## Objective

Determine the area of an irregular figure by dividing it into other shapes, such as rectangles and triangles.

## Common Core State Standards

7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

## Geometry

## Area of Irregular Figures

Most of the area problems students are asked to solve in 7th and 8th grade involve combining the areas of standard figures such as squares, rectangles, triangles, and some regular polygons. Finding the area of irregular figures challenges students to build on this knowledge. In addition, having students solve problems of this type can provide teachers with insight into student understanding of area and the formulas used to determine it.

## Iry lit! Perform the Try It! activity on the next page.

## Talk About It

Discuss the Try It! activity.

- Help students recognize the rectangle and the two triangles formed when points ACDF are connected by the rubber band. Ask: What shapes do you see in this irregular hexagon?
- Have students discuss how to find the area of the figure now that they see how the figure can be divided into a rectangle and two triangles. Ask: What is the formula for finding the area of a rectangle? A triangle? How can we determine the area of the entire figure?


## Solve It

Reread the problem with students. If necessary, review what makes a figure regular or irregular. Have students write a short paragraph explaining how it is possible to find the area of an irregular figure by dividing it into its component shapes (rectangles and triangles).

## More Ideas

For other ways to teach about the area of irregular figures-

- Have students use the XY Coordinate Pegboard to form irregular figures that have no internal rectangles and divide the figures into triangles.

■ Have students make a rectangular figure with the squares from the Pattern Blocks. Instruct them to remove one square from anywhere in the figure. They should then find the area of the resulting irregular figure by thinking of it in terms of the original shape minus another shape.


## Formative Assessment

Have students try the following problem. Find the area of the figure.
A. 84 sq. units
B. 126 sq. units
C. 156 sq. units
D. 168 sq. units


## Try lt !

Here is a problem about the area of irregular figures.
Kristin and Erik want to install new flooring in the sunroom of their grandfather's old house. Unfortunately, the room is oddly shaped. How can they determine the area of such an irregular room?


Introduce the problem. Then have students do the activity to solve the problem. Distribute the materials.
Have students set up a four-quadrant grid on their pegboard. Write the following coordinates on the board: $A(-4,2), B(-1,7), C(4,2), D(4,-3), E(2,-7)$, $F(-4,-3)$.


1. Have students place pegs at the coordinates and create figure $A B C D E F$.

2. Have students transfer the figure to the dot paper by marking and labeling the points. Students should then connect the points with straight lines to form an irregular hexagon.

## Materials

- XY Coordinate Pegboard
- BLM 10
- ruler or straightedge


2. Have students use a rubber band to connect points $A, C, D$, and $F$ to form a rectangle.

3. Have students find the area of each of the internal figures-a rectangle and two triangles. Students should then add the areas together to find the total area of the hexagon.

## A Look Out!

Be sure that students correctly identify the base and height of the triangles that are found inside the irregular figure. Students should realize that being able to do this is the key to solving problems of this type.

Use an XY Coordinate Pegboard to model the irregular figure. Divide the shape into triangles and a rectangle. Find the area of the irregular figure.
(Check students' work.)
1.


Area of figure $\qquad$ 48
 sq units

Area

| triangle | 6 | sq units |
| :---: | :---: | :---: |
| ctangle | 30 | sq units |
| ang | 12 | sq units |

Using an XY Coordinate Pegboard, model an irregular figure. Sketch the model.
Find the area of the irregular figure.
2.


Find the areas of the shapes into which you can divide your figure.
$\qquad$


Area of figure $\qquad$ sq units

Find the area of each figure.
3.

4.


## Answer Key

Challenge! Why do you divide an irregular figure into other shapes to find its area? Draw a picture to help.

Challenge: (Sample) By dividing an irregular figure into common shapes, you can use formulas you know to find the area. Find the area of each shape and then add the areas together to find the area of the irregular figure.
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$\qquad$
Use an XY Coordinate Pegboard to model the irregular figure. Divide the shape into triangles and a rectangle. Find the area of the irregular figure.
1.


Area triangle $\qquad$ sq units
rectangle $\qquad$ sq units triangle $\qquad$ sq units

Area of figure $\qquad$ sq units

Using an XY Coordinate Pegboard, model an irregular figure. Sketch the model.
Find the area of the irregular figure.
2.


Find the areas of the shapes into which you can divide your figure.
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$\qquad$
Area of figure $\qquad$ sq units

Find the area of each figure.
3.

4.


Name

Challenge! Why do you divide an irregular figure into other shapes to find its area? Draw a picture to help.
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