

Task

17

Overview

Identify fractional parts.
Justify fractional names.

Tangram

Short Task

Task Description

Students are given a Tangram, an oriental puzzle made up of geometric shapes. They determine what fractional part each piece represents and give explanations to justify their names.

Assumed Mathematical Background

It is assumed that students have a background in rational numbers.

Core Elements of Performance

- correctly identify fractional parts of a whole using spatial and analytical reasoning
- justify fractional names

Circumstances

Grouping: Students complete an individual written response.

Materials: scissors

Estimated time: 10 minutes

Tangram

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A.137

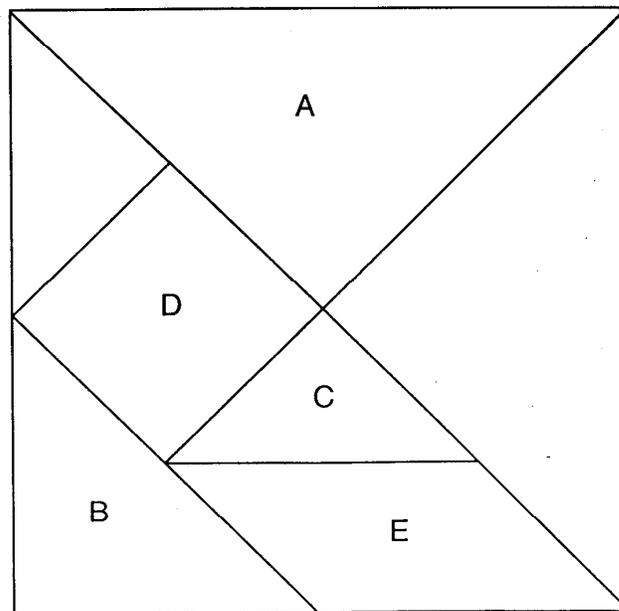
Tangram

This problem gives you the chance to

- *identify fractional parts*
- *justify fractional names*

Below is an oriental puzzle called a Tangram. It is made up of geometric shapes. For this task, consider the area of the whole puzzle, the large square, to be 1 whole unit.

If the area of the original square is 1 whole unit, what fractional part of the whole does each tangram shape represent? (You may cut out the Tangram puzzle found on page 239 to help you with this task.)



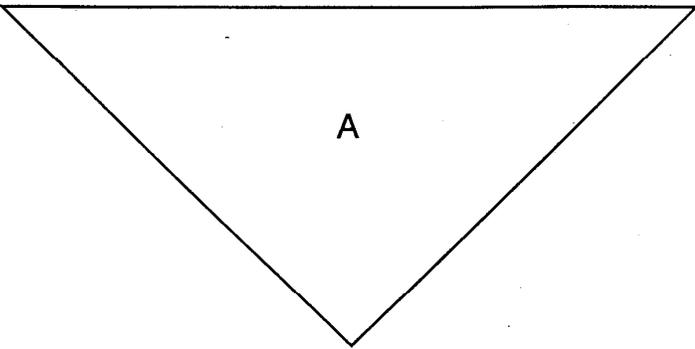
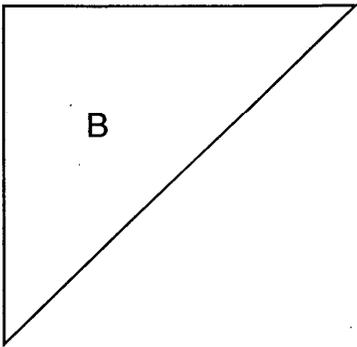
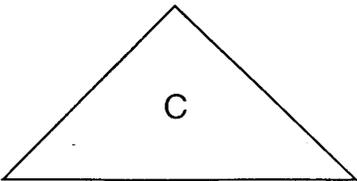
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A.138

Name

Date

1. Write the fractional part of each shape in relation to the whole and describe how you figured it out.

Shape	Fraction and your explanation
	
	
	



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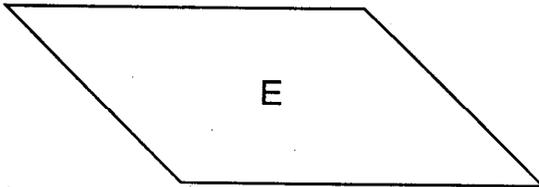
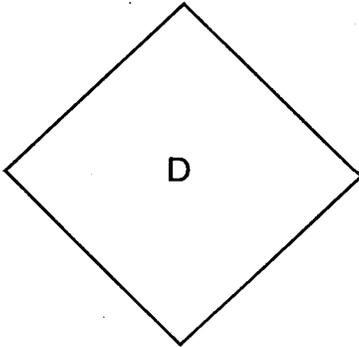
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Name

Date

Shape

Fraction and your explanation



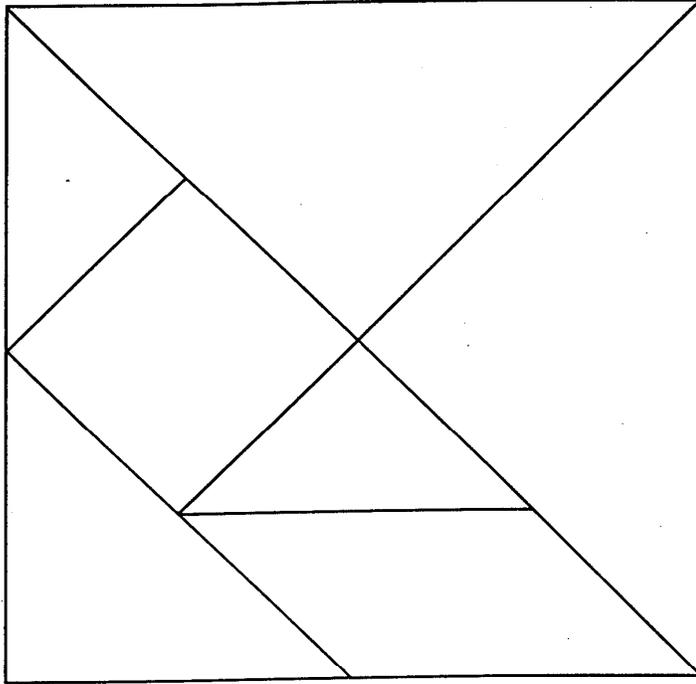
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A.140

Name

Date

Tangram Puzzle Cutout



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Page 4 of 4

Tangram

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A.141

A Sample Solution

17

Solution A

$A = \frac{1}{4}$: Four of these triangles would make the entire square, so piece A is $\frac{1}{4}$ of the square.

$B = \frac{1}{8}$: Piece A can be made by putting 2 B-pieces together. So, B is equal to $\frac{1}{2}$ of A or $\frac{1}{8}$ of the whole square.

$C = \frac{1}{16}$: Piece B can be made by putting 2 C-pieces together. So, C is equal to $\frac{1}{2}$ of B or $\frac{1}{16}$ of the whole square.

$D = \frac{1}{8}$: Piece D can be made by putting 2 C-pieces together. D is twice C or $\frac{2}{16}$ which equals $\frac{1}{8}$ of the whole square.

$E = \frac{1}{8}$: Piece E can also be made by putting 2 C-pieces together. So, E is also $\frac{1}{8}$ of the whole square.

Solution B

C is the smallest piece and can be used a whole number of times to make each other piece. You can cut out piece C, determine the number of C-sized pieces that are needed to make the whole square and then determine the relationship of C to each other piece. Since it takes 16 C-pieces to exactly cover the whole square, $C = \frac{1}{16}$.

$A = \frac{1}{4}$: 4 Cs make up A. Therefore $A = \frac{4}{16} = \frac{1}{4}$ of the whole square.

$B = \frac{1}{8}$: 2 Cs make up B. Therefore $B = \frac{2}{16} = \frac{1}{8}$ of the whole square.

$C = \frac{1}{16}$: 16 Cs make up the whole square.

$D = \frac{1}{8}$: 2 Cs make up D. Therefore $D = \frac{2}{16} = \frac{1}{8}$ of the whole square.

$E = \frac{1}{8}$: 2 Cs make up E. Therefore $E = \frac{2}{16} = \frac{1}{8}$ of the whole square.