

**Teacher Prep
Committee**

***It Worked for Me:
Activities from the Classroom***

**Title: Discovering Numeration
Systems**

Author: Teresa Stricklin

Category: Counting and the Number System

Mathematical Topics: Mayan, Babylonian, Roman and Egyptian
Numeration Systems

Mathematical Prerequisites: Students will be asked to work together in small groups to discover patterns and form conjectures amongst their groups. They must truly understand the value of inductive reasoning in learning.

Abstract: Each student will receive a passport booklet in which to record their observations and conjectures. Groups will then be given a stack of numeration cards with one Numeration on one side and the corresponding Hindu-Arabic number on the other. Using the

cards, students will identify what symbols are used and which base (if applicable) is used. Then students will solve the problems in the passport booklet in which the instructor will stamp when it is correct. Rotate cards through the groups until all 4 numeration systems have been discovered.

Babylonian Number System

Some notes I took during my visitation:



The symbols that the Babylonians use and what each symbol represents.

Which base are the Babylonians using? Explain how you know.

Write 12,321 using the Babylonian system.

Write the current year in Babylonian.

Teacher stamp

Teacher stamp

Write $\nabla \nabla < \nabla \nabla$ in Hindu-Arabic (the base 10 system we use today)

Teacher stamp

Roman Numeral System

Some notes I took during my visitation:



The symbols that the Romans use and what each symbol represents.

Which base are the Romans using? Explain how you know.

Write 5280 using Roman numerals

Write the year you were born in Roman numerals.

Teacher stamp

Teacher stamp

Write CCXLIX in Hindu-Arabic (the base 10 system we use today)

Teacher stamp

Mayan Number System

Some notes I took during my visitation:



The symbols that the Mayans use and what each symbol represents.

Which base are the Mayans using? Explain how you know.

Write 684 using the Mayan system.

Write your age quadrupled in Mayan



Teacher stamp

Teacher stamp

Write

in Hindu-Arabic (the base 10 system we use today)

Teacher stamp

Eygptian Number System

Some notes I took during my visitation:



The symbols that the Eygptians use and what each symbol represents.

Which base are the Eygptians using? Explain how you know.

Write 1,312,322 using the Eygptian system

Add your birth year to the current year & write it in Eygptian

Teacher stamp

Teacher stamp

Write  in Hindu-Arabic (the base 10 system we use today)

Teacher stamp



Your passport to adventure!

Happy Trails!

Purpose of each trip:

- Study each numeration system
- Discover which symbols are used and what each symbol represents
- Use inductive reasoning to form patterns about each system
- Convert numbers written in each system to Hindu-Arabic (the base 10 system we use today)
- Convert Hindu-Arabic numbers into other numeration systems

Roman

VIII

Hindu-Arabic

8

Roman

IX

Hindu-Arabic

9

Roman

LXVII

Hindu-Arabic

67

Roman

CCCXXVI

Hindu-Arabic

326

Roman

DXL

Hindu-Arabic

540

Roman

CMXCVI

Hindu-Arabic

996

Roman

MDCCLXIV

Hindu-Arabic

1,714

Roman

MMXIV

Hindu-Arabic

2,014

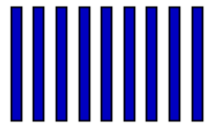
Roman

$\overline{X}M$

Hindu-Arabic

11,000

Egyptian



Hindu-Arabic

9

Egyptian



Hindu-Arabic

43

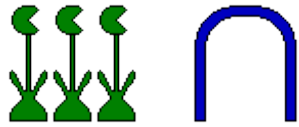
Egyptian



Hindu-Arabic

257

Egyptian



Hindu-Arabic

3,010

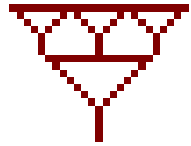
Egyptian



Hindu-Arabic

1,231,312

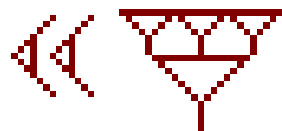
Babylonian



Hindu-Arabic

4

Babylonian



Hindu-Arabic

24

Babylonian



Hindu-Arabic

64

Babylonian



Hindu-Arabic

601

Babylonian



Hindu-Arabic

613

Babylonian



Hindu-Arabic

1,203

Babylonian



Hindu-Arabic

36,061

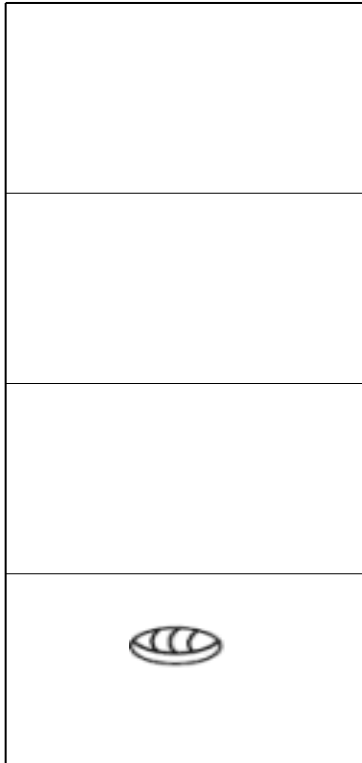
Babylonian

𐎶 𐎶 𐎶

Hindu-Arabic

40,271

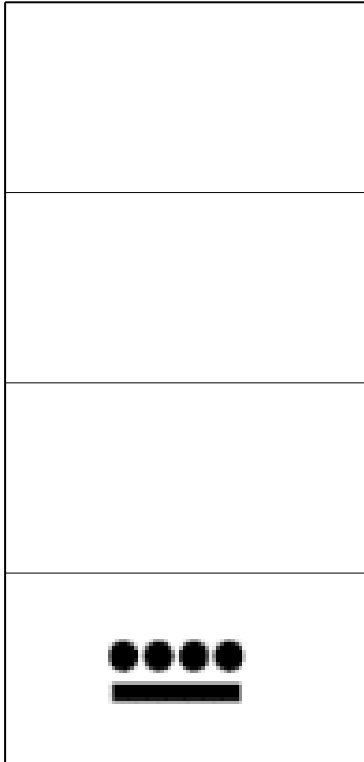
Mayan



Hindu-Arabic

0

Mayan



Hindu-Arabic

9

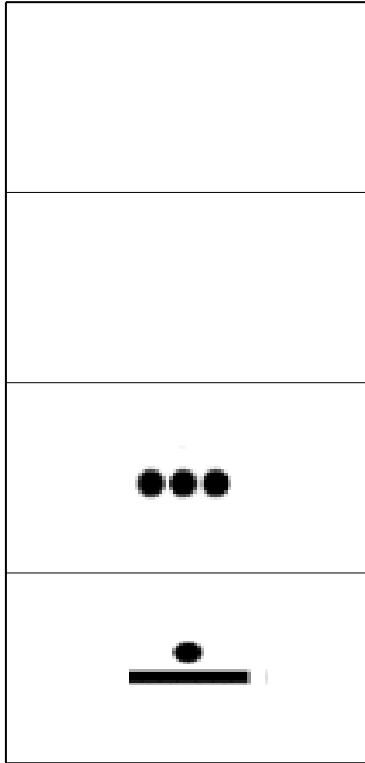
Mayan



Hindu-Arabic

17

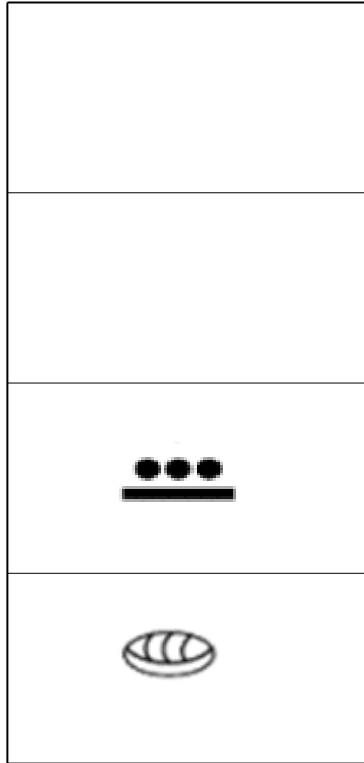
Mayan



Hindu-Arabic

66

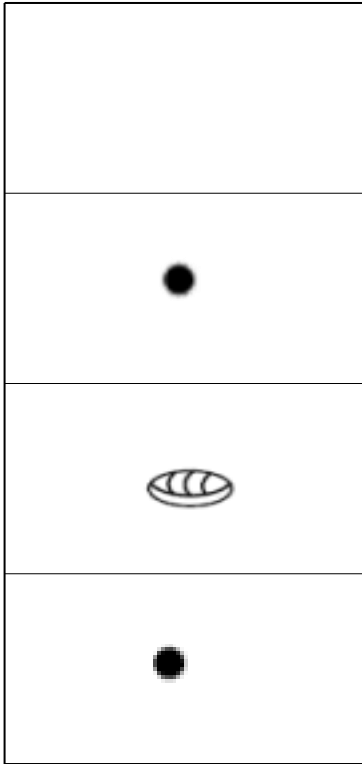
Mayan



Hindu-Arabic

160

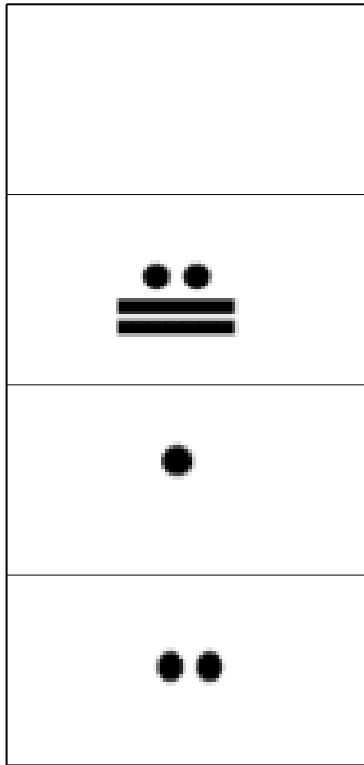
Mayan



Hindu-Arabic

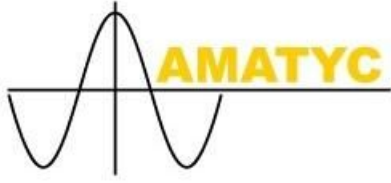
361

Mayan



Hindu-Arabic

4,342



**Teacher Prep
Committee**

*It Worked for Me:
Activities from the Classroom*

Title: Mystery Triangles

Author: Teresa Stricklin

Category: Geometry

Mathematical Topics: Triangle Congruency

Mathematical Prerequisites: Student must know how to copy a line segment and an angle using constructions (compass and straightedge only!) They also must know what it means for shapes to be congruent.

Abstract: Students will first work together to decide the minimum information necessary to construct congruent mystery triangle (the goal will be to accept that 3 pieces are needed). Once triangle #1 has been constructed and verified, they will test all of the possible triangles congruency theorems (AAA, SSS, SSA, SAS, ASA, AAS) to determine which one(s) are valid and those that are not.

Investigator _____

Mystery Triangle Investigation

Inside of the can are 7 different triangles. Your task as an investigative team is to **construct** an EXACT replica of each of the 7 mystery triangles. This means you are only allowed to use your compass and straightedge (no rulers of any kind).

Mystery triangle #1: Let's refer to this mystery triangle as Δ MYS. Your team must determine which information you need to gather in order to get this mystery triangle drawn. Your goal is to ask the least amount of questions possible. These do NOT have to be yes or no questions. Write all of your questions here and let me know when you are ready to get the responses!

Questions asked

EXACT replica of mystery triangle #1

Place a star by the questions listed above that were helpful in getting the EXACT replica drawn.

Were there any questions that did not help?

What was the least amount of information you truly needed to get the task done?

Mystery triangle #2: This time I have chosen what information to provide you. Your goal is to determine IF enough information was provided. In other words, is there only ONE possible triangle that can be constructed using only the information provided? I should either see ONE EXACT mystery triangle replica drawn OR an explanation as to why enough information was NOT provided because more than one possible triangle can be constructed to fit the information provided.

$\triangle ABC$

Reflection: Describe what information was provided.

The name for this triangle congruency shortcut is: _____

Mystery triangle #3: This time I have chosen what information to provide you. Your goal is to determine IF enough information was provided. In other words, is there only ONE possible triangle that can be constructed using only the information provided? I should either see ONE EXACT mystery triangle replica drawn OR an explanation as to why enough information was NOT provided because more than one possible triangle can be constructed to fit the information provided.

$\triangle DEF$

Reflection: Describe what information was provided.

The name for this triangle congruency shortcut is: _____

Mystery triangle #4: This time I have chosen what information to provide you. Your goal is to determine IF enough information was provided. In other words, is there only ONE possible triangle that can be constructed using only the information provided? I should either see ONE EXACT mystery triangle replica drawn OR an explanation as to why enough information was NOT provided because more than one possible triangle can be constructed to fit the information provided.

$\triangle HIJ$

Reflection: Describe what information was provided.

Mystery triangle #5: This time I have chosen what information to provide you. Your goal is to determine IF enough information was provided. In other words, is there only ONE possible triangle that can be constructed using only the information provided? I should either see ONE EXACT mystery triangle replica drawn OR an explanation as to why enough information was NOT provided because more than one possible triangle can be constructed to fit the information provided.

$\triangle KLM$

Reflection: Describe what information was provided.

The name for this triangle congruency shortcut is: _____

Mystery triangle #6: This time I have chosen what information to provide you. Your goal is to determine IF enough information was provided. In other words, is there only ONE possible triangle that can be constructed using only the information provided? I should either see ONE EXACT mystery triangle replica drawn OR an explanation as to why enough information was NOT provided because more than one possible triangle can be constructed to fit the information provided.

$\triangle NOP$

Reflection: Describe what information was provided.

The name for this triangle congruency shortcut is: _____

Mystery triangle #7: This time I have chosen what information to provide you. Your goal is to determine IF enough information was provided. In other words, is there only ONE possible triangle that can be constructed using only the information provided? I should either see ONE EXACT mystery triangle replica drawn OR an explanation as to why enough information was NOT provided because more than one possible triangle can be constructed to fit the information provided.

$\triangle QRS$

Reflection: Describe what information was provided.

Summarize:

Below are possible triangle congruency shortcuts. Circle the ones that do indeed produce ONE exact replica of a given triangle. Cross off the ones that do NOT produce ONE exact replica of a given triangle.

SAS

SSS

SSA

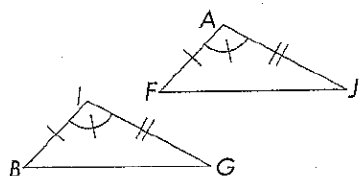
ASA

AAS

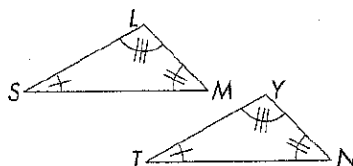
AAA

In each problem, use your triangle congruence shortcuts and the information given in the diagram to decide if the two triangles are congruent. If they are, complete the congruence statement and name the shortcut that you used to justify your conclusion. If the two triangles cannot be shown to be congruent based on the information given, write *cannot be determined*, and draw a figure using the given information showing noncongruent triangles.

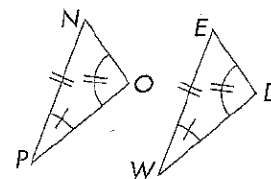
1. $\triangle BIG \cong \triangle$ _____



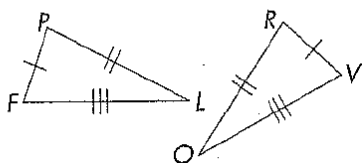
2. $\triangle SML \cong \triangle$ _____



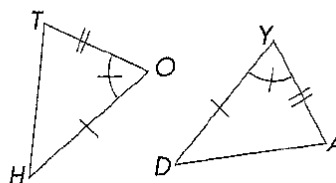
3. $\triangle OPN \cong \triangle$ _____



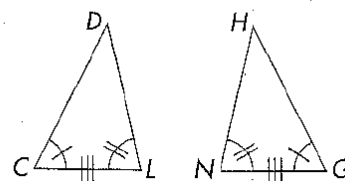
4. $\triangle FLP \cong \triangle$ _____



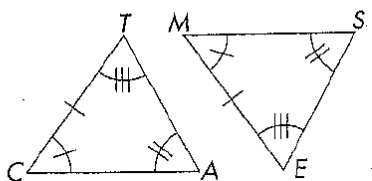
5. $\triangle HOT \cong \triangle$ _____



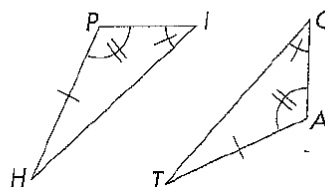
6. $\triangle CLD \cong \triangle$ _____



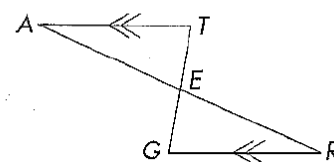
7. $\triangle CAT \cong \triangle$ _____



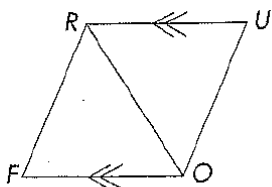
8. $\triangle HIP \cong \triangle$ _____



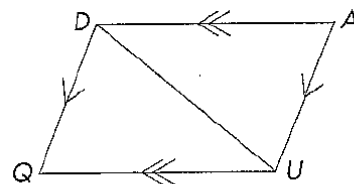
9. $\triangle GRE \cong \triangle$ _____



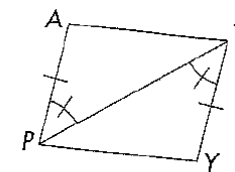
10. $\triangle FOR \cong \triangle$ _____



11. $\triangle QUD \cong \triangle$ _____



12. $\triangle PAT \cong \triangle$ _____



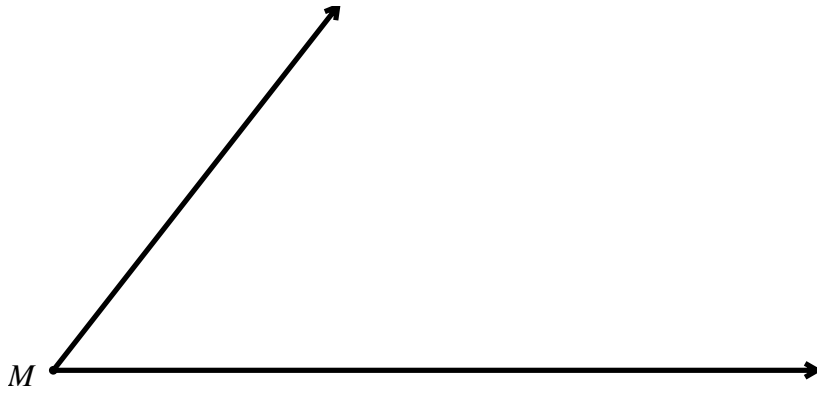
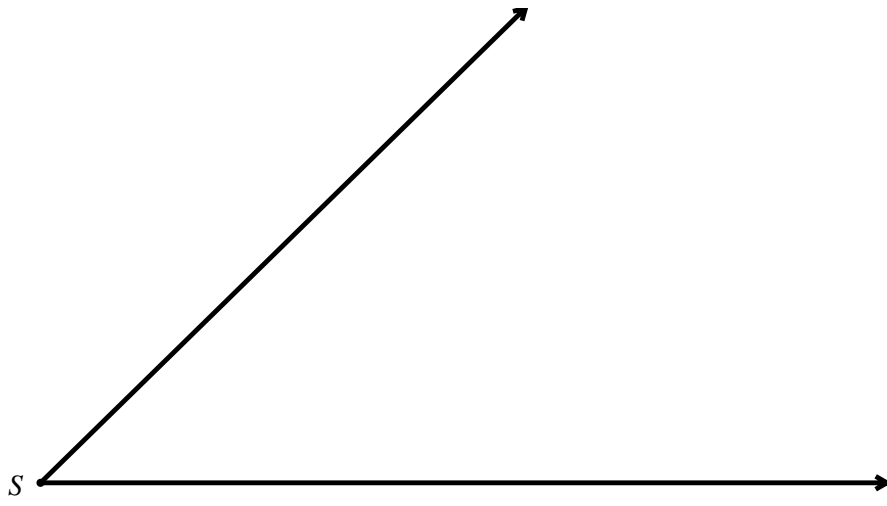
CLUES FOR MYSTERY TRIANGLE #1

(Only give students the pieces they request)

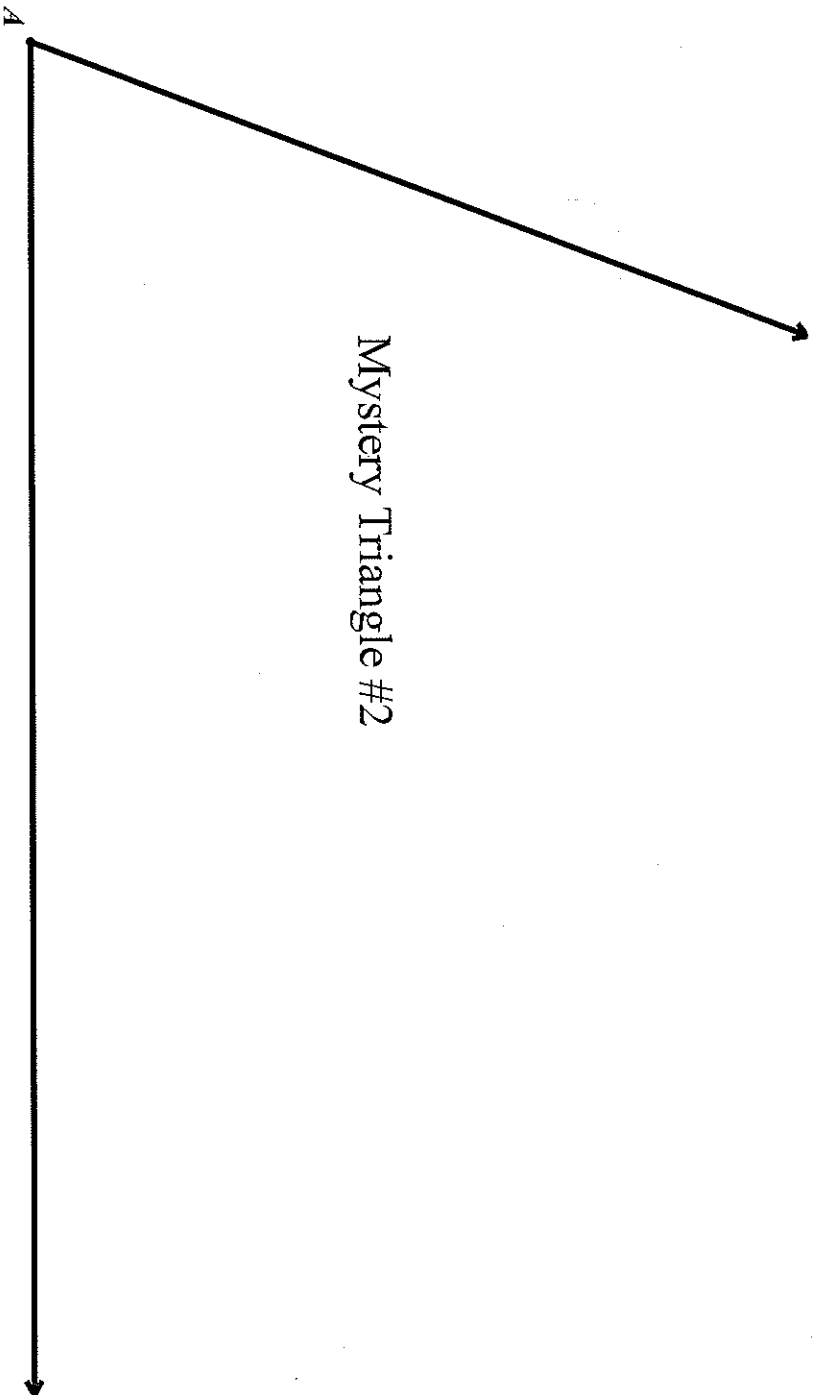
M ————— Y

————— M ————— S

Y ————— S



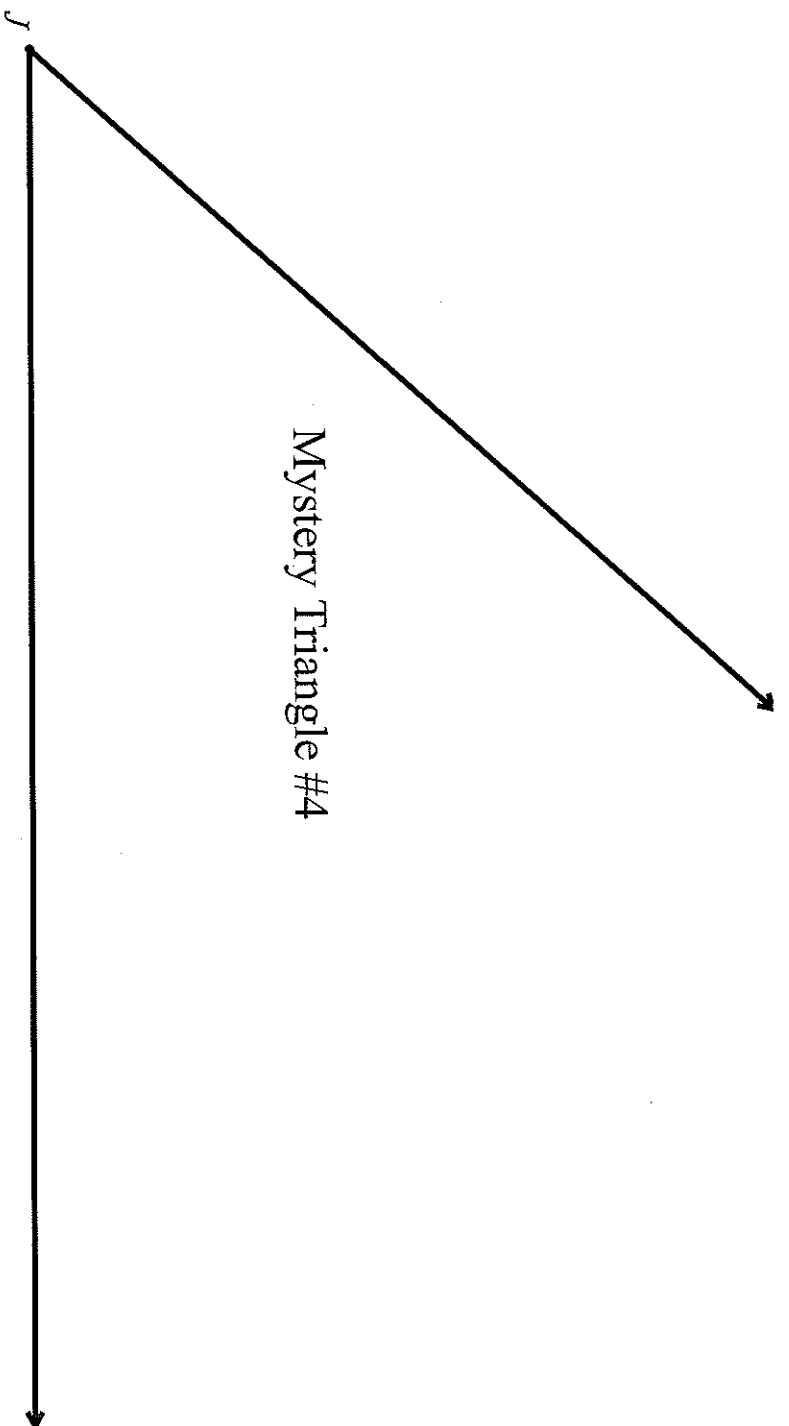
Mystery Triangle #2



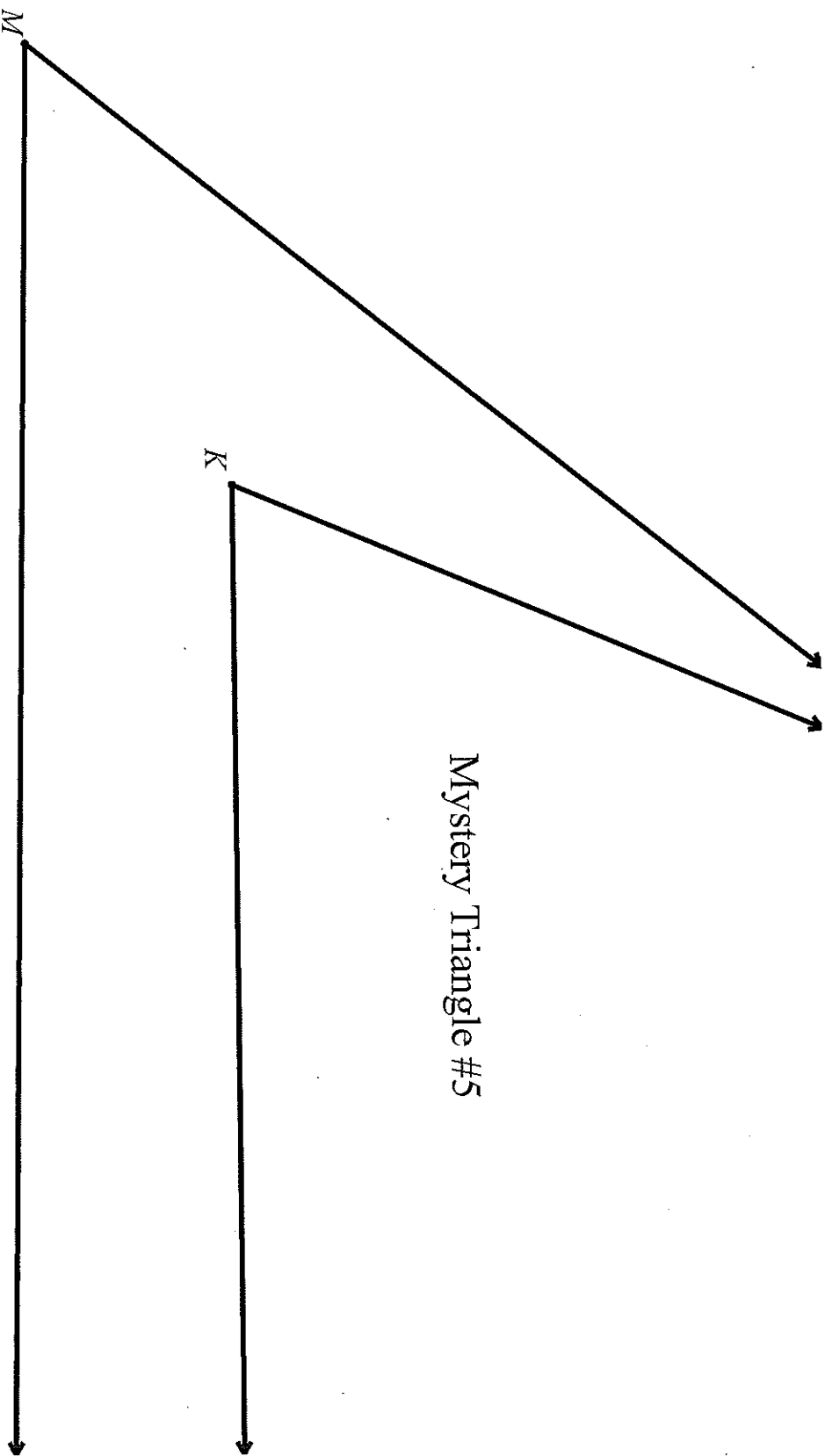
Mystery Triangle #3



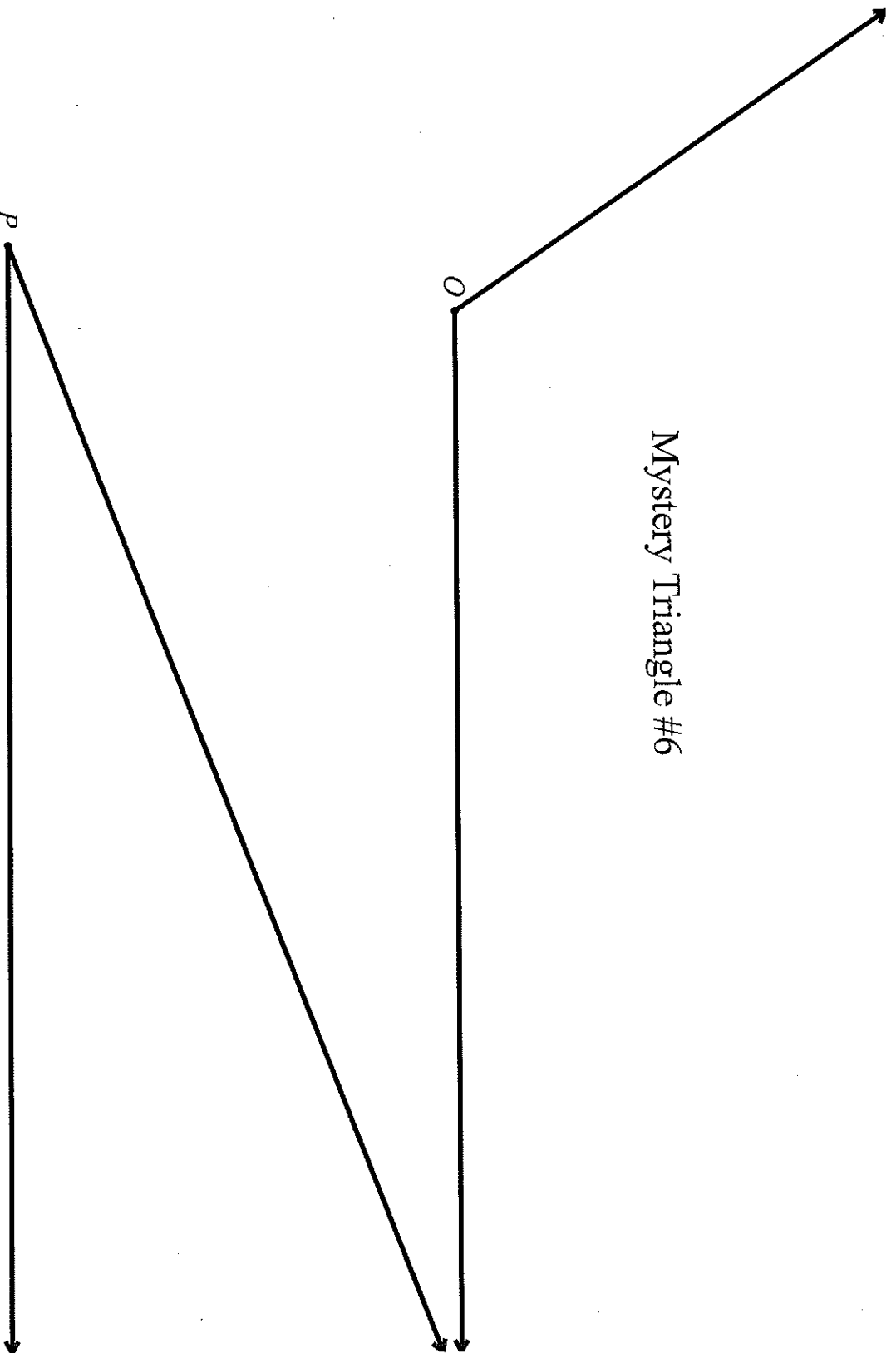
Mystery Triangle #4



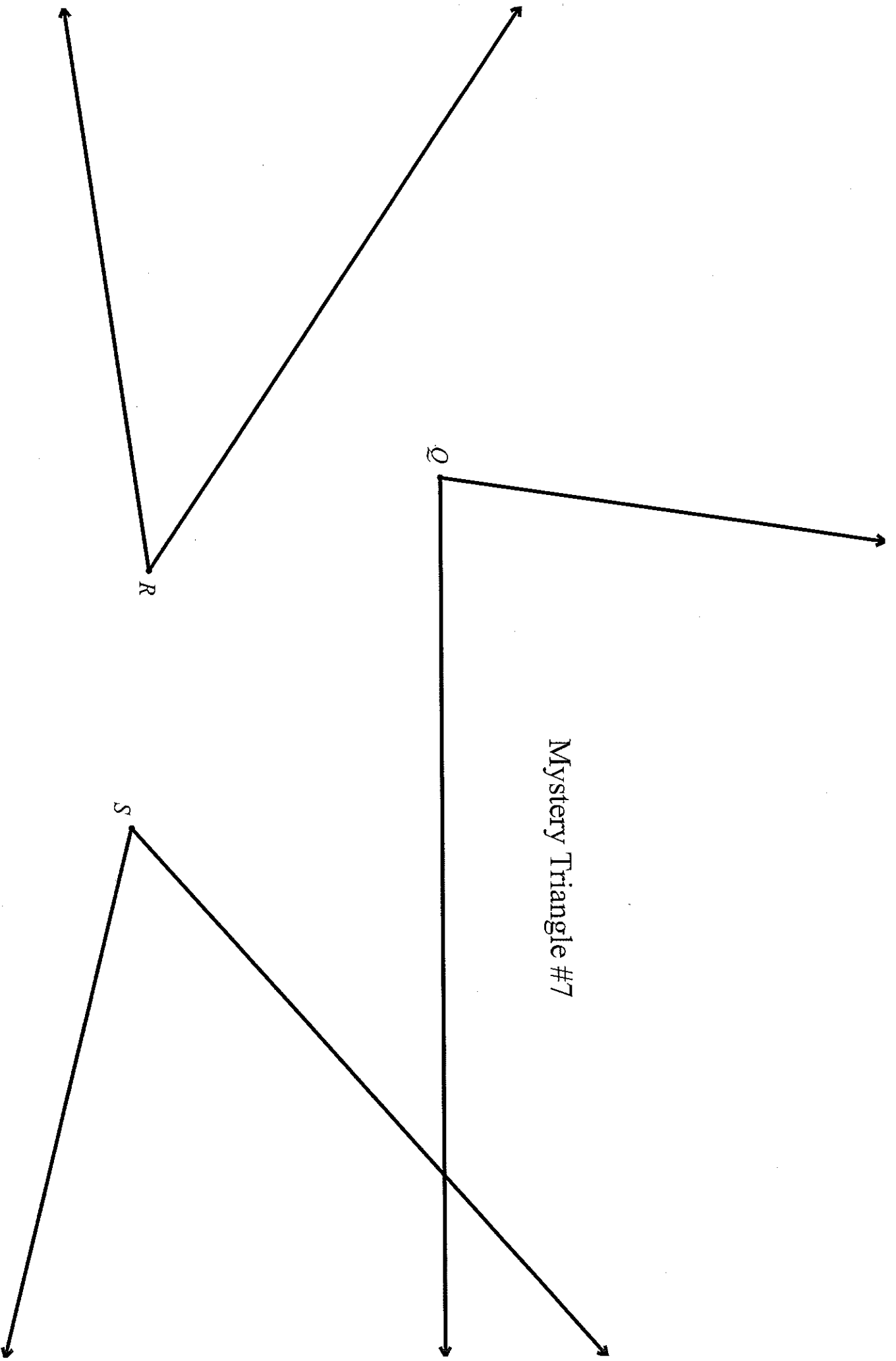
Mystery Triangle #5



Mystery Triangle #6



Mystery Triangle #7



Mystery Triangle Templates (**NOT FOR STUDENT EYES!**)

Use these to create the 7 Mystery Triangles inside the can.

