Lesson 8.1: Areas of Rectangles and Parallelograms

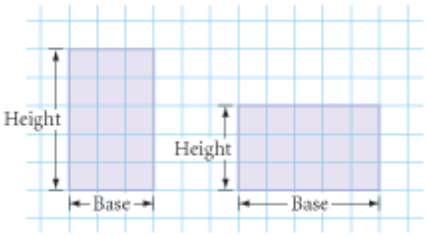
In this lesson you will:

- review the formula for the area of a rectangle
- use the area formula for rectangles to find areas of other shapes
- discover the formula for the area of a parallelogram

People work with areas in many occupations. For example, carpenters, painters, decorators, engineers, and artists all work with areas.

The area of a plane figure is the _____ of the size of the _____ of a figure. You probably already know several area formulas. In this lesson, we will be reviewing how to find the area of a rectangle and parallelogram.

Any side of a rectangle can be called a _____. A rectangle's _____ is the length of the side that is perpendicular to the base. For each pair of parallel bases, there is a corresponding height.



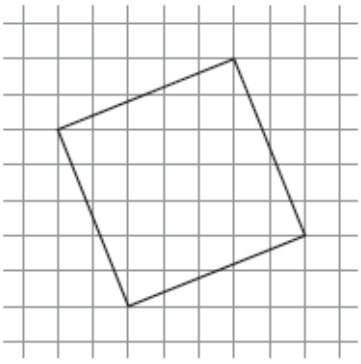
If we call the bottom side of each rectangle in the figure the base, then the length of the base is the number of squares in each row and the height is the number of rows. So you can use these terms to state a formula for the area.

Rectangle Area Conjecture (C-74)

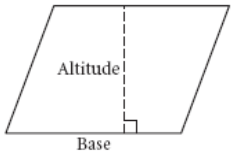
The area of a rectangle is given by the formula A = _____, where A is the area, b is the length of the base, and h is the height of the rectangle.

The area formula for rectangles can help you find the areas of many other shapes.

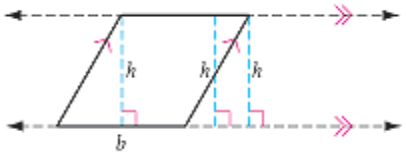
•Example 1: Find the area of this square.



You can also use the area formula for a rectangle to find the area formula for a parallelogram. Just as with a rectangle, any side of a parallelogram can be called a base. But the height of a parallelogram is not necessarily the length of a side. An _____ is any segment from one side of a parallelogram perpendicular to a line through the opposite side. The length of the altitude is the _____.

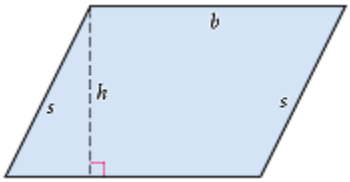


The altitude can be inside or outside the parallelogram. No matter where you draw the altitude to a base, its height should be the _____ because the opposite sides are parallel.



Investigation 8.1: "Area Formula for Parallelograms"

Can the area of a parallelogram be rearranged into a more familiar shape?



A.) Looking at the parallelogram at right, if you cut along the altitude, you will have two pieces—a triangle and a trapezoid. Could you rearrange these two pieces to make a new shape? ____ If so, what shape can you create? _____

B.) Is the area of the new shape the same as the area of the original parallelogram? _____ Why?

C.) How would you calculate the area of your new shape? _____ Can you use this formula to the find the area of any parallelogram? _____

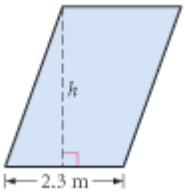
D.) Complete the conjecture based on your findings.

Parallelogram Area Conjecture (C-75)

The area of a parallelogram is given by the formula A = _____, where A is the area, b is the length of the base, and h is the height of the parallelogram.

The area is measured in square units (un^2) like m^2 or in^2.

•Example 2: Find the height of a parallelogram that has an area of 7.13 m^2 and a base length of 2.3 m.



⇒**ASSIGNMENT**: _____