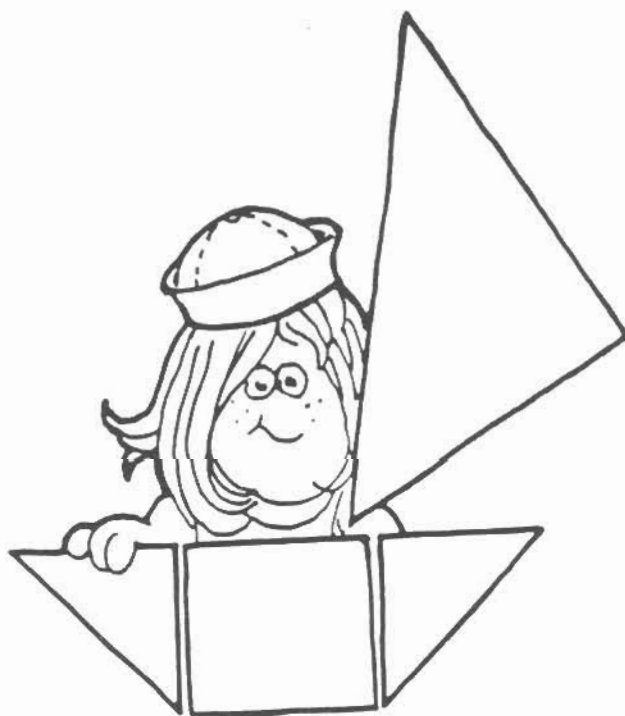


Tangrams



THE TANGRAM

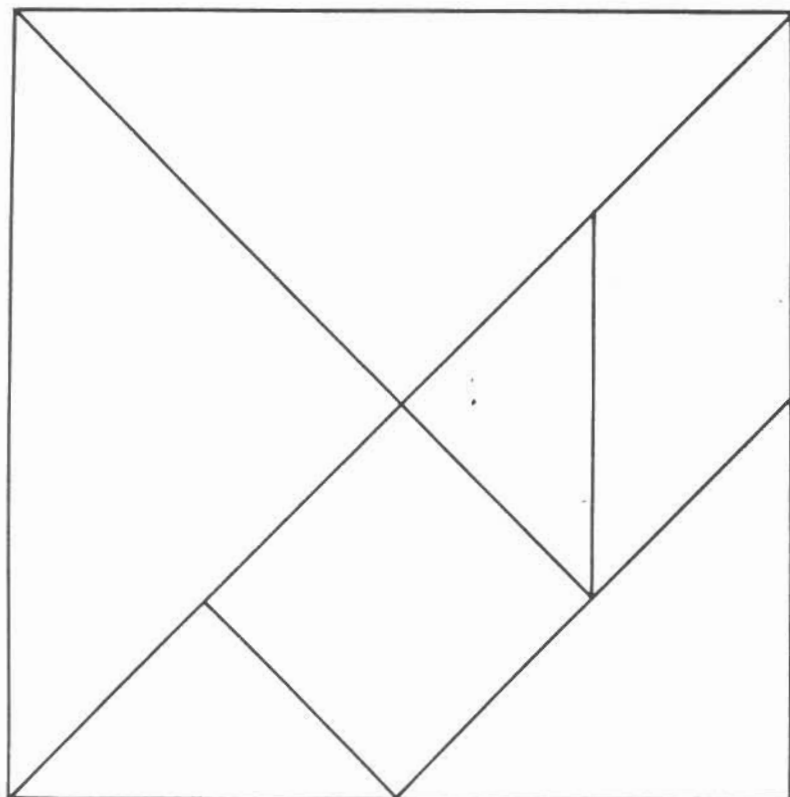
About 4000 years ago in China there lived a man called, Tan. Tan had as his greatest possession a fine ceramic tile. One day while he was carrying it to show the Emperor, he tripped and the tile fell to the floor and smashed into seven pieces. Tan spent the rest of his life trying to put the tile back together again. Even though he was unsuccessful in putting the tile together, he did succeed in creating many different geometric shapes and pictures. He inadvertently pictured his cat with the seven pieces and a pagoda which resembled the one he visited often for meditation.

Tan enjoyed his life and his friends who often came to visit with him and share in the delights of his pictures. Thus Tan amused himself and his friends into the "sunset years" of his life and even until death.

However, Tan's puzzle did not die with him. It was passed on from one generation to the next and from country to country. Some people even say it helped ease the restless pacing of Napoleon while he was imprisoned on St. Helena. It has been the companion of millions of children through the centuries.

If we can read the history of the puzzle within the more than 300 designs it hides from all but those who see beyond the square, perhaps we can suppose it likes best to be a gift to someone with an imagination.

TANGRAM MASTER SHEET



TANGRAM MASTER SHEET

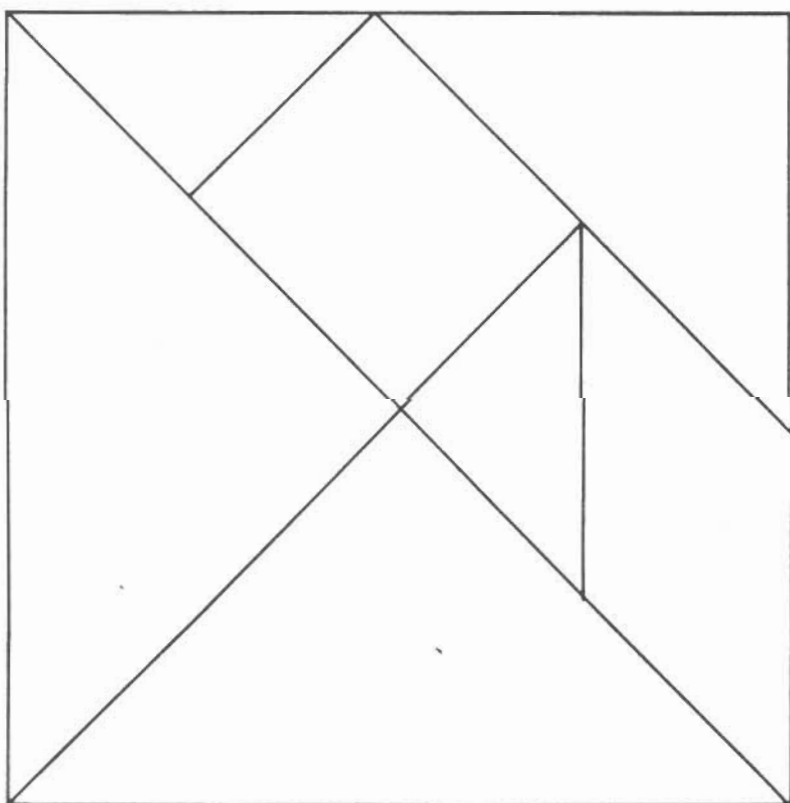
- ☆ Each person should have one square of Tangram pieces to cut out.
- ☆ You may want to take the book to a place that makes copies and have this page copied onto heavy paper.
- ☆ Put your own initials on the seven pieces of your own Tangram shape. Save all of the pieces in an envelope, so you can use them later.

TANGRAM SHAPE SHEET

- ☆ Use the Tangram Shape Sheet (see next page) to make a record of shapes that can be made using 1, 2, 3, 4, 5, 6, or 7 of the pieces.


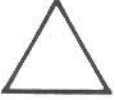





Square	□
Triangle	△
Rectangle	▭
Trapezoid	◐
Parallelogram	▯
Rhombus	◇
Pentagon	⬠

- ☆ When you have solved each shape, draw around the outside and save the drawing.
Try to make the same shape with other pieces.

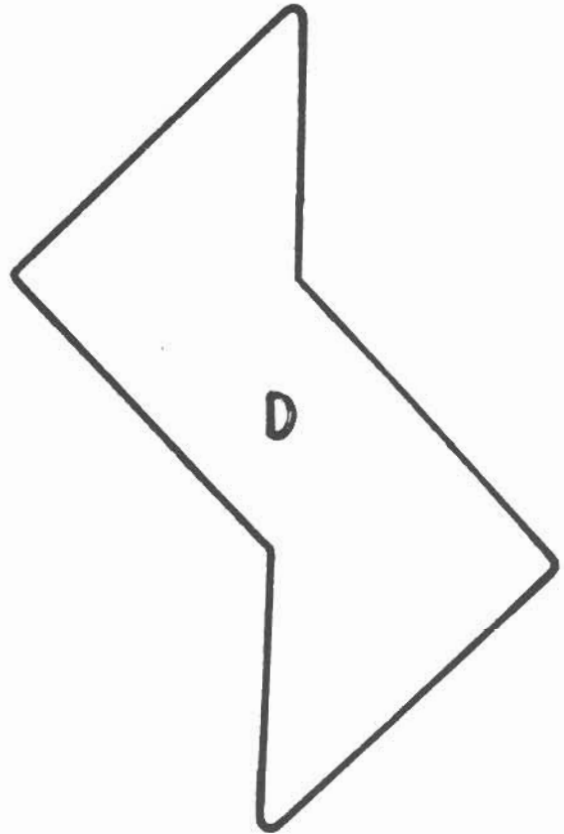
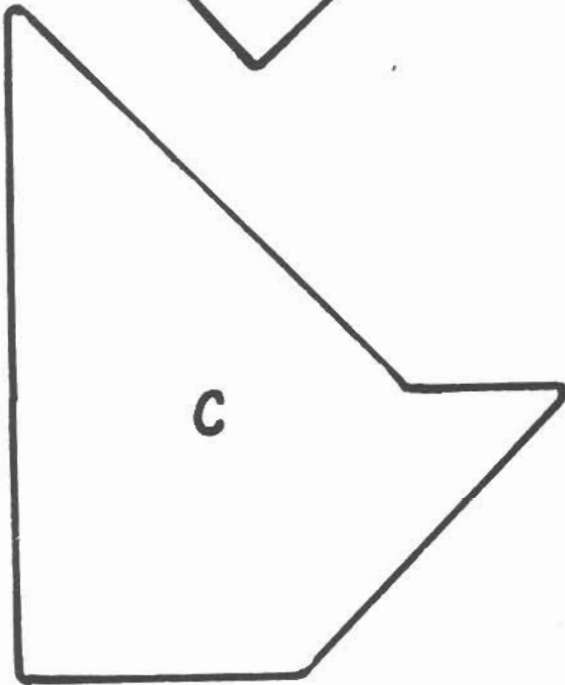
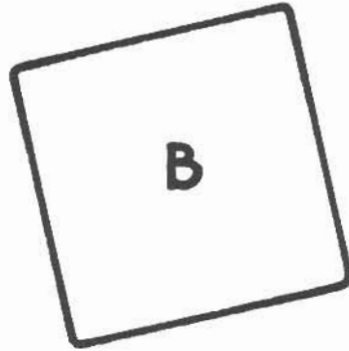
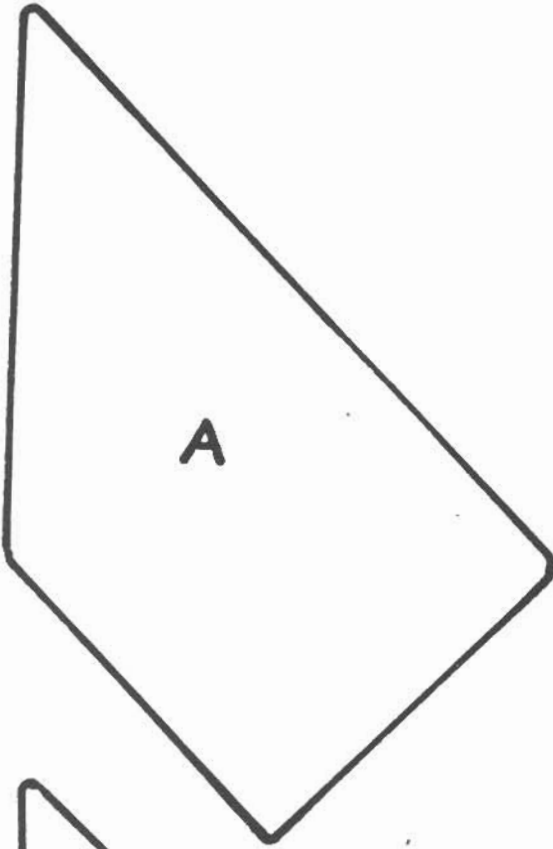


TANGRAM SHAPE SHEET

Which shapes can you make with your tangram pieces? Draw a sketch of your solution.

Number of pieces used \ Shape Made	1	2	3	4	5	6	7
 Square							
 Triangle							
 Rectangle							
 Trapezoid							
 Parallelogram							
 Rhombus							
 Pentagon							
Other							

Put these in order from smallest to **LARGEST**



Smallest

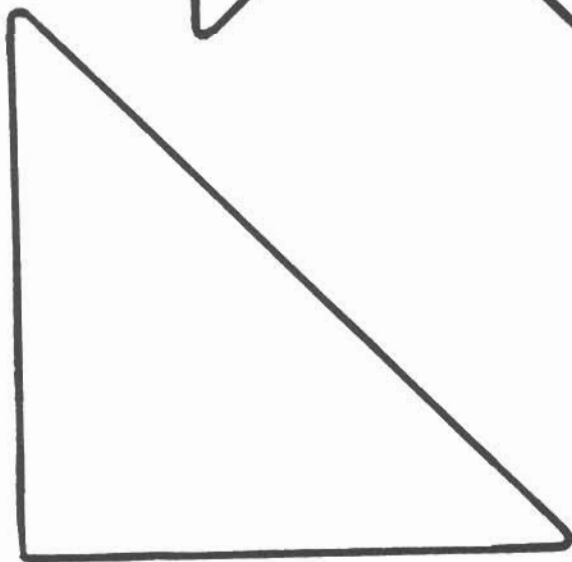
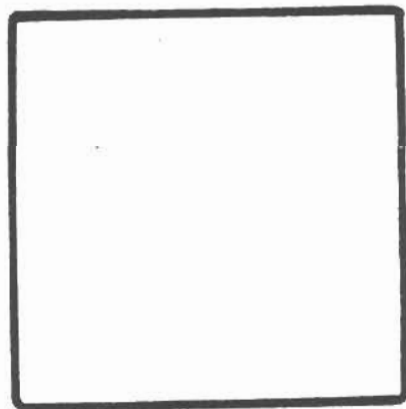
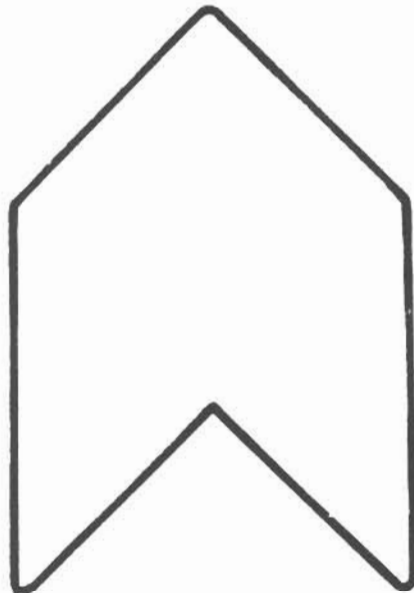
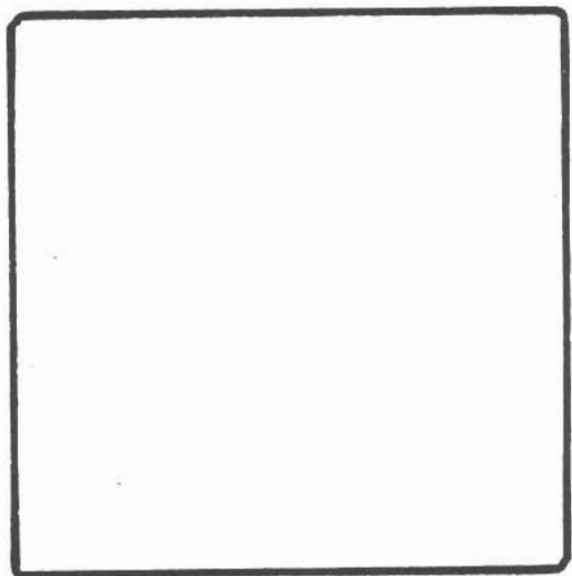
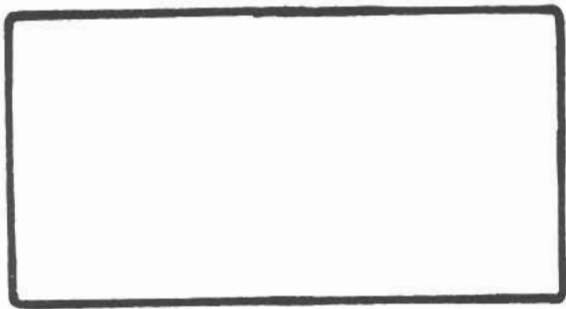
LARGEST

Make up your own shapes!

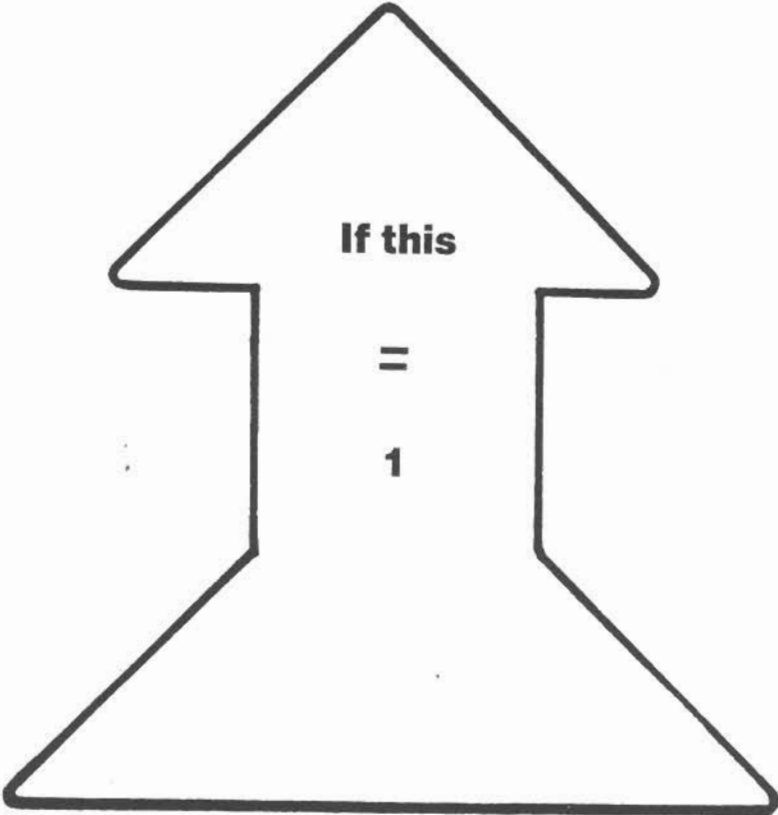
Fractions: $\frac{1}{4}$'s

Cover each shape with 4 pieces.

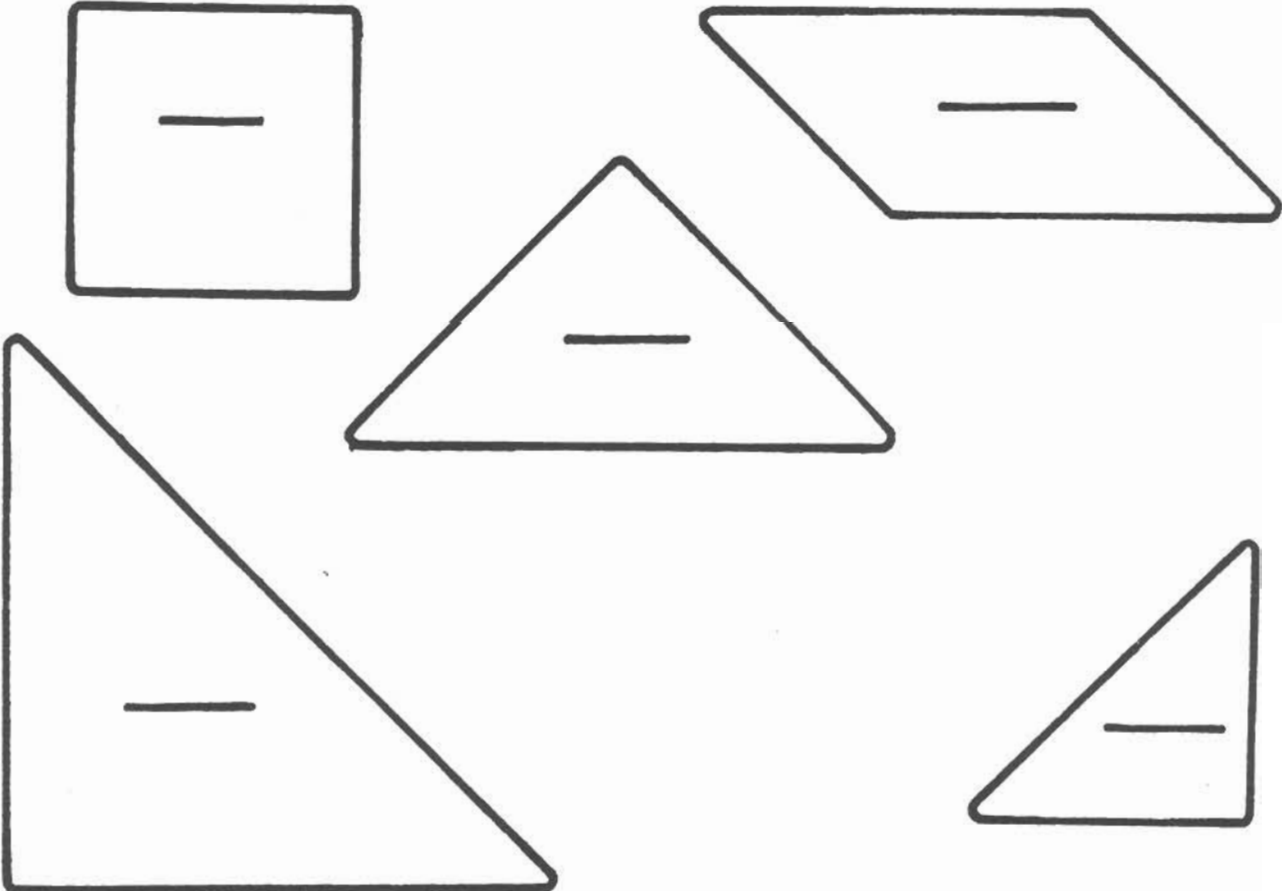
Color $\frac{1}{4}$



FRACTIONS



What fractions are these?



FRACTIONS







LOGICAL THINKING

If the small triangle is

$$\triangle = \frac{1}{2}$$

$$\triangle = \frac{1}{4}$$

$$\triangle = \frac{1}{8}$$









+

If the parallelogram is

$$\text{parallelogram} = \frac{1}{2}$$

$$\text{parallelogram} = \frac{1}{4}$$

$$\text{parallelogram} = \frac{1}{8}$$









+

If the large triangle is

$$\triangle = \frac{1}{2}$$

$$\triangle = 1$$

$$\triangle = 2$$



+

Square Pizza Factory

Pizza
For
One
\$2.00

Pizza
for Two
\$4.00

Pizza for Three
\$6.00

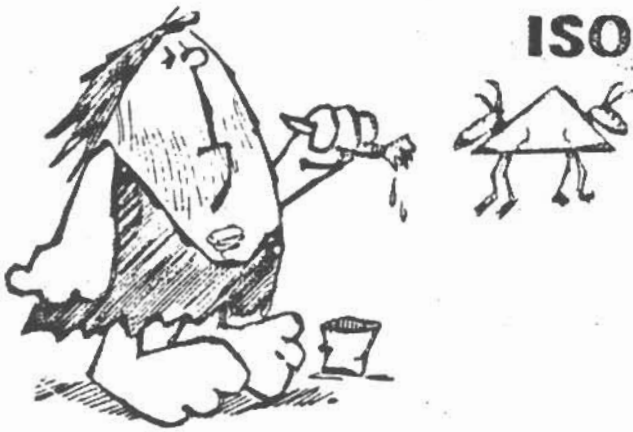
Pizza for Four
\$8.00

1. Which pizza is the most for the money? _____

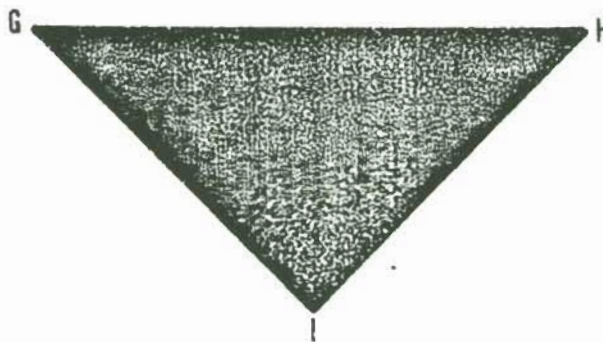
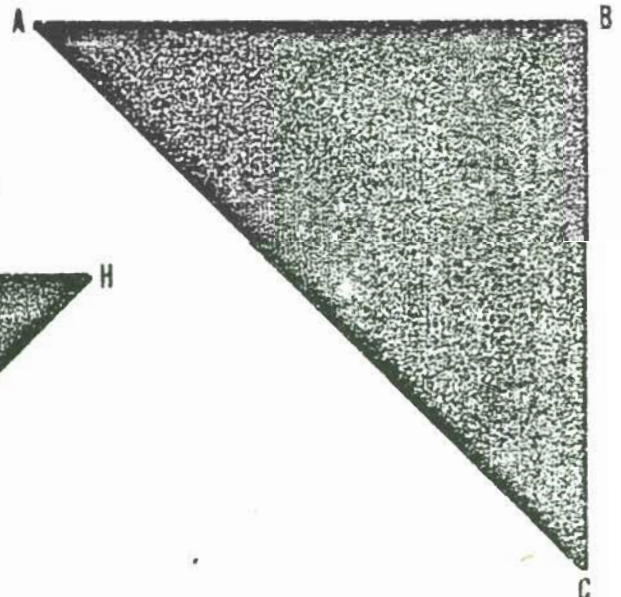
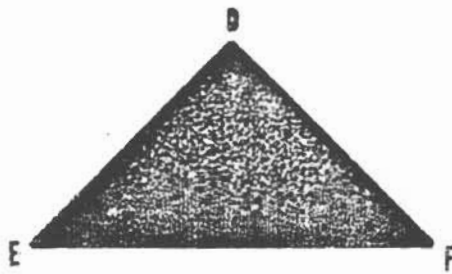
2. Compare the price and size of the four pizzas and write what you found out. _____

3. Do you think the Square Pizza Factory is charging the right prices? _____
Why? _____

A TRIANGLE WITH TWO
SIDES CONGRUENT IS
ISOSCELES!



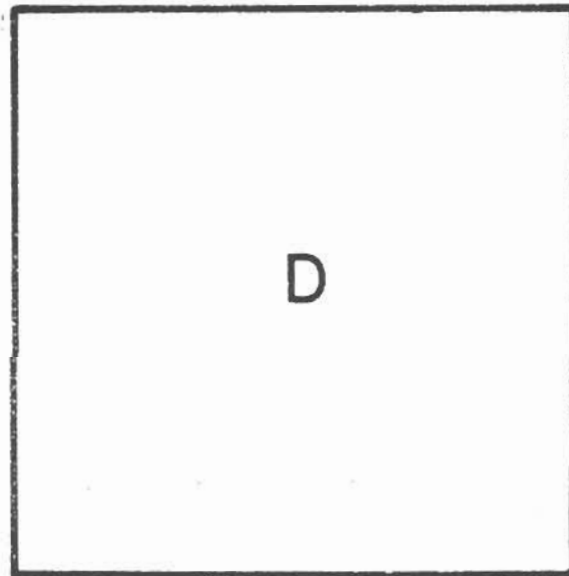
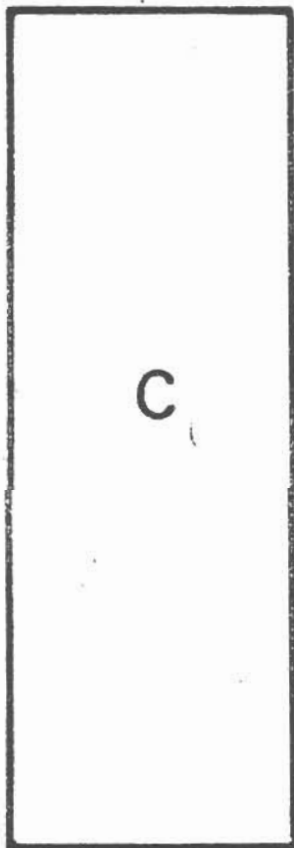
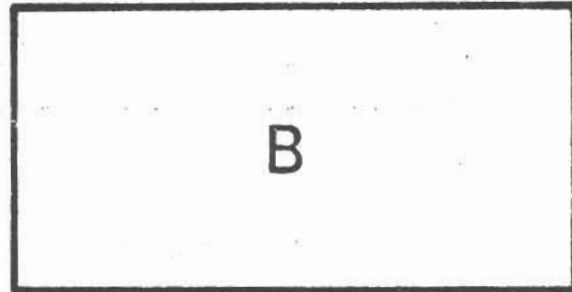
CAN YOU "FLIP" YOUR TANGRAM
PIECES TO PROVE THAT THE TRIANGLES
BELOW ARE ISOSCELES TRIANGLES ?



PRONOUNCE ISOSCELES I-SAW-CELL-EASE.

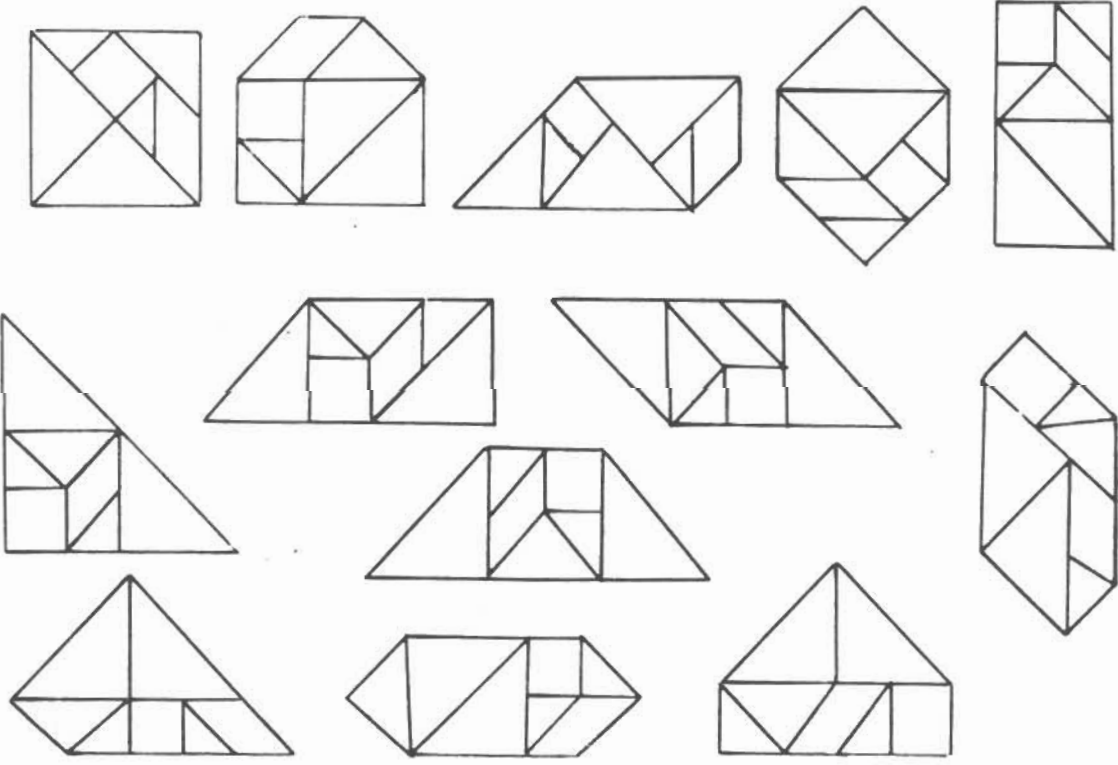
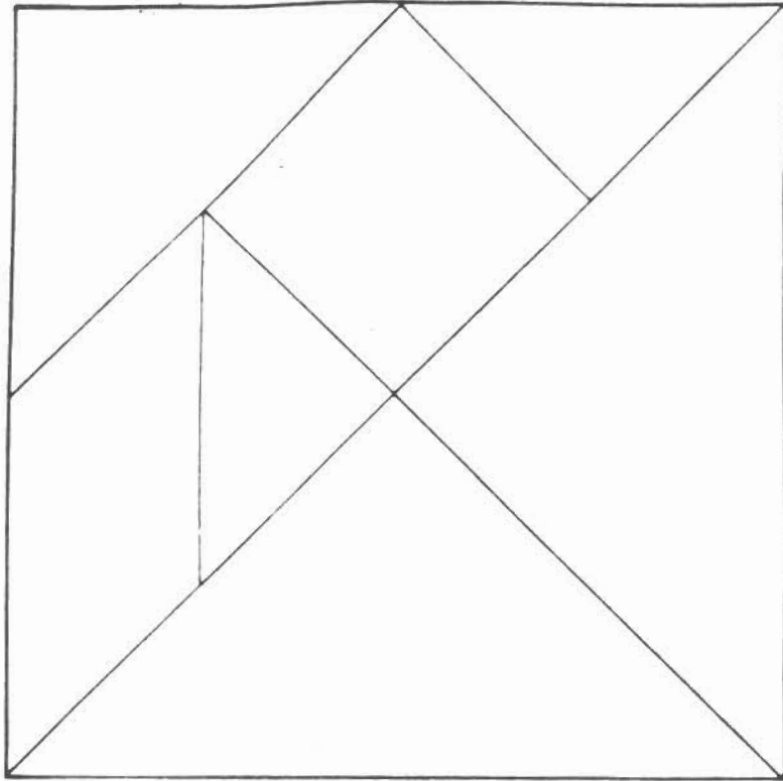
AREA IS A MEASURE OF COVERING

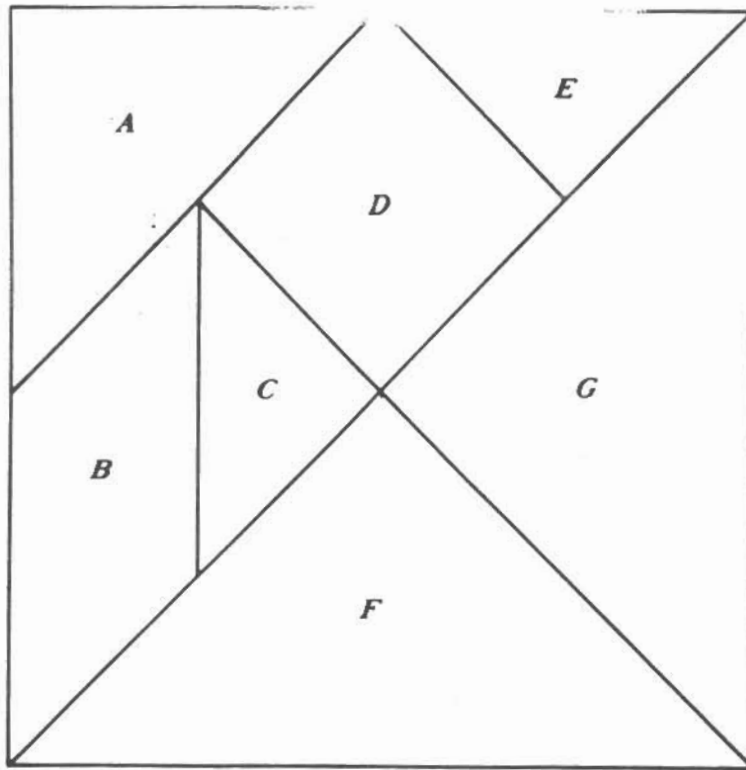
HOW MANY OF THE SQUARE TANGRAM
PIECES COVER EACH FIGURE BELOW?



FILL EACH FIGURE WITH
TRACED TANGRAM SQUARES.

TANGRAM





Area of Square is
100 cm²

Tangram Piece	Area of Tangram Piece in cm ²	Fractional Part of Tangram Piece in Relation to Total Set	Percent Each Tangram Piece Is of Whole Set
A			
B			
C			
D			
E			
F			
G			

Tangram Piece	Area in cm ²	Fractional Part Area Is of Total Set	Percent Area Is of Total Set
A	12 1/2	1/8	12 1/2%
B	12 1/2	1/8	12 1/2%
C	6 1/4	1/16	6 1/4%
D	12 1/2	1/8	12 1/2%
E	6 1/4	1/16	6 1/4%
F	25	1/4	25%
G	25	1/4	25%

Tangram Pieces Used	Square	Rectangle (Not a Square)	Triangle	Parallelogram	Trapezoid
1					
2					
3					
4					
5					
6					
7					

No. of Pieces	Square	Rectangle (Not Square)	Triangle	Parallelogram	Trapezoid
1		NO			NO
2		NO			
3	NO				
4					
5					
6	NO		NO	NO	
7					

SQUARE FRACTIONS

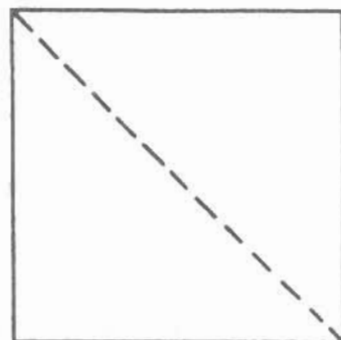
Follow the folding and cutting directions carefully. If scissors are not used, make a sharp crease in the paper, and tear along the crease. Answer each question as you proceed through the activity.

1. Fold the square on the diagonal and cut along the fold:

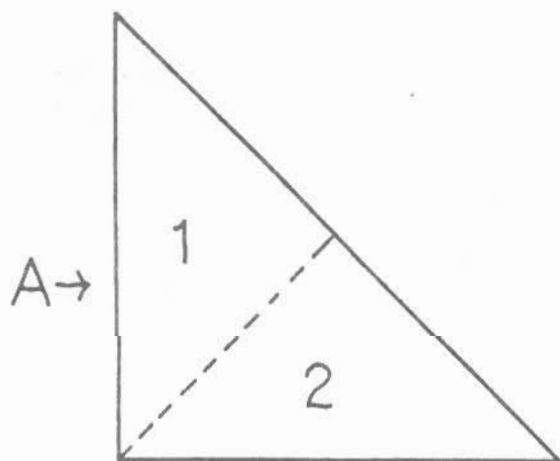
a. What are the resulting polygons?

b. How are the two polygons related?

c. Each polygon is what fraction of the original square? _____



2. Select one of the triangles and fold it so that two congruent polygons result. Cut along the fold and label the polygons 1 and 2 as shown.



Note: The large triangle will be referred to later as triangle A.

a. What are the resulting polygons?

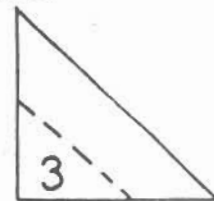
b. How are the two polygons related? _____

c. Triangle 1 is what fraction of triangle A? _____

d. Triangle 1 is what fraction of the original square? _____

3. Locate the midpoint of the longest side of the remaining large triangle. Fold the vertex of the right angle to the midpoint of the longest side and cut along the fold. Mark the triangle 3.

a. What are the resulting polygons?



b. How is triangle 3 related to:

1. triangle 1? _____

2. triangle A? _____

c. Triangle 3 is what fractional part of:

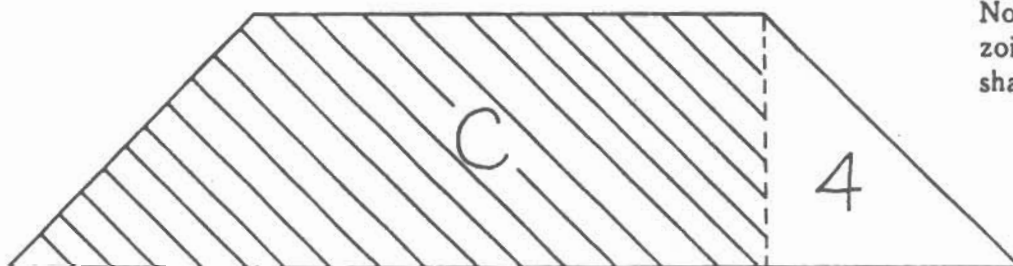
1. triangle 1? _____

2. triangle A? _____

3. the original square? _____

4. the isosceles trapezoid? _____

4. Using the isosceles trapezoid, fold one of the vertices of the long side to the midpoint and cut along the fold. Mark the triangle 4.



Note: The isosceles trapezoid is trapezoid B. The shaded section is C.

a. What are the resulting polygons?

b. How is triangle 4 related to:

1. triangle 3? _____

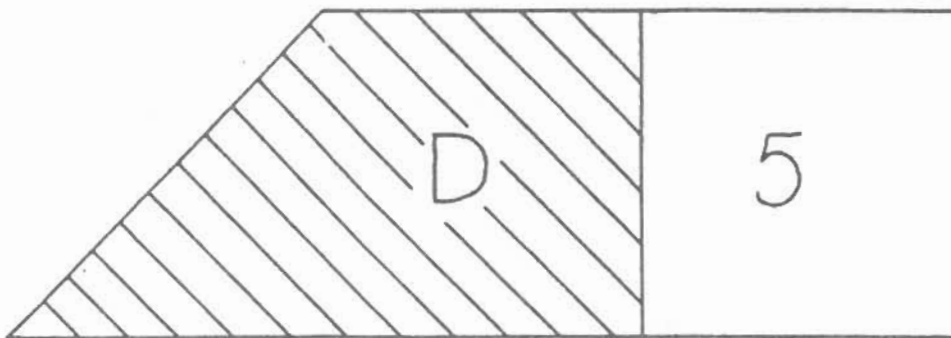
2. triangle 1? _____

3. triangle A? _____

c. Triangle 4 is what fraction of:

- | | |
|-----------------------|-------------------------------|
| 1. triangle 3? _____ | 2. triangle 1? _____ |
| 3. triangle A? _____ | 4. trapezoid C? _____ |
| 5. trapezoid B? _____ | 6. the original square? _____ |

5. Using trapezoid C match the endpoints of the shortest of the parallel sides and fold. Cut along the fold and mark 5 as shown.



Note: The large trapezoid is trapezoid C. The shaded section is D.

a. What are the resulting polygons?

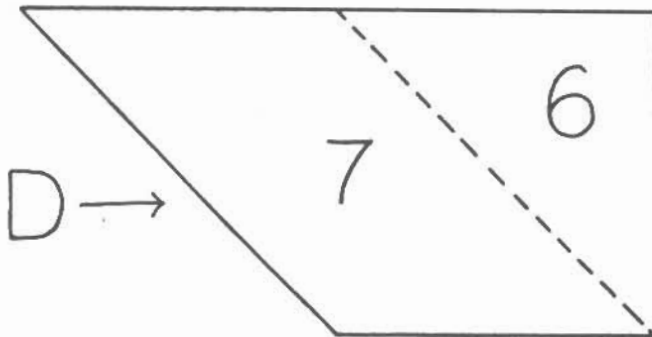
b. Square 5 is what fractional part of:

- | | |
|-----------------------|-------------------------------|
| 1. trapezoid C? _____ | 2. trapezoid D? _____ |
| 3. triangle 3? _____ | 4. trapezoid B? _____ |
| 5. triangle 4? _____ | 6. triangle 1? _____ |
| 7. triangle A? _____ | 8. the original square? _____ |

c. C is what fraction of:

- | | |
|-------------------------------|--------------------|
| 1. trapezoid D? _____ | 2. square 5? _____ |
| 3. the original square? _____ | |

6. Using the trapezoid that is left, fold as shown, matching opposite corners. Cut along the fold and mark 6 and 7 as shown.



Note: The trapezoid shown here is trapezoid D.

- a. What are the resulting polygons?

- b. How is triangle 6 related to:

1. triangle 4? _____

2. triangle 3? _____

3. triangle A? _____

- c. Triangle 6 is what fraction of:

1. trapezoid D? _____

2. trapezoid C? _____

3. parallelogram 7? _____

4. triangle 3? _____

5. triangle 1? _____

6. square 5? _____

7. trapezoid B? _____

8. triangle A? _____

9. the original square? _____

7. Parallelogram 7 is what fraction of:

a. trapezoid D? _____

c. trapezoid C? _____

e. triangle 4? _____

g. triangle 1? _____

i. the original square? _____

b. triangle 3? _____


d. trapezoid B? _____

f. square 5? _____


h. triangle A? _____

Tangram (number pieces on both sides)

- ① Make square w/ side = width of paper
- ② Tear diagonal
- ③ Bisect ($2 \cong \triangle$) one of the \triangle Label them ① and ②
- ④ Using larger \triangle , find mdpt of hypotenuse -- fold down 90° L vertex & tear off (Label it ③)

- ⑤  Fold over vertex to mdpt & tear
Label it ④ (the \triangle)

- ⑥ Fold at mdpt & tear off square Label it ⑤

- ⑦  CAREFUL!
Fold, crease, tear
Label \triangle ⑥
Label \square ⑦

