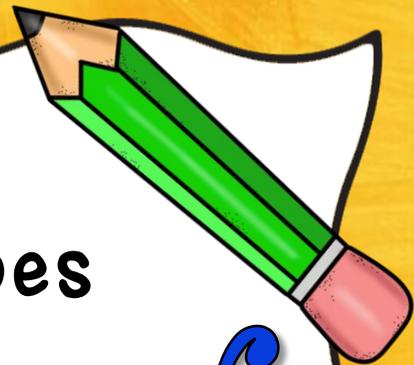


Exploring and  
Classifying Angle Types

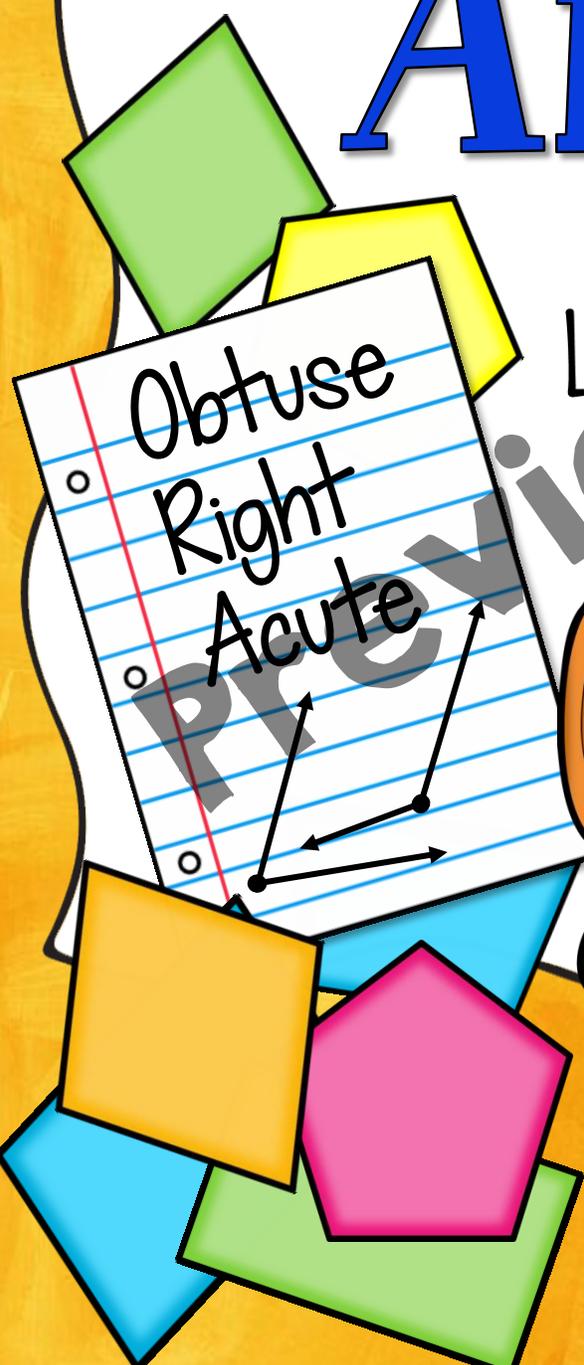


# Amazing Angles

Laura Candler



Obtuse  
Right  
Acute



# Amazing Angles

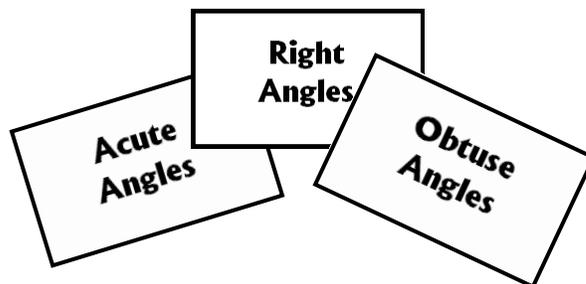
by Laura Candler



Reviewing angle types is a common lesson in upper elementary math classrooms. However, students need to do more than simply memorize the definitions of acute, obtuse, and right angles. They need to be able to apply angle concepts to shapes and lines. *Amazing Angles* begins with a short lesson for reviewing three basic angle types. That introduction can be followed by one of two lessons, either *Angles in Shapes* or *Alphabet Angles*. Both lessons follow a similar structure; however, *Angles in Shapes* is much easier than *Alphabet Angles*. Choose the lesson that's right for your students. You'll notice that neither lesson requires the use of a protractor. These lessons are meant to be fun and challenging without the added difficulty of angle measurement. However, you may certainly include this component on your own by having students measure and record the size of each angle in either activity. Allow plenty of time for discovery and sharing as your students explore Amazing Angles!

## Mini Pack Contents

Reviewing Angles.....	3
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Alphabet Angles Lesson.....	11
Answer Keys.....	14



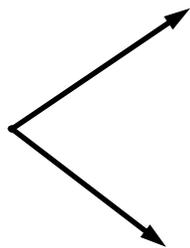
## Common Core Aligned

### Content Standards (4th Grade)

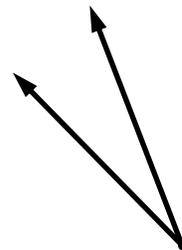
- 4.G.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- 4.G.2** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.



**Standards for Mathematical Practices (Grades 4 and up)** Amazing Angles is also aligned with the eight Standards for Mathematical Practice found at all grade levels. These standards include making sense of problems and persevering in solving them, reasoning abstractly and quantitatively, and constructing viable arguments and critiquing the reasoning of others. Because the content is based on 4th grade standards, this Mini Pack would be appropriate for grades 4 and up and can be taught to students to integrate problem solving with a review of angle types and classification.



# Reviewing Angles

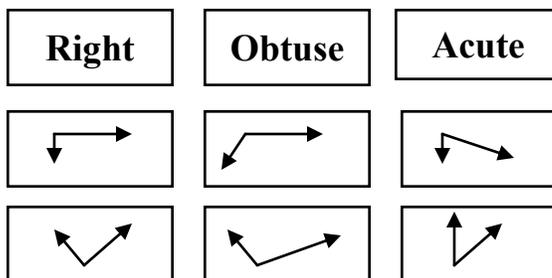


## Introduce or Review Angles

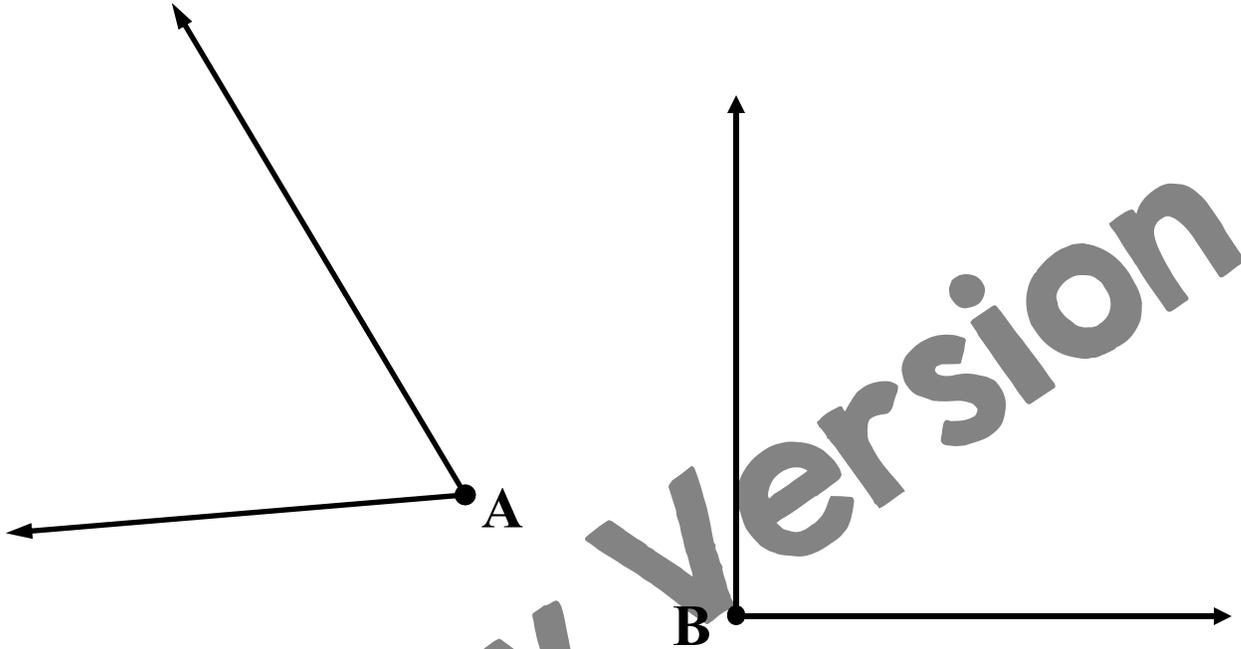
- Use the **Angle Types** page to display the 3 angle types (right, obtuse, acute) on page 4 and pre-assess by asking if students know these angle words. Have them show what they know using dry erase boards.
- Introduce the correct terms, and discuss the fact that the size of an angle is not related to the length of the sides but rather the spread of the opening, the interior of the angle.
- Have students put their hands together and move them apart like a clam shell opening up to model the different types of angles.
- Using the **Angle Types** page, demonstrate how to use an index card or the corner of a piece of paper to decide the angle type.
- **Angle Arm Buddies** - Pair students and have one person be the Angle Maker and the other hold out one arm as their Angle Arm. As you call out an angle type, the Angle Maker gently bends the Angle Arm at the elbow to demonstrate the angle. Switch roles and continue practice.

## Guided Practice: Team Angle Sorting

1. Cut apart the **Angle Sorting Cards** (pages 5 and 6) and remove the 3 heading cards (words). Place the heading cards in the center of the team, face up. Place the angle cards in a stack near them, face down.
2. The first person picks up an angle card and shows it to the team. He or she announces the type of angle, and team members give a thumbs up to show approval. (If they don't agree, they discuss the correct placement.) Remind students to use an index card or the corner of a paper to "prove" their choices.
3. The angle card is placed under the correct heading card.
4. The next person picks up an angle card. Repeat the process until all cards are place.
5. Check each team's arrangement for accuracy. (Answers on page 14)



# Angle Types



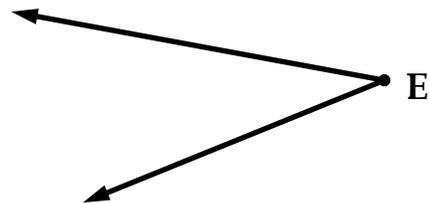
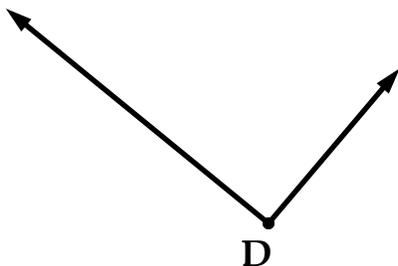
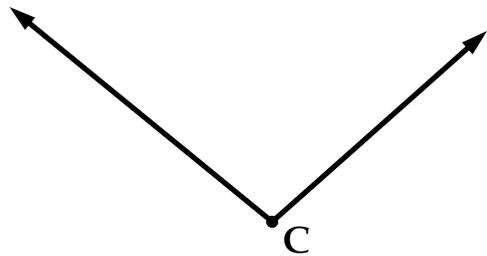
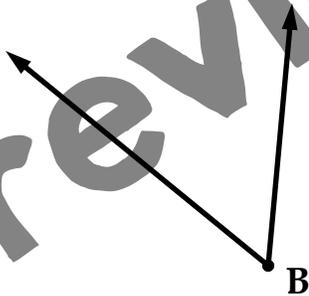
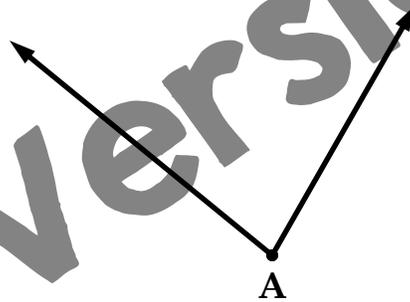
**Right?    Acute?    Obtuse?**

# Sorting Angles

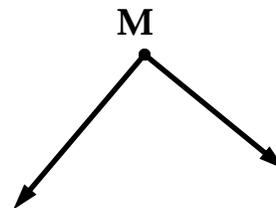
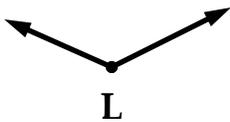
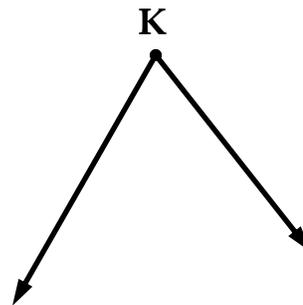
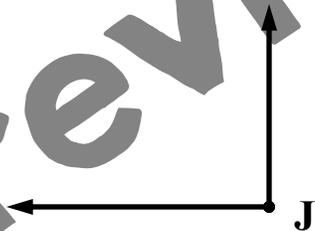
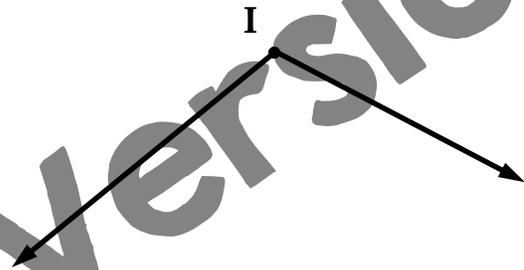
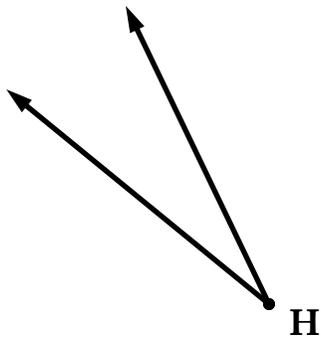
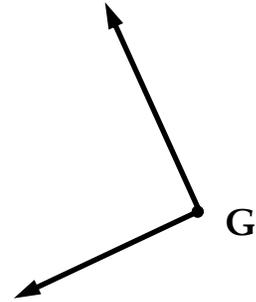
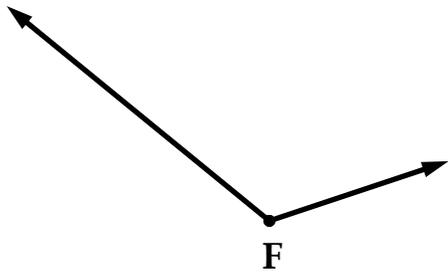
**Right  
Angles**

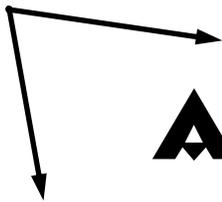
**Obtuse  
Angles**

**Acute  
Angles**



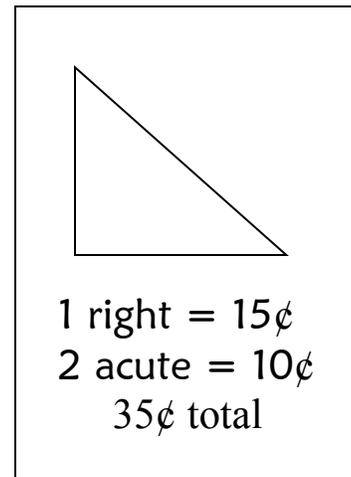
# Sorting Angles





# Angles in Shapes

## Teacher Directions



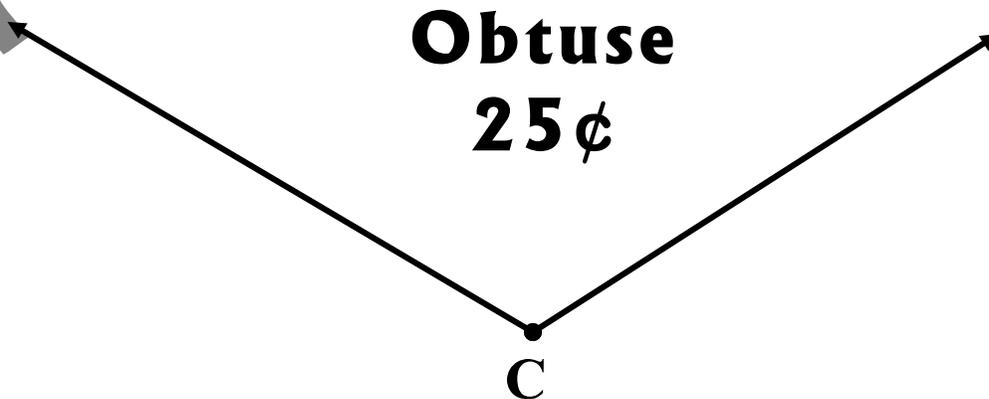
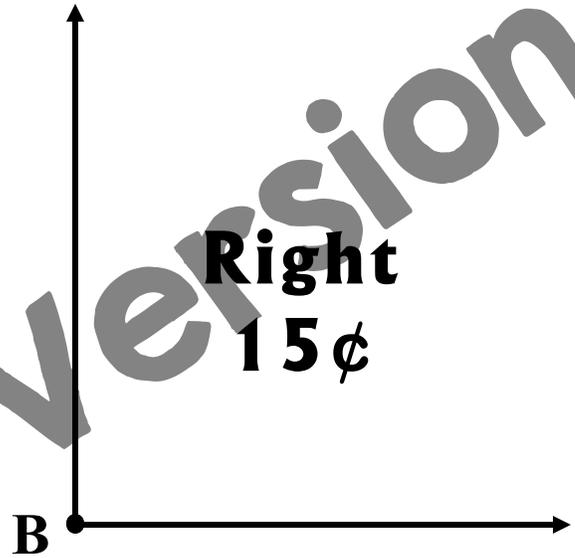
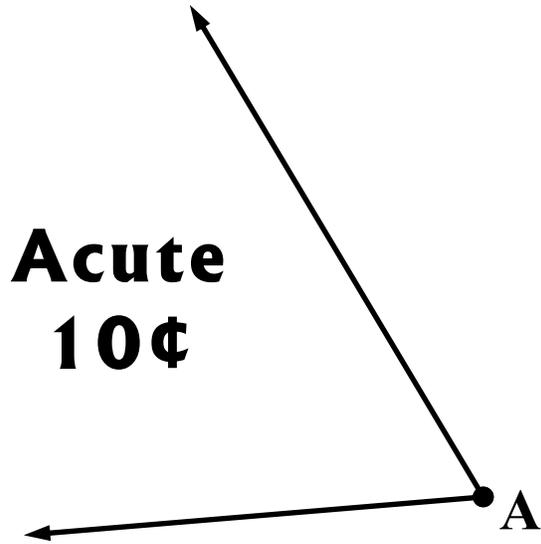
### Angle Cost Problem

- Introduce the problem by telling students to imagine they are going to work on a project and need to have some shapes cut from blocks of wood. However, the carpenter who will be cutting the shapes has a strange way of charging for his service. He charges by the number and type of angle needed to create each shape (see example above).
- Give each pair of students a copy of the Angle Cutting Costs (page 8) or display the illustrations and prices on the board.
- Show the Angles in Shapes Practice Page (page 9) and have each student try to figure out how much the carpenter would charge to cut each shape. Demonstrate how to identify each angle and mark it with the price, then add to find the total cost. (Shape #1 = 60¢ Shape #2 = 75¢)
- Then give each team the Angles in Shapes Team Page (page 10) and have them cut apart the shapes and pass them out according to number. Each person should figure out the cost of his or her own shape, then trade with a partner to check each other's calculations.
- Discuss as a class: What was the cost of each shape? (Answers on page 14.) What patterns do you notice? Which shape is the most expensive? (#4) Which one is the least expensive? (#3)

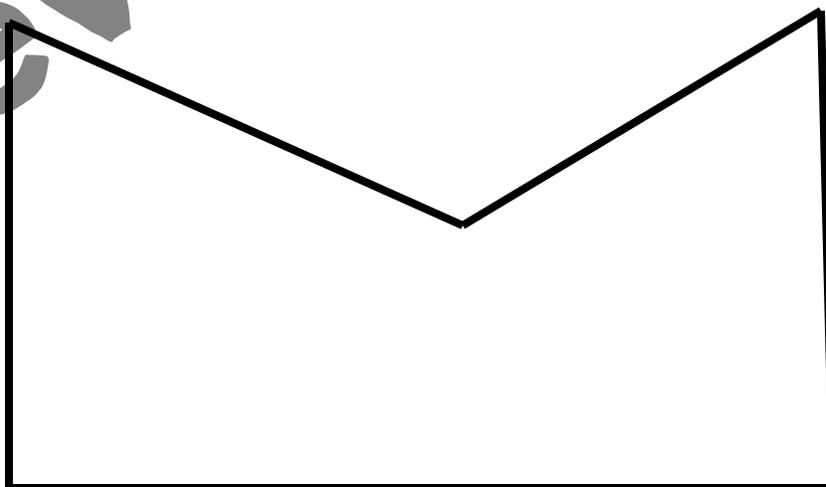
### Angle Shape Challenge

- Present the challenge: **What is the most expensive shape you can make using 5 straight lines?**
- Allow time for individuals to find their answers, then have them compare answers with their teammates. Ask the person with the most expensive shape to stand and share with the class.
- Be sure to allow time for students to share the strategies they used to attack this problem!

# Angle Cutting Costs



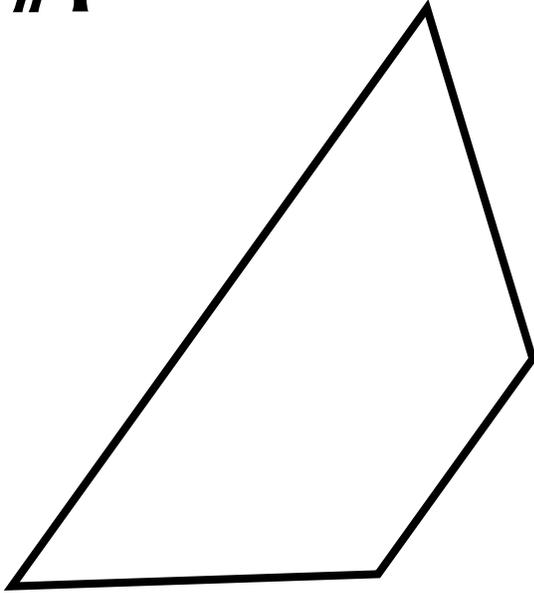
# Angles in Shapes Practice Page



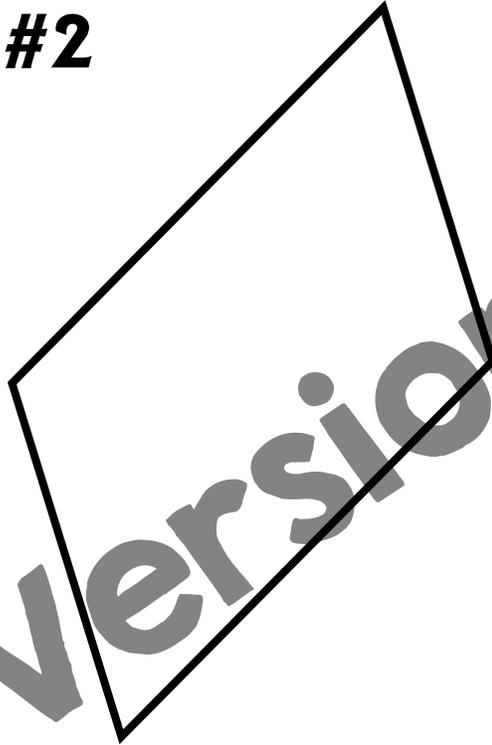
Preview Version

# Angles in Shapes Team Page

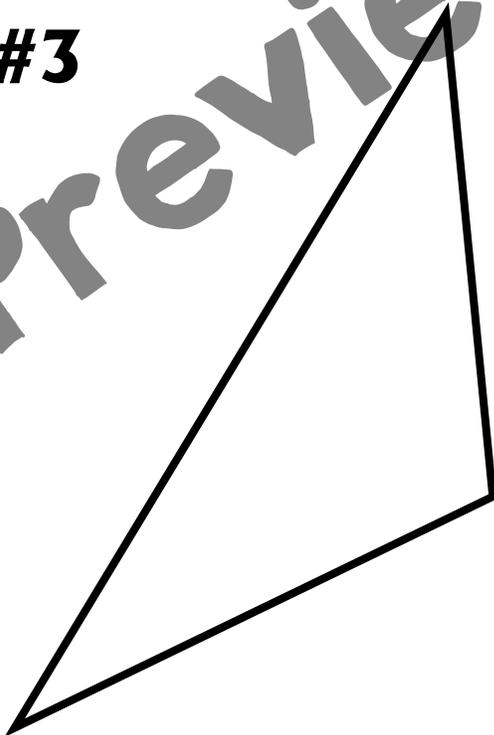
**#1**



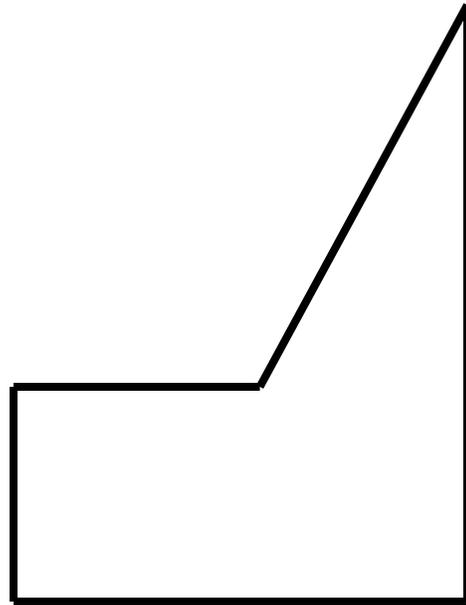
**#2**

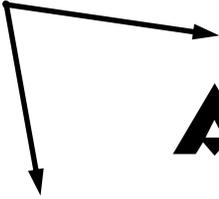


**#3**



**#4**





# Alphabet Angles

## Teacher Directions

M

3 acute angles  
 $\times 7\text{¢} = 21\text{¢}$

### Trophy Names Problem

- Give each pair of students a copy of the **Alphabet Angles** handout (page 12) showing the letters of the alphabet and the costs of the angles.
- Display a copy of **Math Student of the Year** (page 13) and review the task with your class.
- Demonstrate how to find the cost of each letter by multiplying the number of each angle type by its cost.
- Present a few different letters, one at a time, and allow the students to practice figuring the cost of those letters.
- Give each student a piece of white copier paper or 9" x 12" piece of white construction paper. Have them print their first names on the top of the paper in the square style shown on the overhead transparency. Then have each person figure the cost of his or her name, showing all work in the space under the name.
- Ask each person to trade with their partner and check each other's work using a calculator if needed.
- Post the names and put a star on the most expensive name for each team. Who has the most expensive name in the class?
- Discuss as a class: What patterns do you notice? Is the shortest name the least expensive? Is the longest name the most expensive?

### Angle Word Challenge

- Present this challenge:  
**What is the most expensive 3-letter word you can make?**
- Allow time for individuals to find their answers, then have them compare answers with their teammates. Ask the person with the most expensive word to stand and share with the class.
- Be sure to allow time for students to share the strategies they used to attack this problem!

# Alphabet Angle Costs

A B C D E F G H I  
J K L M N O P Q R  
S T U V W X Y Z

Acute - 7¢      Right - 8¢      Obtuse - 13¢

# Math Student of the Year Congratulations!

You have just won the Math Student of the Year Award! Your name will be engraved on a trophy in your honor. The cost of engraving will depend on how many angles and the types of angles in your first name.



## Directions:

To figure out the cost, write your first name in block letters as shown on the Alphabet Angles price list. Under each letter, show how you figured the cost of that letter (see example below). Then figure out the total cost of your name. Be sure to get a partner to check your work!

M

3 acute angles  
 $\times 7\text{¢} = 21\text{¢}$

# Answer Keys

## Reviewing Angles

**Right Angles**  
D, G, J, M

**Obtuse Angles**  
C, F, I, L

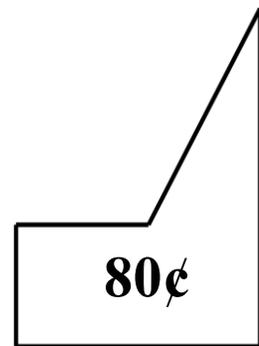
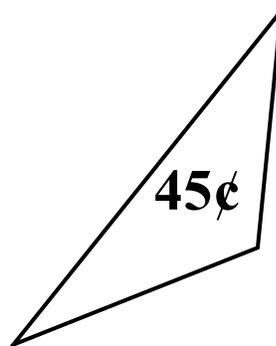
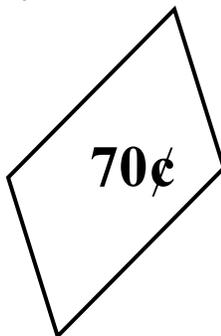
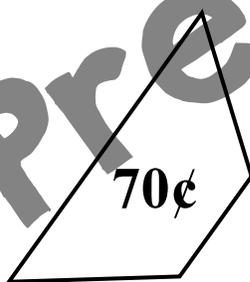
**Acute Angles**  
A, B, E, H, K

## Angles in Shapes

Practice Angles



Team Angles



## Angles in Shapes

Answers will vary depending on words used in calculations.

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