



Ideas

Prepared by *George W. Bright*
Northern Illinois University
DeKalb, Illinois

Reprinted with permission from the Arithmetic Teacher, December 1978 (Vol. 26, No. 4), copyright 1978 by the National Council of Teachers of Mathematics.

Ideas for this month provides activities to build the concept of area measure. Considerable experience with the idea of comparing and measuring areas seems to be needed for students to understand area measure fully. The introduction of units of area measure, nonstandard or standard, should be delayed until students are able to compare regions directly and to put such regions together to cover a larger region. Only then will the repeated use of a single unit be meaningful. Finally, a standard unit and formulas for area can be used.

IDEAS for Teachers: Levels K, 1, 2

Objective: To practice comparing and ordering areas.

Directions for teachers:

1. Give each student a copy of the worksheet and scissors.
2. Read the directions to the students.
3. You may want to have students paste the figures on sheets of construction paper.

4. When everyone is finished, conduct a discussion with the class. Ask students to explain why they ordered the figures as they did. Help the students use the words *bigger (larger)* and *smaller*.

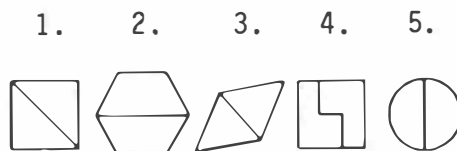
IDEAS for Teachers: Levels 2, 3, 4

Objective: To practice covering regions to illustrate additivity of area.

Directions for teachers:

1. Give each student a copy of the worksheet and scissors.
2. You may want the students to paste the two shaded regions on each black region.
3. In exercises 3 and 5, the shaded regions have to be rotated before they will fit.

Answers:



Going further:

Ask students to make up puzzles like these.

IDEAS for Teachers:
Levels 3, 4, 5

Objective: To measure areas by covering regions with a non-standard unit.

Directions for teachers:

1. Give each student a copy of the worksheet and scissors.
2. Be sure students understand that some of the diamonds may need to be cut into pieces in order to cover the figures completely.
3. Some students may prefer to work in small groups.

Answers:

- | | | |
|------|-------|-------------------|
| 1. 4 | 2. 2 | 3. 6 |
| 4. 1 | 5. 12 | 6. $4\frac{1}{2}$ |

Going further:

Ask students to make a figure that could be covered with five diamonds, 10 diamonds, or 20 diamonds.

IDEAS for Teachers:
Levels 6, 7, 8

Objective: To practice measuring in centimetres, computing areas, and computing ratios.

Directions for teachers:

1. Give each student a copy of the worksheet and a ruler marked in centimetres. (Measuring in customary units will produce numbers that are too complex for students to handle.)
2. Be sure students know the formula for the area of a triangle, $A = \frac{1}{2}bh$.
3. The pattern students should see is that the ratio of areas is the square of the ratio of length (or width or base or height).

Answers:

	<i>ratio of lengths (base)</i>	<i>ratio of areas</i>
1.	4:1 or $\frac{4}{1}$	16:1 or $\frac{16}{1}$
2.	2:1 or $\frac{2}{1}$	4:1 or $\frac{4}{1}$
3.	2:1 or $\frac{2}{1}$	4:1 or $\frac{4}{1}$
4.	3:1 or $\frac{3}{1}$	9:1 or $\frac{9}{1}$
5.	3:2 or $\frac{3}{2}$	9:4 or $\frac{9}{4}$

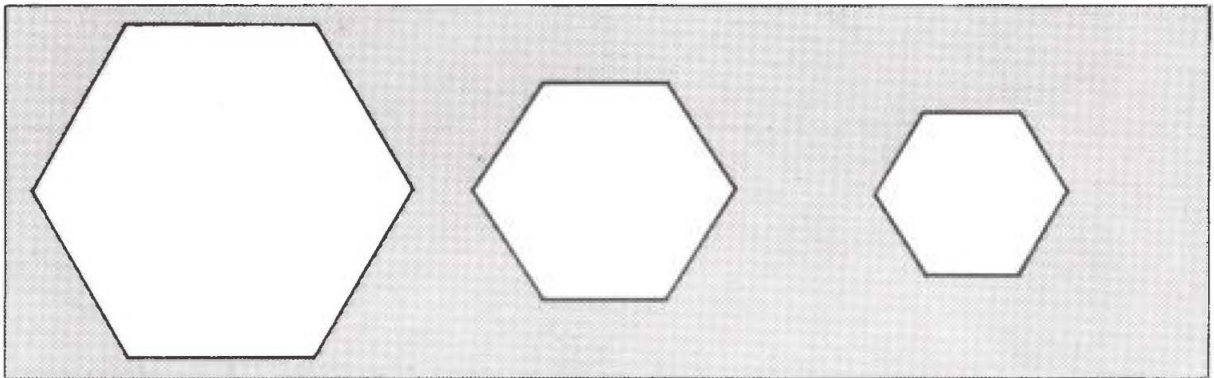
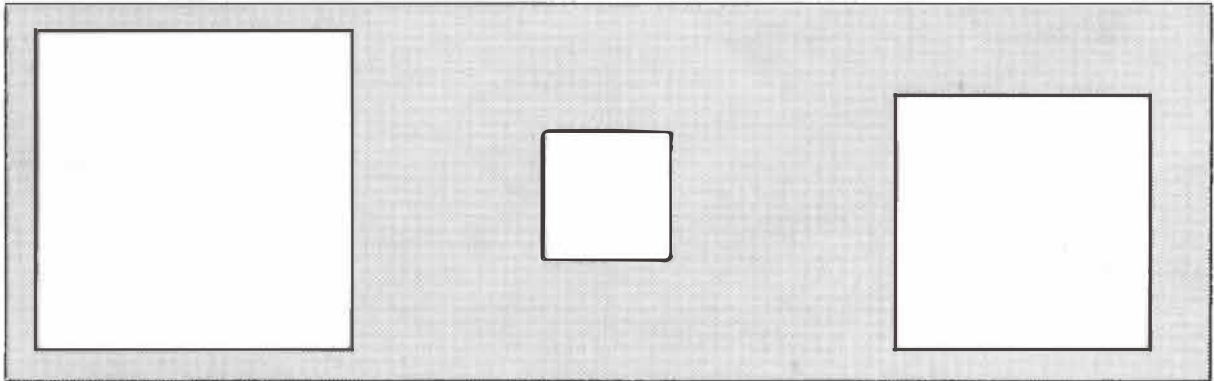
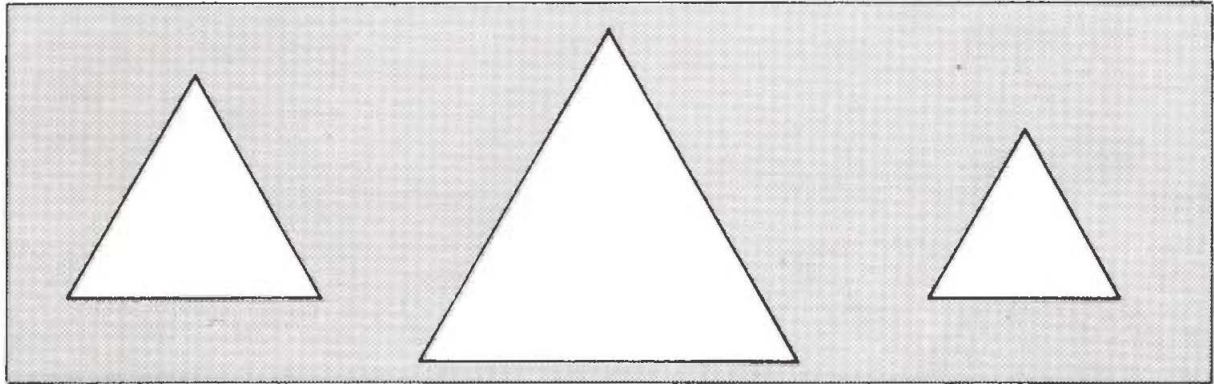
Going further:

Ask students to check their generalizations by drawing their own pairs of similar figures and measuring areas.

Levels K, 1, 2

Cut out the figures in each box.

Put them in order from smallest to largest.



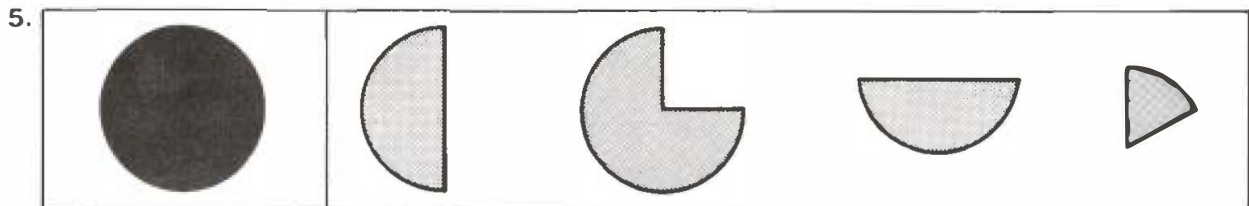
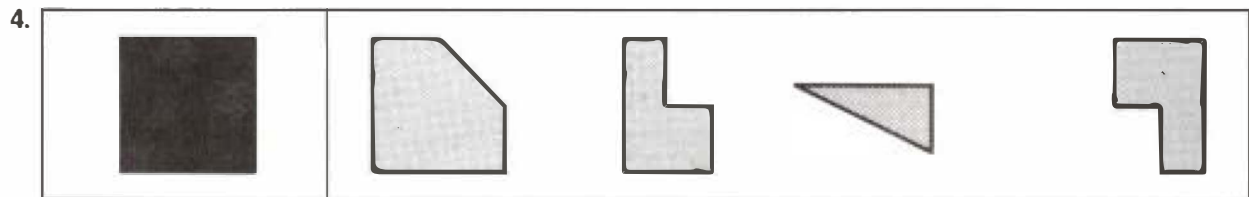
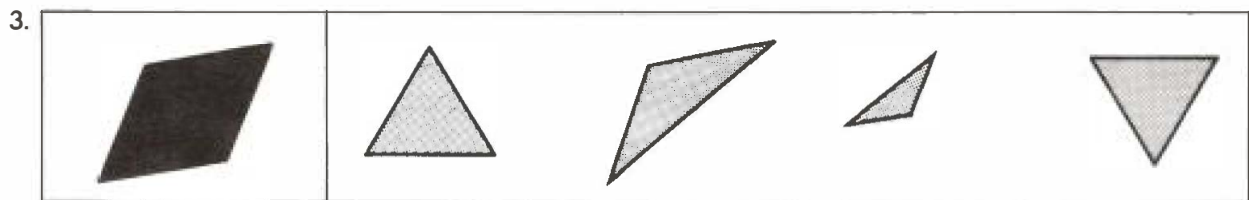
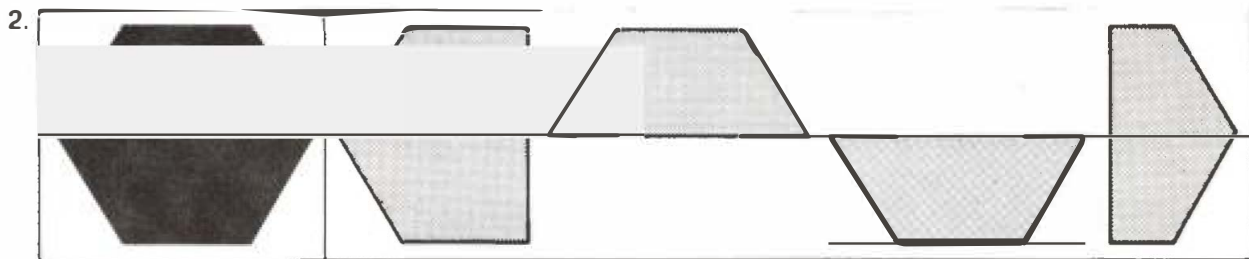
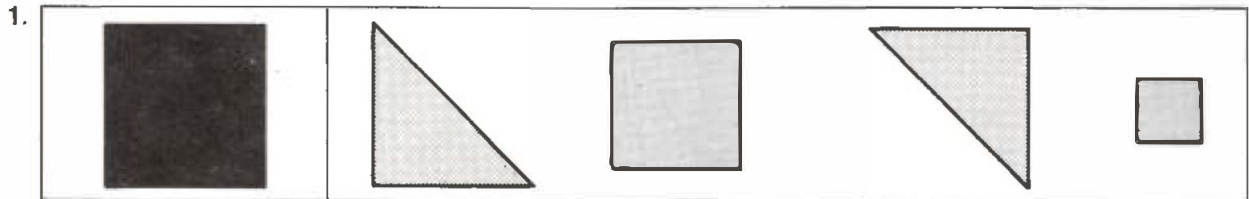
IDEAS

Name _____

Levels 2, 3, 4

In each row, choose two shaded regions that exactly cover the black region when you put them together.

Check your answers by cutting out the two shaded regions and laying them on top of the black region.



From the *Arithmetic Teacher*

IDEAS

Name _____

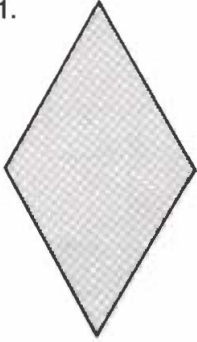
Levels 3, 4, 5

How many of these  will cover each figure?

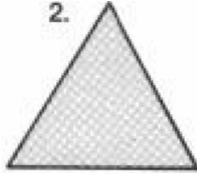
Write the number in the blank.

You may want to cut some of the diamonds into pieces.

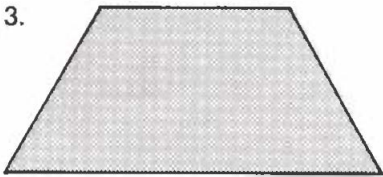
1.



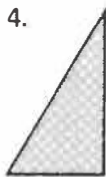
2.



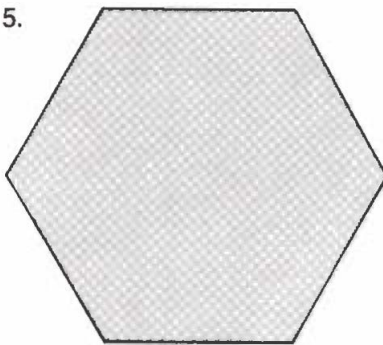
3.



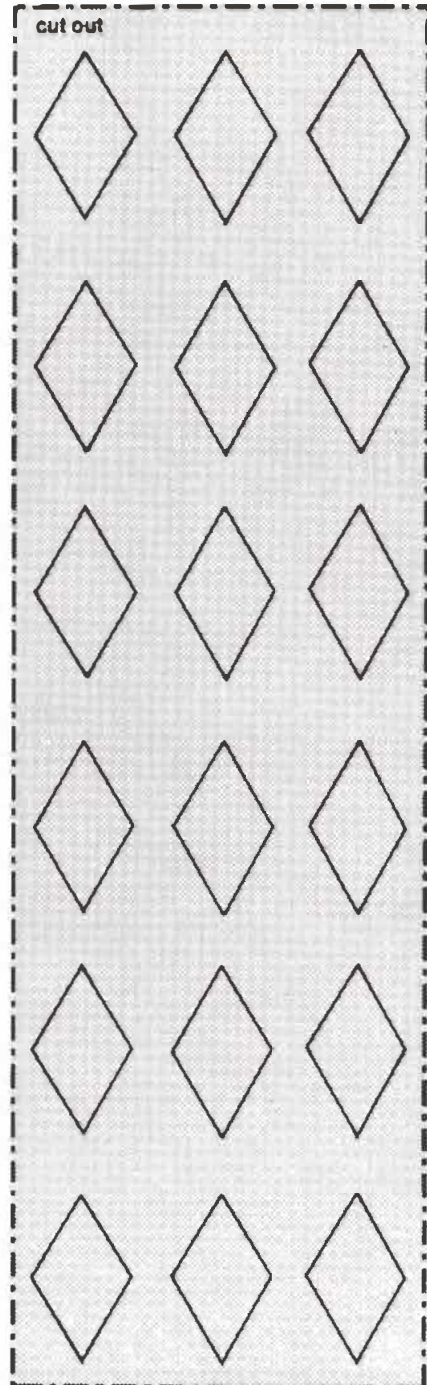
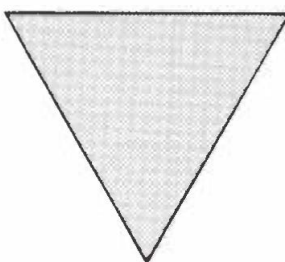
4.



5.



6.



IDEAS

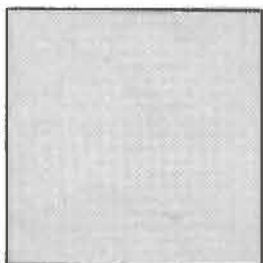
Name _____

Levels 6, 7, 8

Complete each table. Use a centimetre as the unit of measure.

What pattern do you see? _____

1. a.



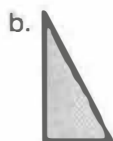
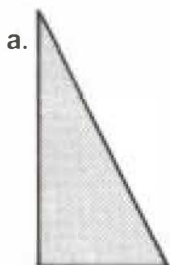
	length	ratio of length	width	ratio of width	area	ratio of area
a						
b						

2. a.



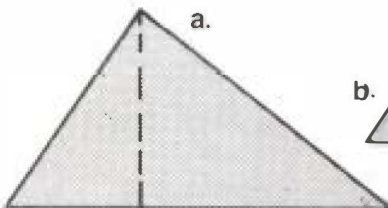
	length	ratio of length	width	ratio of width	area	ratio of area
a						
b						

3. a.



	base	ratio of base	height	ratio of height	area	ratio of area
a						
b						

4. a.



	base	ratio of base	height	ratio of height	area	ratio of area
a						
b						

5. a.



	length	ratio of length	width	ratio of width	area	ratio of area
a						
b						