its net.

11-4

Name _____ Date _____

Reteach*Identify and Extend Geometric Patterns*

The squares on a checkerboard repeat a pattern: black, red, black, red, black, red. You might also find patterns on flooring, clothing material, or art.

If you saw the following repeating pattern, what would you expect the next shape to be?



Step 1 Identify the shapes in the pattern.

The shapes are: square, rectangle, pentagon, and parallelogram.

Step 2 This is the pattern unit.

There are four shapes, so the fifth shape will be a repeat of the very first shape.

So, the next shape in the pattern will be a square.

If you saw a pattern unit that repeats 2 circles and 1 triangle, what would the sixth shape be?

The sixth shape would be a triangle.

Identify and extend each pattern.

1. How many triangles will be used if this pattern repeats 4 times? _____



2. You see a pattern that repeats the following: red circle, blue circle, red circle, green circle. There are 26 circles total. How many red circles are used? _____

3. How many rectangles will be used if this pattern continues until there are a total of 23 polygons? _____



11-4

Name _____ Date _____

Skills Practice*Identify and Extend Geometric Patterns***Identify and extend each pattern.****Solve.**

6. Monique created a pattern using her stamp set. She stamped 1 rectangle, 2 triangles, and then 1 square. If this pattern continues until there are 15 stamps, how many triangles will be used?
-

7. There is a pattern that repeats a square and a triangle. If each side of each polygon is 2 inches, how many polygons will there be to make the total perimeters 42 inches?
-

11-4

Name _____ Date _____

Problem-Solving Practice*Identify and Extend Geometric Patterns***Solve.**

1. Madelaine painted a pattern that repeats 3 seashells and 3 stars. There were 19 seashells and stars total. Then she added a circle after each seashell. How many circles did she add?

2. A pattern repeats 2 trapezoids and 3 squares. How many squares will there be if the pattern repeats itself until there are 27 polygons?

3. What will be the 17th shape in the pattern below?



4. There is a pattern that consists of only squares. The first square has a height of 40 cm. The next two squares have heights of 20 inches and 10 inches. What is the height of the fourth square?

5. Write your own geometric pattern and have a classmate identify and extend the pattern.

6. Name two examples of places you see geometric patterns in real-world objects.

Name _____ Date _____

11-4

Enrich

Geometric Pattern Puzzlers

Read each problem and answer the questions. Draw pictures to help explain your answers.

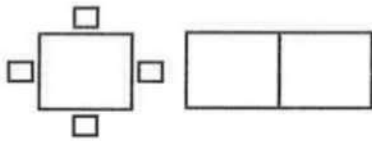
1. If this pattern continues, in what position will the 15th congruent triangle be? _____

In what position will the 20th congruent triangle be? _____



Write a rule that helps you know what the position will be for any triangle.

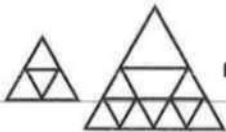
2. Suppose you have a table with four chairs placed around it. How many chairs can be placed around two tables that are put together like this?



Rule:	Number of Tables	Number of Chairs
	1	4
	2	_____
	3	_____
	4	_____
	5	_____
	6	_____

Copy and complete the chart. Then complete this rule that tells how many chairs would be needed for each time you add a table, up to six tables. Multiply the number of tables x _____ and add _____ chairs.

3. Copy this pattern of triangles. Use the number of triangles down the right side of each figure to help you create a rule for how many triangles will be in each new figure in the pattern.



Hint:	Number of triangles down one side	Total number of triangles in figure
	2	4
	3	9

Formative Assessment Unit 11: Lesson 11 - 4

Sumi placed the following shapes on her desk on the following order: square, square, rhombus, rhombus, triangle, square, square, rhombus.

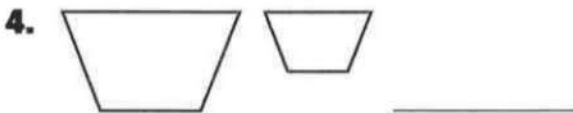
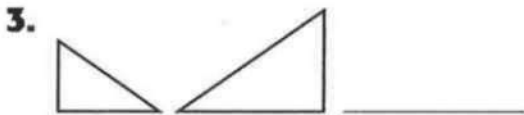
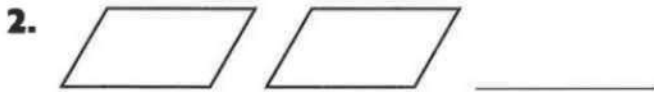
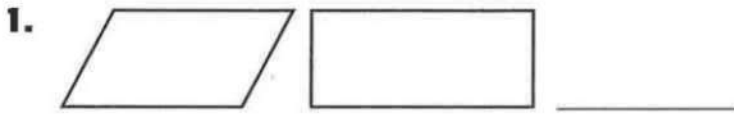
How could you determine the next three figures in the pattern?

What is the pattern?

What would the next three figures in the pattern be? _____

11-5

Name _____ Date _____

Skills Practice*Identify Congruent Figures***Tell whether each pair of figures is congruent. Write yes or no.**

5. a square that has sides that are 4 inches, and another square that has sides that measure 4 inches _____

6. a rectangle and a trapezoid _____

7. a circle and a triangle _____

8. One room measure 5 feet by 10 feet. Another room measures 5 feet by 15 feet. Are the rooms congruent? Explain.

9. All of the rectangular windows in Owen's house are the same size. Owen says they are congruent. Is he correct? Explain.

10. Two swimming pools hold the same amount of water. One is a circular swimming pool and the other is a rectangle. Are they congruent? Explain.

11-5

Name _____ Date _____

Problem-Solving Practice*Identify Congruent Figures***Solve.**

1. The sides of a triangle are all 9 centimeters long. If there is another triangle that is congruent to the one described, how long are its sides?

2. All of the rectangular patches on Lou's quilt are the same size. Lou says they are congruent. Is he correct? Explain.

3. Explain why the following two figures are not congruent.



4. Henry drew a rectangle that was 4 inches by 3 inches. John Paul drew a rectangle that was 4 inches by 2 inches. Are the rectangles congruent? Explain.

5. Draw two triangles that are congruent.

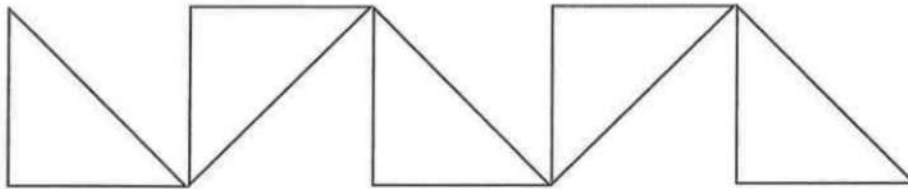
6. A rectangle has two sides that measure 6 feet and 4 feet. What are the measurements of the other two sides?

11-5

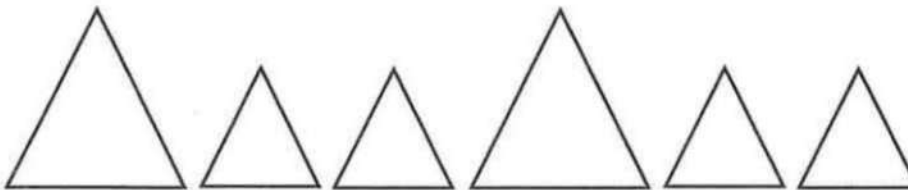
Name _____ Date _____

Enrich*Congruent and Similar Figures*

This pattern is made from congruent triangles.



This pattern is made from similar triangles.



1. Choose a shape. Create a pattern using congruent shapes. Draw your pattern below.
2. Choose another shape. Create a pattern using similar shapes. Draw your pattern below.
3. Create a third pattern using shapes that are not congruent or similar. Draw your pattern below.
4. Are all triangles similar? Explain.

Formative Assessment Unit 11: Lesson 11 - 5

Look at the three squares.

Which squares are congruent?

Which squares are NOT congruent?

Name _____ Date _____

11-6**Reteach***Problem Solving Investigation: Choose a Strategy*

Sabrina has collected trading cards for 5 years. She now has 125 trading cards. In the second year, she collected 34 more cards than she did the first year. She only collected 12 cards her third and fourth years. In her fifth year she collected 9 Cards. How many cards did she collect in the first year?

Understand	<p>Be sure you understand the problem.</p> <p>What do you know?</p> <ul style="list-style-type: none"> You know Sabrina has 125 trading cards. You know she collected 34 more cards in the second year than in the first year. <p>What do you need to find?</p> <ul style="list-style-type: none"> You need to find how many cards Sabrina collected in the first year. 																								
Plan	<p>Make a plan.</p> <p>Choose a strategy.</p> <p>Organize the data in to a table to help you solve the problem.</p>																								
Solve	<p>First, fill in what you know.</p> <table border="1" data-bbox="414 1260 727 1564"> <thead> <tr> <th>Year</th> <th>Cards Collection</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> </tr> <tr> <td>2</td> <td></td> </tr> <tr> <td>3</td> <td>12</td> </tr> <tr> <td>4</td> <td>12</td> </tr> <tr> <td>5</td> <td>9</td> </tr> </tbody> </table> <p>You know Sabrina now has 125 cards. $125 - 12 - 12 - 9 = 92$ cards</p> <p>You know Sabrina collected 34 more cards in the second year than in the first year. So, $92 - 34 = 58$.</p> <p>Divide $58 \div 2 = 29$.</p> <table border="1" data-bbox="414 1585 727 1900"> <thead> <tr> <th>Year</th> <th>Cards Collection</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>29</td> </tr> <tr> <td>2</td> <td>63</td> </tr> <tr> <td>3</td> <td>12</td> </tr> <tr> <td>4</td> <td>12</td> </tr> <tr> <td>5</td> <td>9</td> </tr> </tbody> </table> <p>Sabrina collected 29 cards in the first year. $29 + 34 = 63$</p> <p>Sabrina collected 63 cards in the second year.</p>	Year	Cards Collection	1		2		3	12	4	12	5	9	Year	Cards Collection	1	29	2	63	3	12	4	12	5	9
Year	Cards Collection																								
1																									
2																									
3	12																								
4	12																								
5	9																								
Year	Cards Collection																								
1	29																								
2	63																								
3	12																								
4	12																								
5	9																								

11-6

Name _____ Date _____

Reteach*Problem Solving Investigation (continued)***Check****Is the solution reasonable?**

Reread the problem. Check your answer.

Use any strategy to solve. Tell what strategy you used.

- Draw a picture or diagram
- Find a pattern

- Guess and check
- Use logical reasoning

1. Spencer biked two miles to get to his Aunt's house. Then he hiked twice as far to the park. How many miles was the total trip?
- _____

3. What two numbers are missing in the pattern below?

4, 8, 12, 16, 20, , 28,

2. The department store is having a sale on sports equipment. All of the equipment is on sale at half the original price. Heather purchases 3 soccer balls, 4 water bottles, and 1 pair of running shoes. How much money did she spend?

4. James walked his dog 3 blocks to his friend's house. On the way home, they walked twice as long. How many blocks was the trip?
- _____

5. The class has 20 students. Each student has 2 erasers at their desk. How many erasers are there altogether?
- _____

Item	Original Price
Baseball	\$6
Soccer ball	\$12
Running shoes	\$40
Water bottle	\$4
Basketball hoop	\$150

6. Annie gave cards to her friends and family. 20 cards were for her classmates, 1 card was for her teacher and 4 cards were for other people. How many total cards did she give out?
- _____

Name _____ Date _____

11-6**Skills Practice***Problem-Solving Investigation: Choose a Strategy***Use any strategy to solve. Tell what strategy you used.**

- Draw a picture or diagram
- Find a pattern
- Use logical reasoning
- Choose an operation

- 1.** Matt and Rachel sold apple cider at the craft fair. They sold 80 cups in the first hour, 60 cups in the second hour, and 40 cups in the third hour. If the pattern continues, how many pints did they sell at the end of the fourth hour?
- _____

- 2.** Reynaldo bought a bagel and orange juice. Luis bought a muffin and Cristina bought milk. How much did each person spend?

Item	Cost
Bagel	\$2
Muffin	\$1
Orange Juice	\$1
Milk	\$2

- 3.** Claire was having a party. She invited 4 friends from her ballet class, 3 friends from school, 5 friends were from other places. How many people were invited in all?
- _____

- 5.** There are 7 members of the Swanson family. Each member of the family has 4 towels. How many towels are there all together?
- _____

- 4.** Megan swims 20 laps each day for a week. Natalie swims twice as much as Megan. At the end of 7 days, how many laps have Natalie and Megan swam in all?
- _____

- 6.** What two numbers are missing in the pattern below?

6, 12, , 24, 30, 36, 42,

Formative Assessment Unit 11: Lesson 11 – 6

Ashanti bought a sweater for \$16 and shoes for \$24. She has \$34 after making her purchases. How much money did she have before she went shopping?

Show your work!

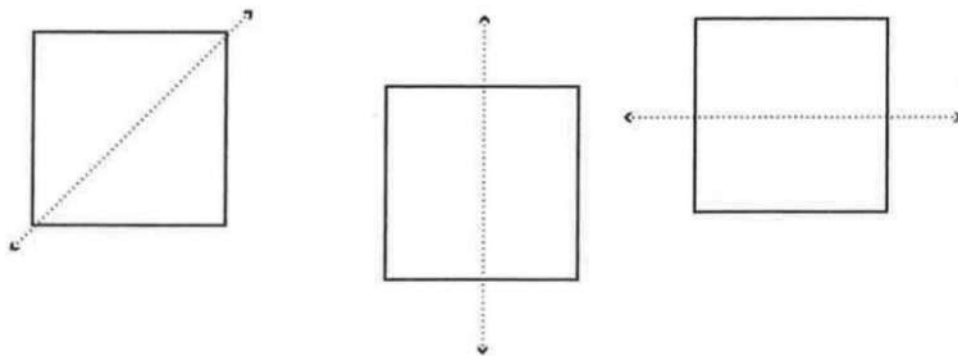
11-7

Name _____ Date _____

Reteach*Symmetry*

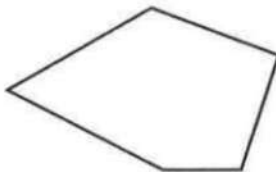
A figure has symmetry if it can be cut in half and the two halves are exact matches. You could fold the figure along a line of symmetry and the two sides would be mirror images.

The following figure has line symmetry.



The two halves formed by the lines are exact matches.

The following figure does not have line symmetry.

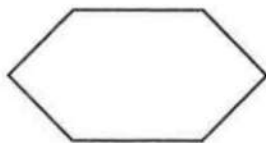


Tell whether each figure has line symmetry. Write *yes* or *no*. If yes, tell how many lines of symmetry the figure has.

1.



2.



3.

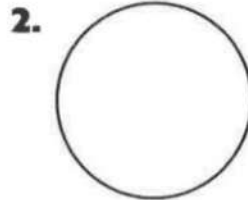


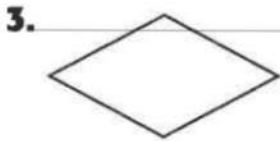
Name _____ Date _____

11-7**Skills Practice***Symmetry*

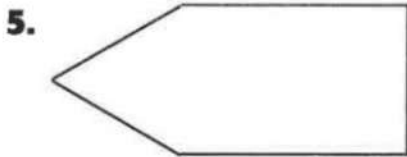
Tell whether each figure has line symmetry. Write yes or no. If yes, tell how many lines of symmetry the figure has.













7. a baseball bat _____

8. a spoon _____

9. Name three letters that have line symmetry. _____

Name _____ Date _____

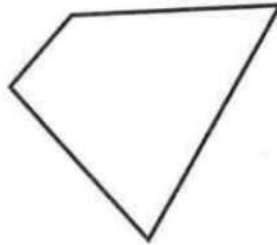
11-7**Homework Practice***Symmetry*

Tell whether each figure has line symmetry. Write yes or no. If yes, tell how many lines of symmetry the figure has.

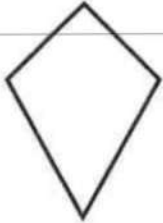
1.



2.



3.



4.



5. Name three numbers that have line symmetry. _____

Spiral Review

Use any strategy shown below to solve. (Lesson 11-6)

- Choose an operation
- Guess and check
- Make a table
- Solve a simpler problem

6. Cesar was hanging a garland around the room. The garland was 40 feet long. He needed to tack it up every five feet. How many times did he have to tack the garland?

7. Sigrid was helping her parents lay new tile in the foyer of their house. The foyer was 8 feet by 8 feet, but the tiles were 4 square feet. How many tiles will they need to fill the space?

Name _____ Date _____

11-8**Reteach***Whole Numbers on a Number Line*

Points on a number line represent numbers.

The following number line represents years.



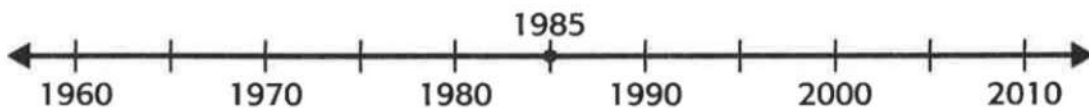
Where would you put a point on the number line to represent 1985?

Step 1 Find the interval between the lines.

The interval between lines is 5 years.

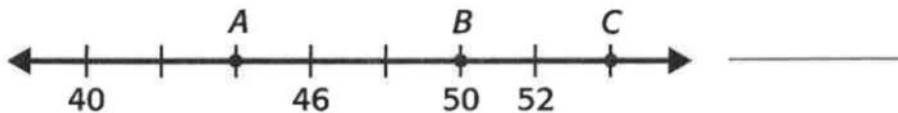
Step 2 Place the point between the appropriate numbers.

The point for 1985 should go on the line between 1980 and 1990.

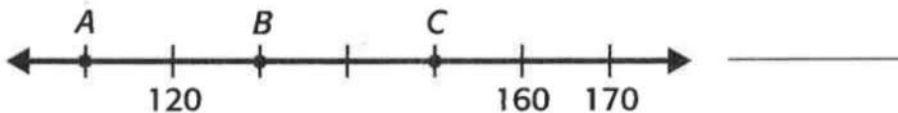


Tell what point represents each number on the number line.

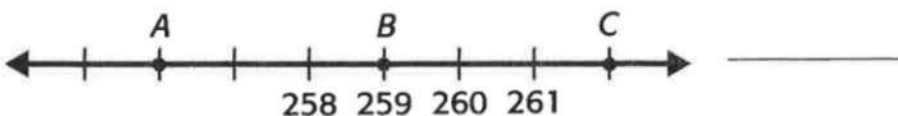
1. 44



2. 130



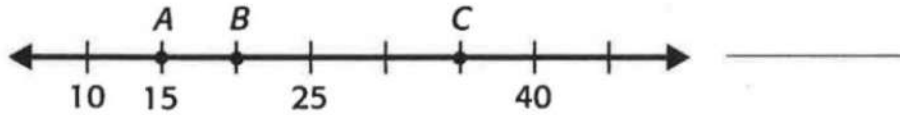
3. 256



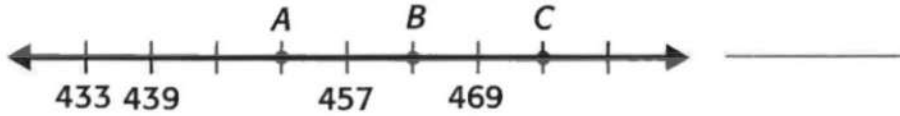
Name _____ Date _____

11-8**Skills Practice***Whole Numbers on a Number Line***Tell what point represents each number on the number line.**

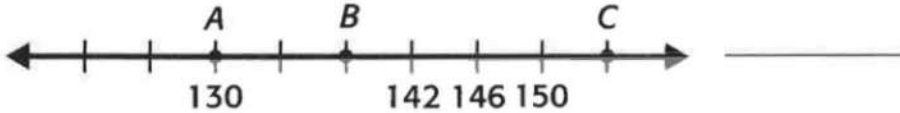
1. 35



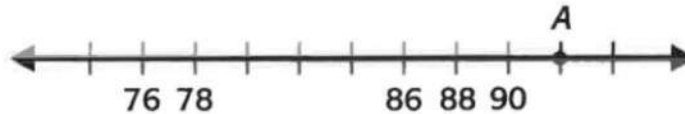
2. 451



3. 138

**Tell what number each letter on the number line represents.**

4. Point A = _____



5. Point A = _____



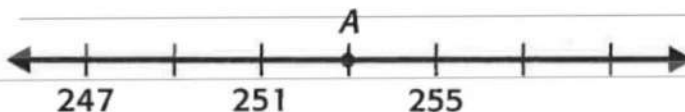
6. Point R = _____



7. Point R = _____

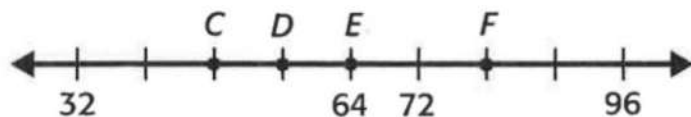


8. Point A = _____



11-8

Name _____ Date _____

Problem-Solving Practice*Whole Numbers on a Number Line***Solve.****Use the number line shown to answer Exercises 1-2.**

1. What are the intervals of the number line? _____
2. What is the difference between point *D* and point *F*? _____

Use the number line shown to answer Exercises 3-5.

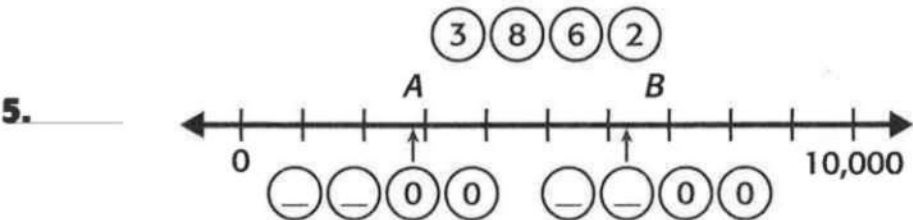
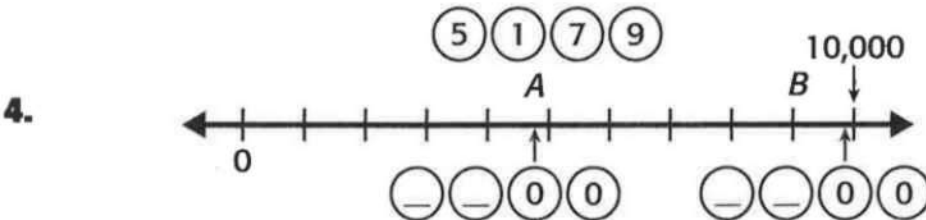
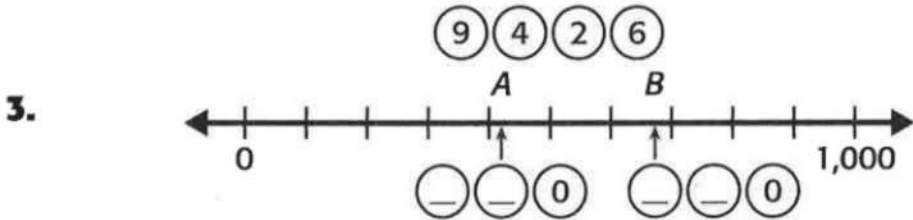
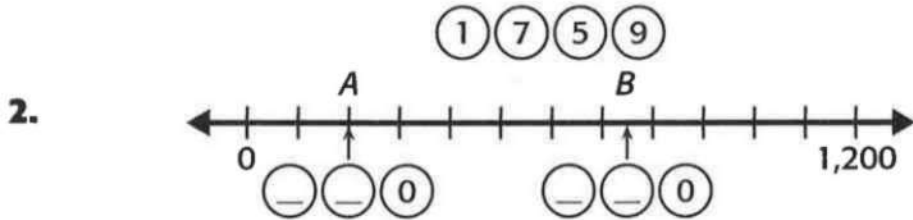
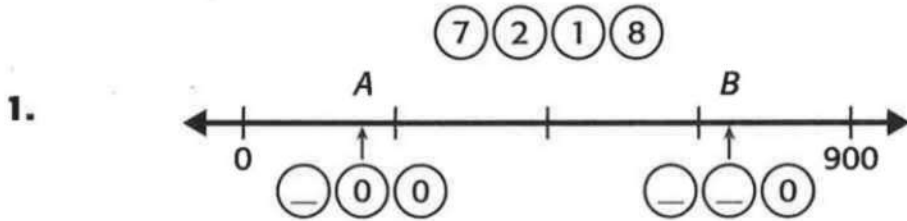
3. What are the intervals of the number line? _____
4. What is the difference between point *L* and point *N*? _____
5. Would 27 be on the number line shown? _____
6. Create a number line below that shows intervals of 10.

11-8

Enrich

On the Line

Use the digits from the circles above each number line to make the missing number.



Formative Assessment Unit 11: Lesson 11 – 8

562 566 570 A 578 B 586

What numbers belong to A and B ?

11-9

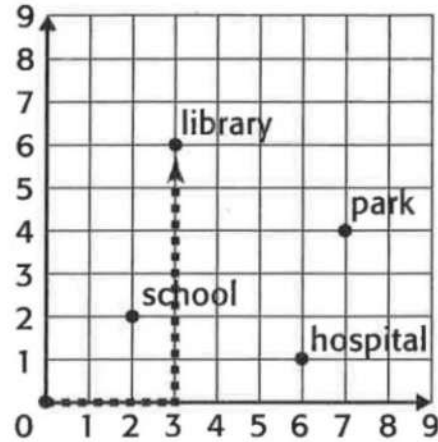
Name _____ Date _____

Reteach*Ordered Pairs*

Just as on number lines, points on a grid represent numbers.

A point such as (3, 5) names a specific place on the grid.

Write the points for the location of the library.



Step 1 Find the first number. Start at (0, 0). Move right until you are directly below the location of the library.

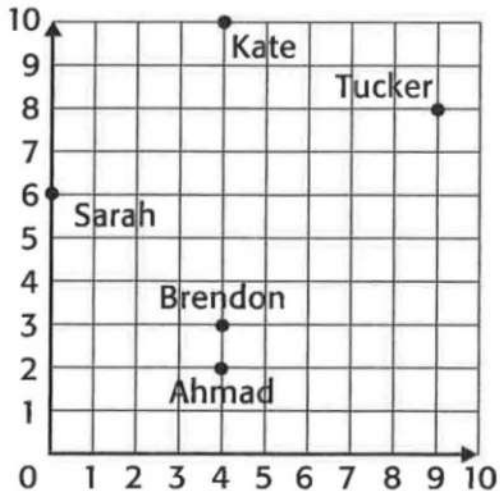
The first number is 3.

Step 2 Find the second number.

Move up until you reach the library. The second number is 6.

The point is (3, 6).

Write the ordered pair for the location of each item on the grid.



1. Tucker

2. Sarah

3. Ahmad

4. Brendan

5. Kate

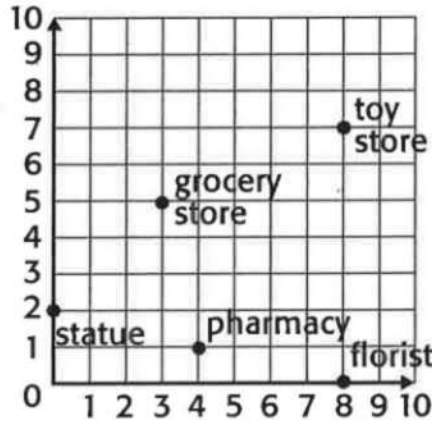
11-9

Skills Practice

Ordered Pairs

Write the ordered pair for the location of each item on the grid.

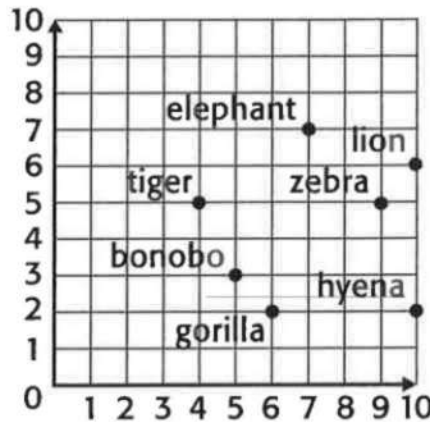
1. pharmacy _____
2. toy store _____
3. florist _____
4. statue _____



Name the animal at each point.

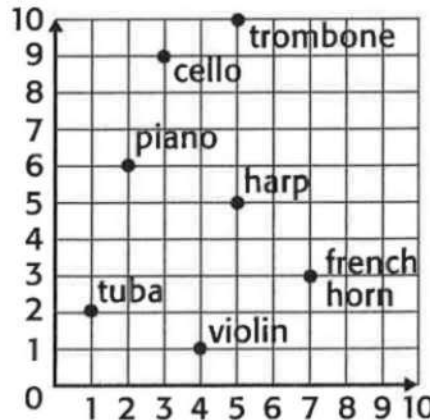
Use the following grid for Exercises 5-8.

5. (10, 2) _____
6. (4, 5) _____
7. (7, 7) _____
8. (10, 6) _____



Use the following grid for Exercises 9-12.

9. (1, 2) _____
10. (5, 5) _____
11. (7, 3) _____
12. (3, 9) _____
13. How would you locate (4, 5) on a grid?

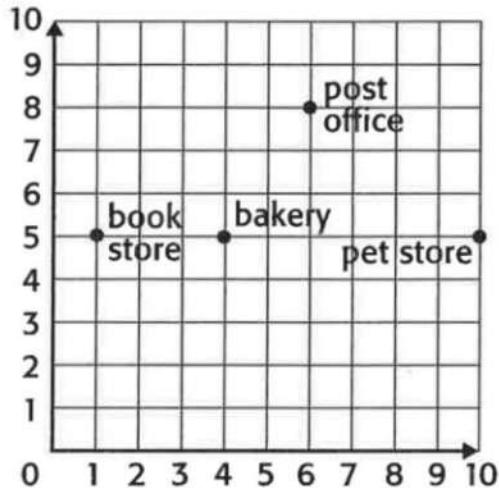


11-9

Name _____ Date _____

Problem-Solving Practice*Ordered Pairs***Solve.**

1. Each unit of the grid represents one block. How far away is the pet store from the bakery? _____



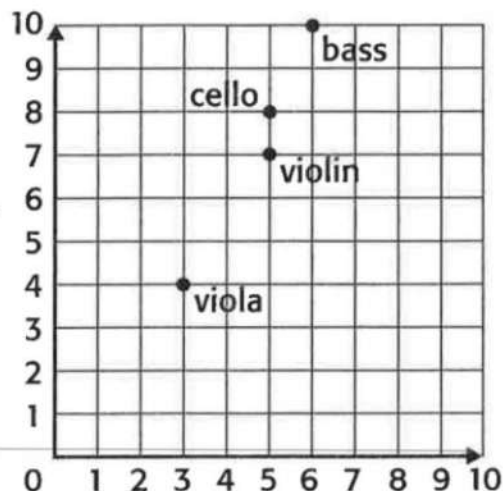
2. How far away is the book store from the pet store? _____
3. Emily and Halima are looking at a grid. Emily says that (7, 8) is the same point as (8, 7). Is she correct? Explain.

4. Describe the similarities between number lines and grids.

5. Name the instrument at (5, 8). _____

6. Name the instrument at (6, 10). _____

5. Name the instrument at (3, 4). _____

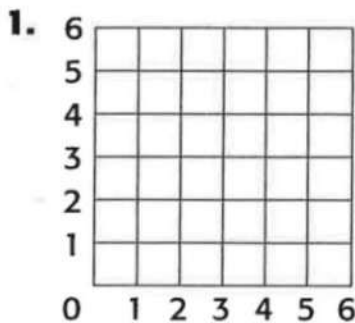


11-9

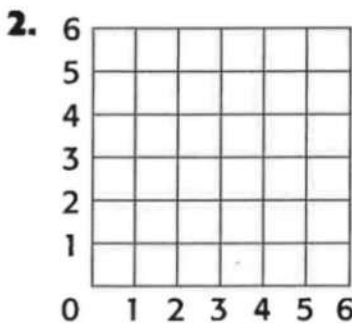
Name _____ Date _____

Enrich*Coordinate Graphs*

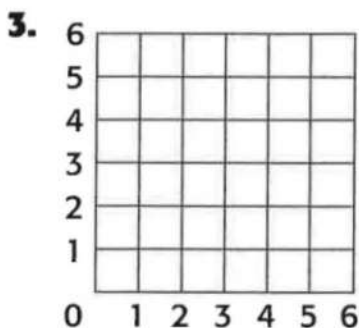
Use the ordered pairs to find the points on each grid. Then connect the points in the order given. Write the name of each shape that you make.


 $(0, 0) \rightarrow (0, 4) \rightarrow (4, 4) \rightarrow (4, 0)$

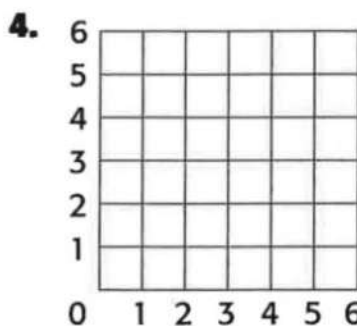
Shape: _____


 $(3, 0) \rightarrow (1, 1) \rightarrow (1, 4) \rightarrow (5, 4) \rightarrow (5, 1)$

Shape: _____


 $(2, 5) \rightarrow (4, 5) \rightarrow (6, 3) \rightarrow (4, 1) \rightarrow (2, 1) \rightarrow (0, 3)$

Shape: _____


 $(3, 6) \rightarrow (4, 4) \rightarrow (6, 4) \rightarrow (4, 3) \rightarrow (5, 1) \rightarrow (3, 2) \rightarrow (1, 1) \rightarrow (2, 3) \rightarrow (0, 4) \rightarrow (2, 4)$

Shape: _____

Formative Assessment Unit 11: Lesson 11 – 9

Find the points $(3, 5)$ on the grid.

How did you find the point? Please write complete answers. _____

Mid-Chapter Test (Lessons 11-1 through 11-4)

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

1. A three-dimensional figure with 2 faces and no edges is called a

A. cube
B. pyramid
C. cylinder
D. sphere

1. _____

2. A polygon with 5 sides is called a

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

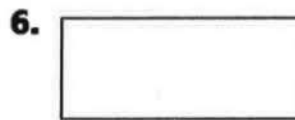
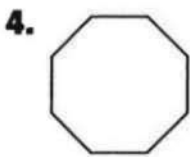
2. _____

3. A shoe box is a

A. cylinder
B. pyramid
C. cone
D. rectangular prism

3. _____

Identify each polygon.



4. _____

5. _____

6. _____

Solve.

7. Paul and Mary took a trip to see the family. They were away for about seven hours. They spent 4 hours visiting and the rest of the time driving back and forth. About how long did it take them to drive one way?

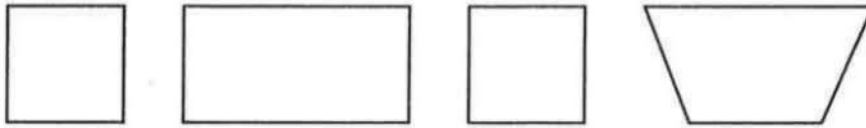
7. _____

8. A pattern repeats 2 pentagons and 3 trapezoids. If a square is placed between the pentagons, how many squares will there be if the pattern repeats itself until there are 21 shapes?

8. _____

Chapter Test, Form 1 (continued)

7. Predict what will be used to complete the pattern.

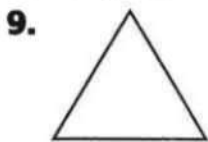


A. rectangle B. trapezoid C. square D. circle 7. _____

8. A pattern repeats 1 square and 2 circles. What will the 15th shape be?

F. circle G. trapezoid H. rectangle J. square 8. _____

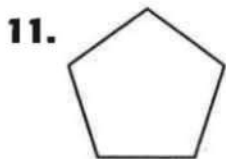
Identify each figure.



A. rectangle B. octagon C. triangle D. pentagon 9. _____



F. quadrilateral G. hexagon H. pentagon J. triangle 10. _____



A. triangle B. hexagon C. octagon D. pentagon 11. _____

Solve.

12. There were 8 crayons, 10 markers, and 13 pens on the table. Annie uses 4 markers. Paul uses 1 pen and 2 crayons. How many items are left?

F. 18 G. 20 H. 22 J. 24 12. _____

13. Jim runs 4 miles a day for a week. Andee runs half as much as Jim. At the end of 7 days, how many miles have Jim and Andee run?

A. 31 B. 42 C. 49 D. 51 13. _____

Mid-Chapter Test (Lessons 11-1 through 11-4)

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- A. cube
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1. _____

2. A polygon with 5 sides is called a

- F. hexagon
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H. rectangle
J. pentagon

2. _____

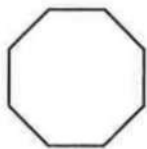
3. A shoe box is a

- A. cylinder
B. pyramid
C. cone
D. rectangular prism

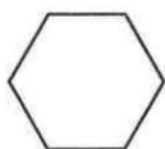
3. _____

Identify each polygon.

4.



5.



6.



4. _____

5. _____

6. _____

Solve.

7. Paul and Mary took a trip to see the family. They were away for about seven hours. They spent 4 hours visiting and the rest of the time driving back and forth. About how long did it take them to drive one way?

7. _____

8. A pattern repeats 2 pentagons and 3 trapezoids. If a square is placed between the pentagons, how many squares will there be if the pattern repeats itself until there are 21 shapes?

8. _____