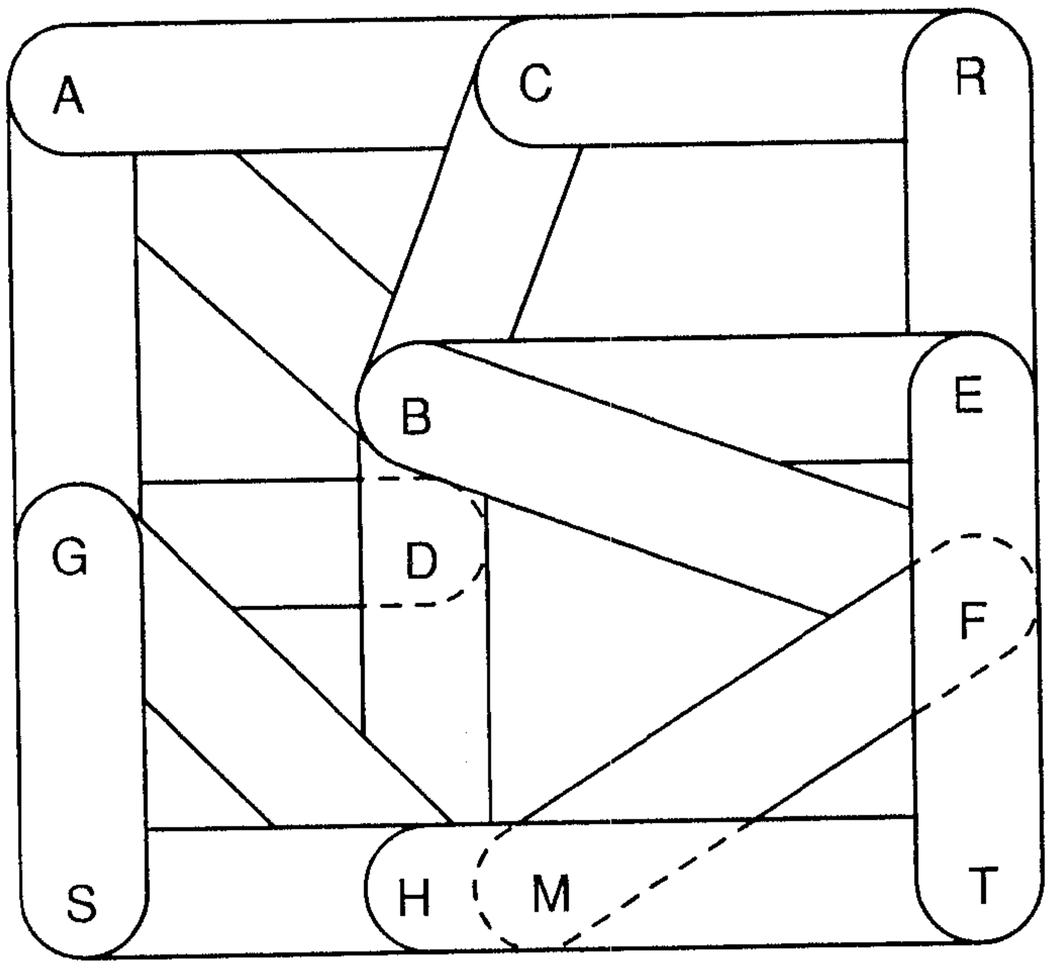
Name _____

A Tangle of Angles

5.12a

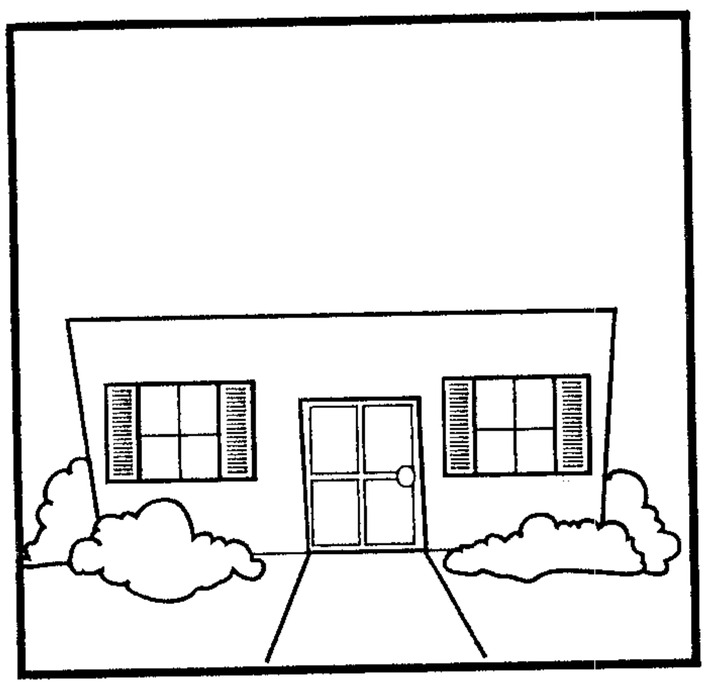
Write *acute*, *obtuse*, or *right* on the line to identify each angle.



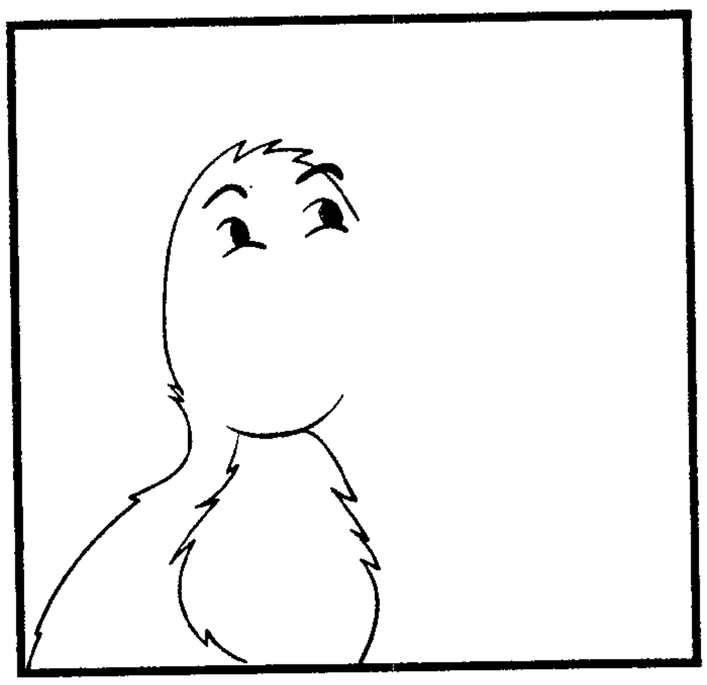
1. ∠ABC _____
2. ∠CBE _____
3. ∠CRE _____
4. ∠AGD _____
5. ∠EBF _____
6. ∠BFM _____
7. ∠ABE _____
8. ∠ABF _____
9. ∠GSH _____
10. ∠MFT _____

Complete each picture by drawing the requested angle.

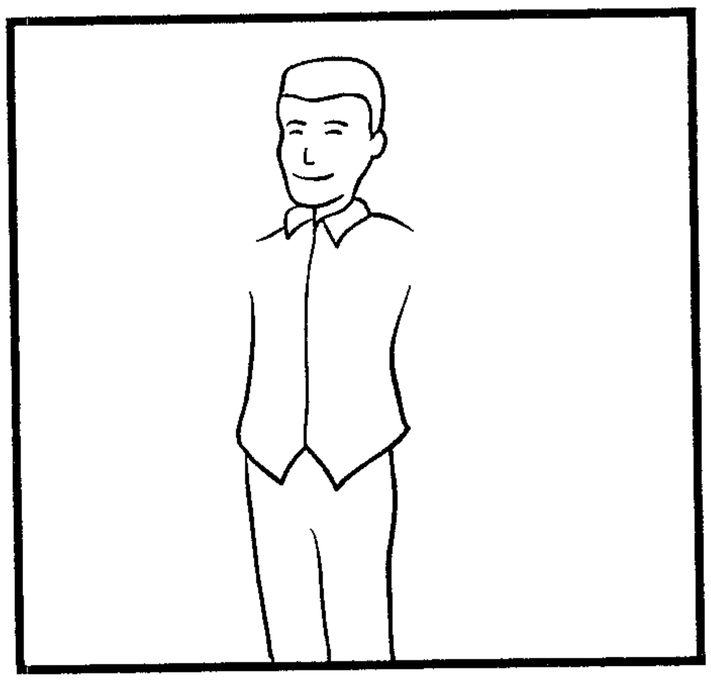
11. an obtuse roof



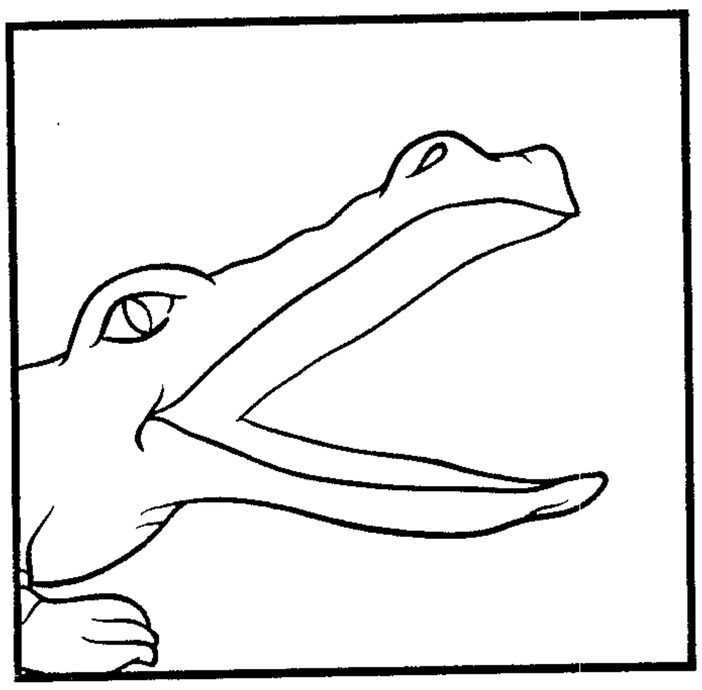
12. an acute beak



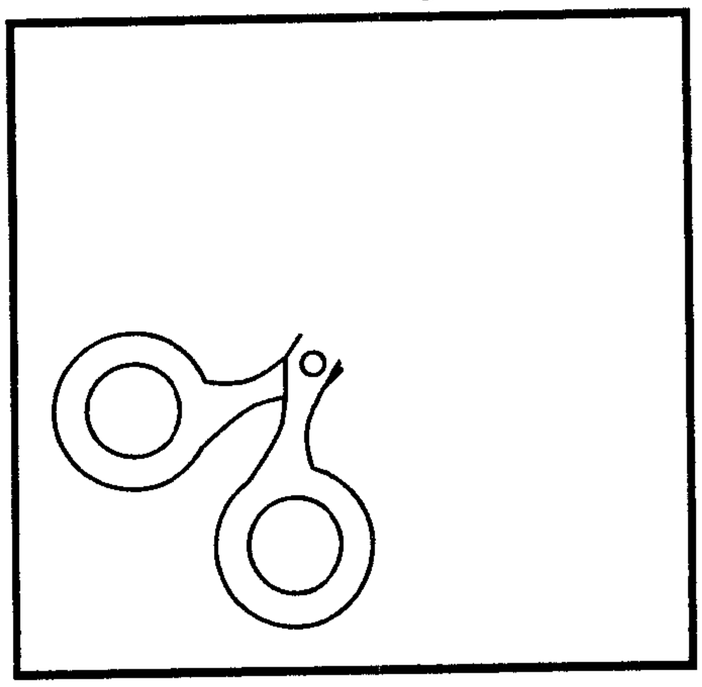
13. arms bent at right angles



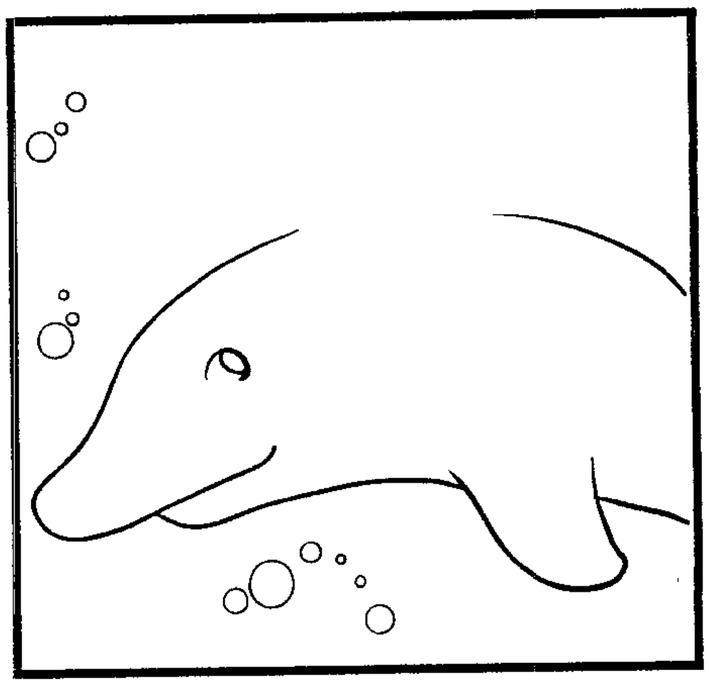
14. acute teeth



15. scissor blades opened to an obtuse angle



16. an acute back fin



91. Angles

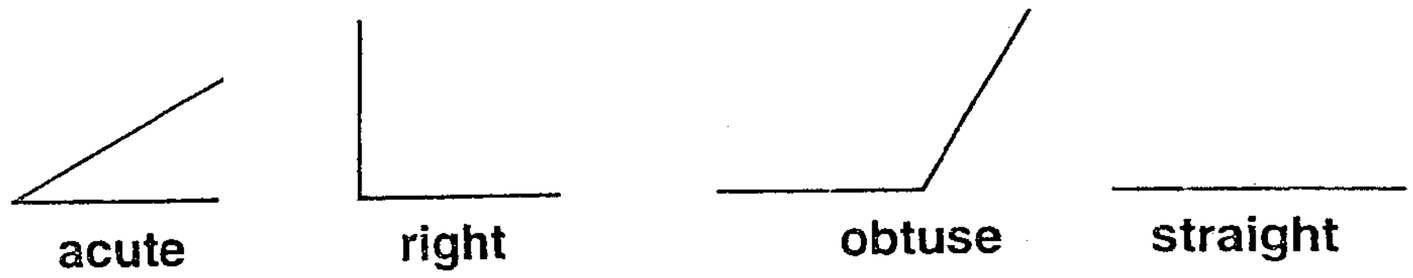
MATERIALS Activity Worksheet 39, geoboards, rubber bands

Ask students to tell you what they know about angles. Distribute Activity Worksheet 39. Have students make the angle at the top left of their worksheet on their circle geoboard. Remind them that the sides of the angle are formed by rays with the same endpoint (vertex). Ask the students how many degrees are in a circle (360°). Ask them how many degrees are in this angle (360° ÷ 12 = 30°).

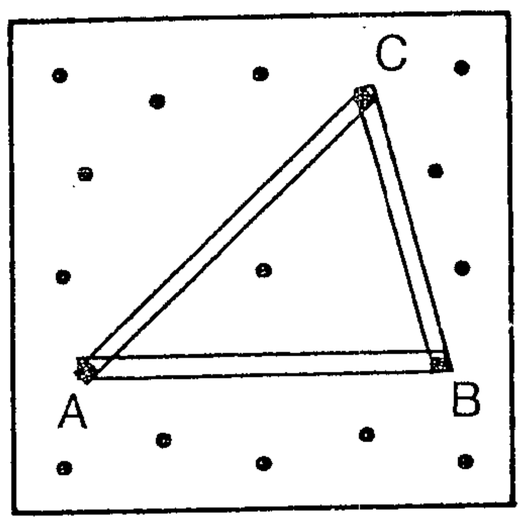
Have students complete the worksheet independently.

EXTENSIONS Challenge the students with the following:

a. Name the type of angle; acute, right, obtuse, or straight.



b. Have students connect rubber bands on their geoboard



Challenge them to find the size of each angle.

Name _____

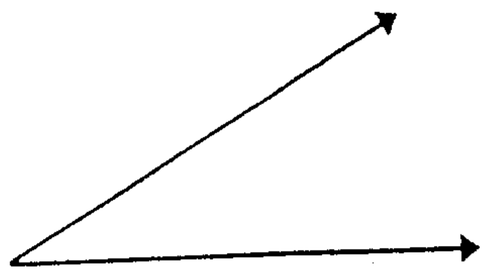
5.12a 4.2

USE WHAT YOU KNOW

Naming Rays and Angles

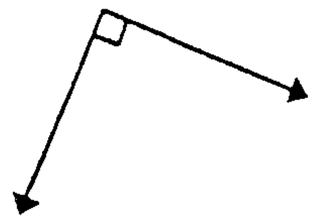
Identify the angle. Write *right*, *acute*, or *obtuse*.

1.



_____

2.

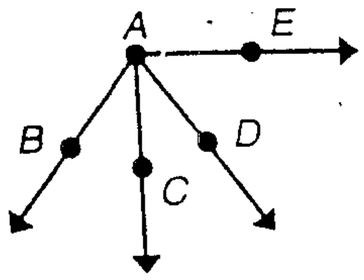


_____

3.

_____

Use the figure for Exercises 4–6.



4. Name a right angle. _____

5. Name an obtuse angle. _____

6. Name two acute angles. _____

Mixed Applications

7. What kind of angle is formed by the hands of a clock when it is 4:15?

_____

8. What kind of angle is formed by the hands of a clock when it is 9:10?

_____

9. Pietro's pet snake is 256 cm long. His sister's pet snake is 129 cm shorter. How long is his sister's snake?

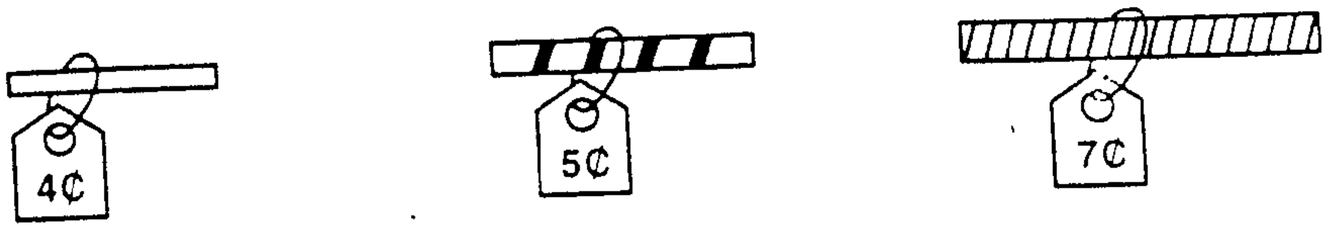
_____

10. Tara is putting 8 photos on each page in her album. She has already filled 24 pages and has 64 more photos to put in the album. How many pages of photos will Tara have filled in all?

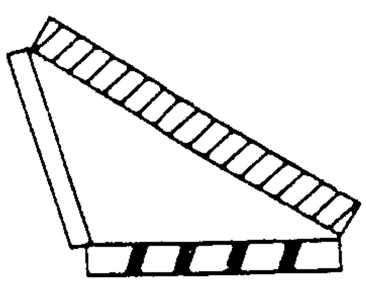
_____

VISUAL THINKING

How much do these cost?

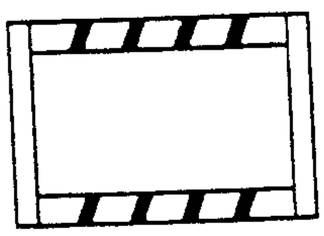


11.



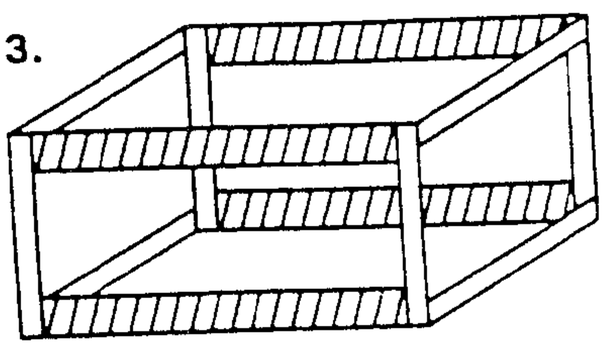
_____

12.



_____

13.



_____

Use with text pages 112–113.

Drying Triangles

5.12b

Name _____

Given these 56 possible outcomes when rolling 3 dice, label those that form a triangle.

1	1	1	
1	1	2	
1	1	3	
1	1	4	
1	1	5	
1	1	6	
1	2	2	
1	2	3	
1	2	4	
1	2	5	
1	2	6	
1	3	3	
1	3	4	
1	3	5	
1	3	6	
1	4	4	
1	4	5	
1	4	6	
1	5	5	

1	5	6	
1	6	6	
2	2	2	
2	2	3	
2	2	4	
2	2	5	
2	2	6	
2	3	3	
2	3	4	
2	3	5	
2	3	6	
2	4	4	
2	4	5	
2	4	6	
2	5	5	
2	5	6	
2	6	6	
3	3	3	
3	3	4	

3	3	5	
3	3	6	
3	4	4	
3	4	5	
3	4	6	
3	5	5	
3	5	6	
3	6	6	
4	4	4	
4	4	5	
4	4	6	
4	5	5	
4	5	6	
4	6	6	
5	5	5	
5	5	6	
5	6	6	
6	6	6	

Can you write a number sentence (equation) that shows the relationship of the shorter sides to the longer side of a triangle?

5.12k

TRIANGLE STRATEGIES

I. Topic Area

Probability, logic, problem solving, and classification of triangles by their sides.

II. Introductory Statement

Students will use probability in a game format to build scalene, isosceles, and equilateral triangles. Logic and problem solving will be involved as they develop strategies for winning.

III. Math Skills

a. Probability
b. Logic
c. Problem solving
d. Classifying triangles by sides
e. Developing strategies

Science Processes

a. Observing
b. Classifying
c. Inferring
d. Generalizing
e. Applying

IV. Materials

a die or 1–6 spinner for each group
"Triangle Strategies" rule sheet
recording sheet

V. Key Question

"What is the best strategy for winning the triangle game?"

VI. Background Information

Students are to form as many equilateral, isosceles, scalene, and right triangles as possible in the following manner:

equilateral triangles must be formed on the diagonals;
isosceles triangles are formed in horizontal rows only; and
scalene and right triangles are formed in vertical columns only.

See the sheet entitled "Triangle Strategies" for the rules of play and scoring.

VIII. Procedure

Game I

One player tosses the die or spins the spinner and all players record the resulting number in one of the empty spaces in the grid on their record sheet. It is good strategy to keep that placement secret.

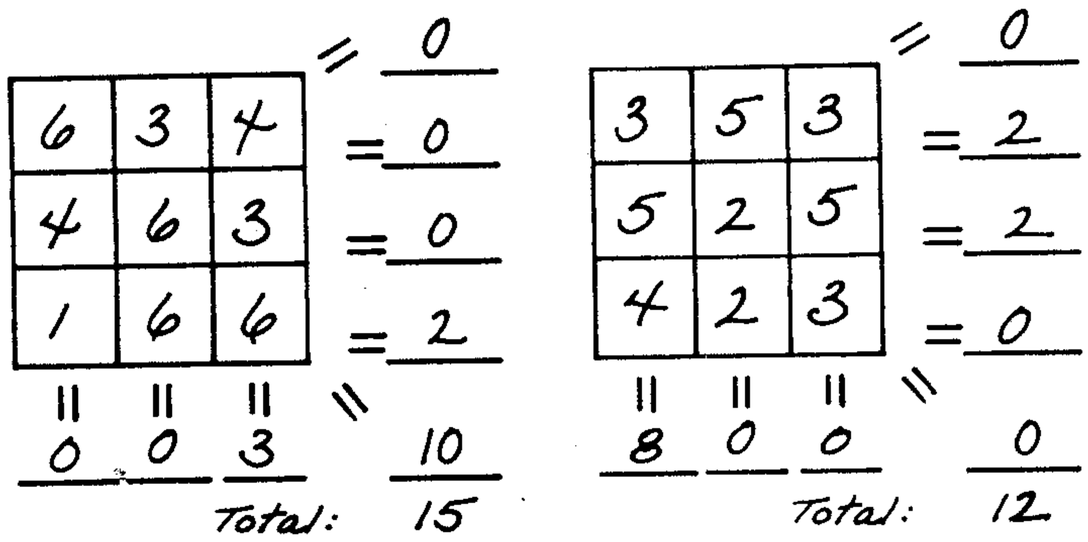
Game II

For Game II, each player tosses the die or spins the spinner in turn. First, decide the order of play. Next, each player plays in turn, recording the number that shows. In this variation players need not keep their entries secret. Scoring is the same for both games.

The most important outcome of playing these games is the development of winning strategies. Students should be encouraged to use logic to develop strategies and then to make a record of them. The merits of the strategies should be discussed within the group.

Scoring

Here are two examples of scoring.



IX. Discussion Questions

1. Have students share their strategies and critique them. As individuals agree that they like a strategy, they record it on their strategy sheet. Here are a few that emerged in one setting.
   a. Since the highest score is for equilateral triangles, the first entry should be placed in a corner square.
   b. The second entry, if the same as the first, should be in the opposite corner. If different, it should be in an adjacent corner. This would then provide two options for forming the equilateral triangle, doubling the probability.
   c. At any time the same number appears as in the steps above, it is placed in the opposite corner. Then, if either appears again it is placed in the middle.
   d. The numbers 3, 4, and 5 are preferably arranged in a column so that the combined score of the scalene and right triangles (8 points) is earned.

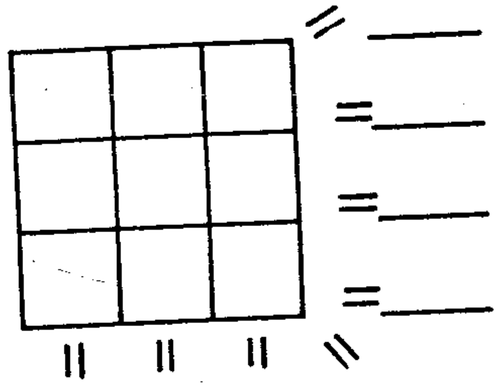
X. Extended Activities

Have students change the values assigned to each type of triangle to improve the game.

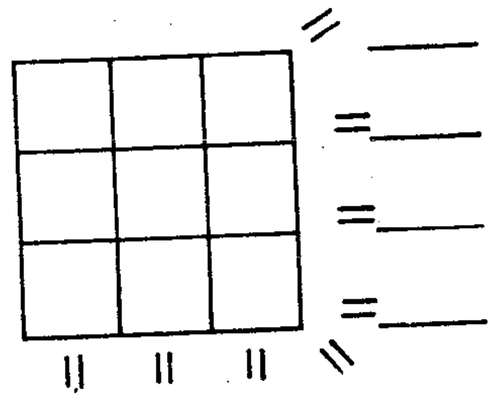
Newsletter January 1989

Triangle Strategies

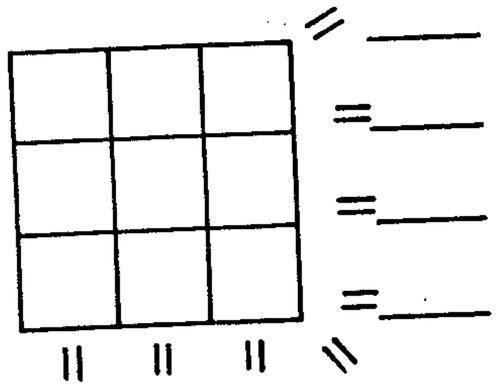
Strategy Planner: _____



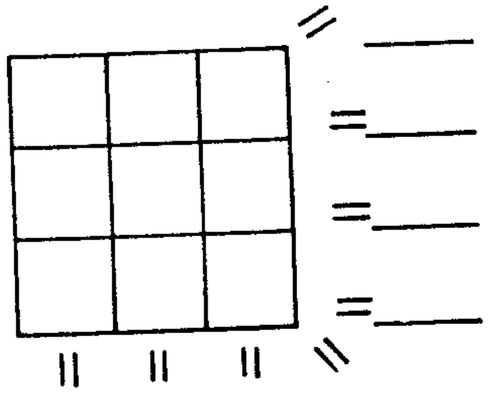
Total: _____



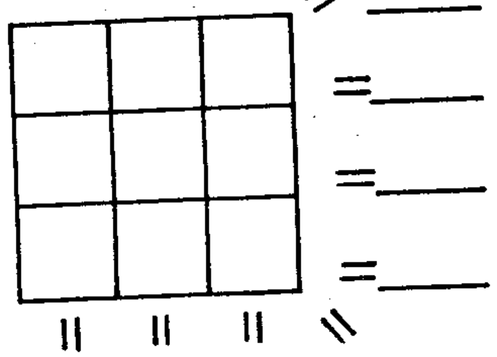
Total: _____



Total: _____



Total: _____



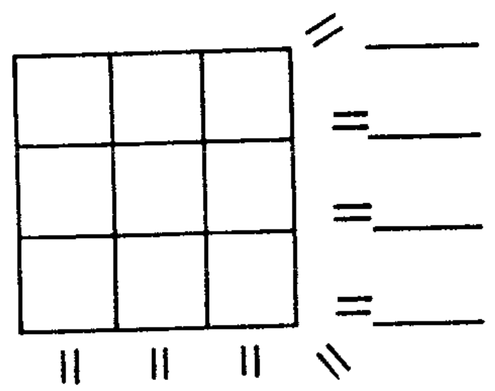
Total: _____

Tournament Total	
Game 1	_____
Game 2	_____
Game 3	_____
Game 4	_____
Game 5	_____
Total Score	_____

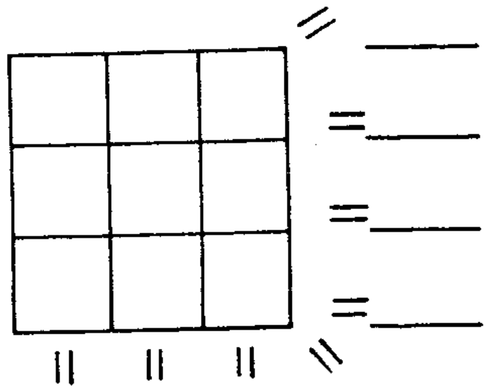
72

Triangle Strategies

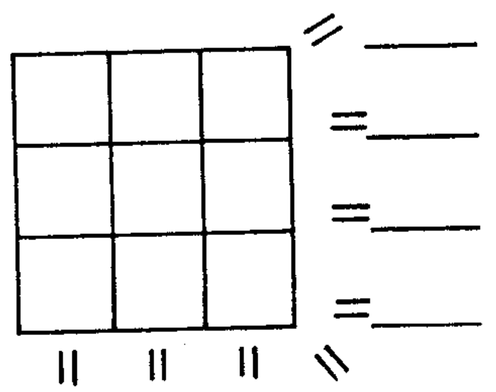
Strategy Planner: _____



Total: _____



Total: _____



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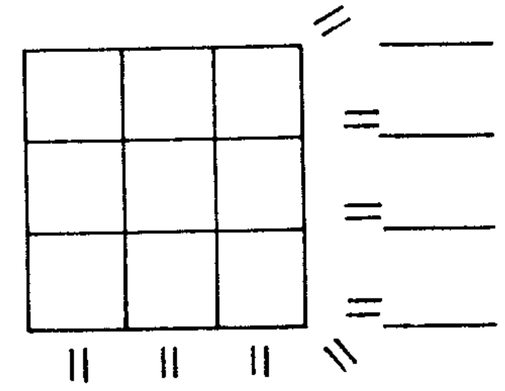
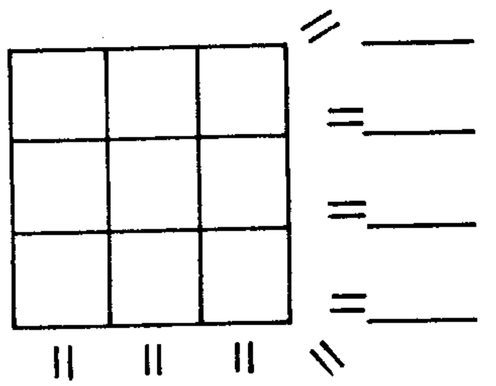
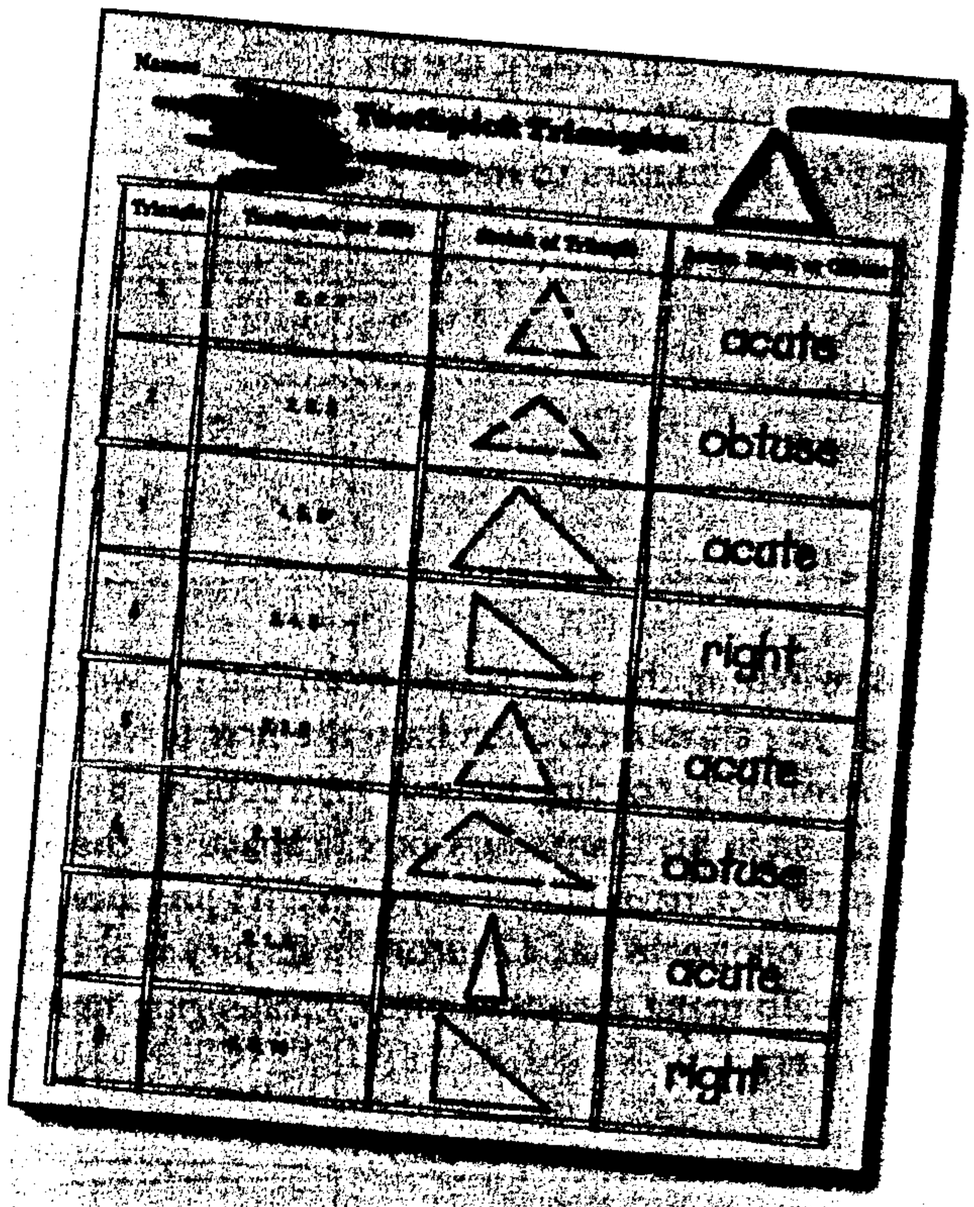


Total: _____



Total: _____

Tournament Total	
Game 1	_____
Game 2	_____
Game 3	_____
Game 4	_____
Game 5	_____
Total Score	_____



Toothpick Triangles

Acute, right, and obtuse triangles

This fun-to-do activity is perfect for partners. At a center, place copies of the recording sheet from page 41 and a small resealable plastic bag filled with 24 toothpicks. Have the partners use the number of toothpicks specified on the recording sheet to form each triangle. Then have them complete the page as shown. ■

Jennifer Otter, Oak Ridge, NC

For a recording sheet that asks students to also identify whether each triangle is equilateral, isosceles, or scalene, go to themailboxcompanion.com.

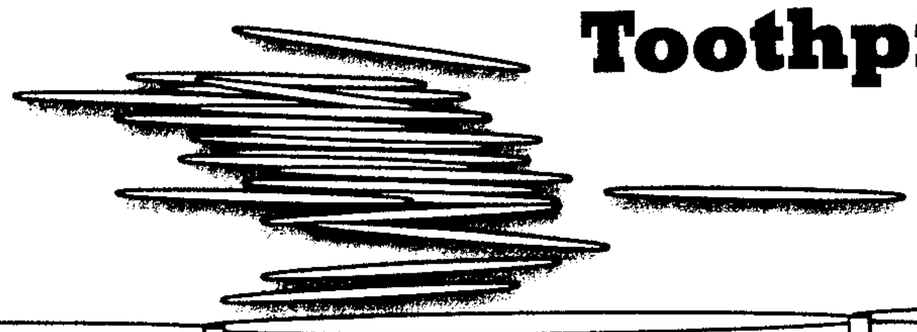
~~Dried~~ Pasta
Uncooked

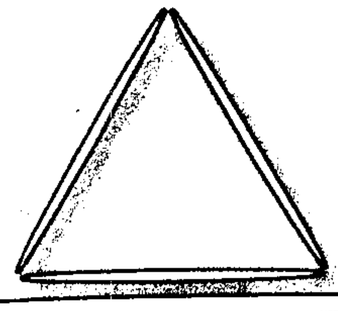
5.12

Recording sheet

Names _____

Toothpick Triangles





Triangle	Toothpicks per Side	Sketch of Triangle	Acute, Right, or Obtuse?
1	2, 2, 2		
2	2, 3, 2		
3	4, 5, 6		
4	3, 4, 5		
5	3, 3, 3		
6	2, 3, 4		
7	2, 1, 2		
8	6, 8, 10		

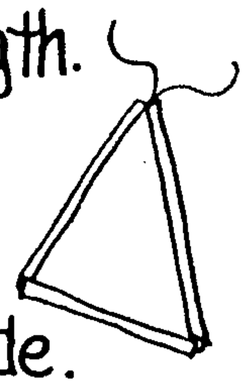
Note to the teacher: Use with "Toothpick Triangles" on page 39.

Drying Triangles

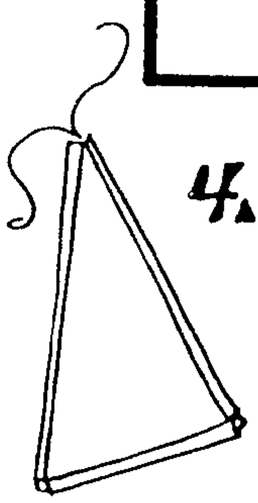
5.12

Name _____

1. Roll 3 dice and match the numbers with straws of the same length.
2. Use the straws to construct triangles. Record.
3. Let a and b represent the shorter sides and c the longest side.



Length of side a	Length of side b	Length of side c	Triangle △ yes or no



4. Find 3 combinations of lengths that will not form a triangle.

___ ___ ___, ___ ___ ___, and ___ ___ ___.

Find 3 combinations of lengths that will form a triangle.

___ ___ ___, ___ ___ ___, and ___ ___ ___.