Name _____ Period _____

Area of Parallelograms, Triangles, and Trapezoids

All three of these figures have formulas with one thing in common:

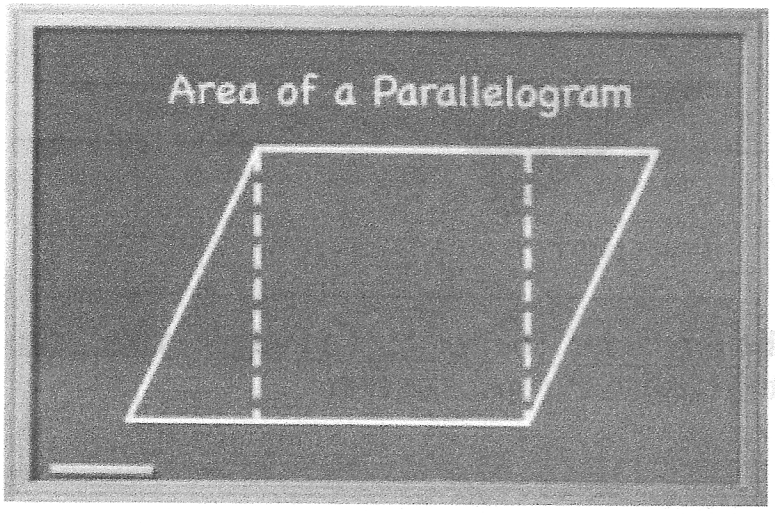
_____ X _____

For all three figures, the _____ must always be a_____

line from the _____.

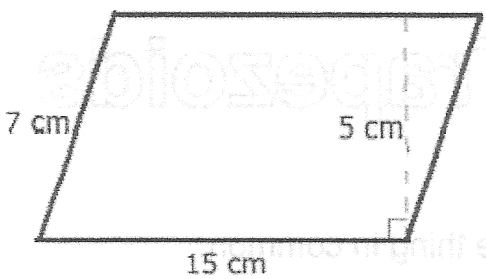
The formula for the area of a parallelogram is _____ x _____ because a parallelogram has the same area as a rectangle with the same height and base.

Proof:



Find the area of the parallelogram:

Example 1:

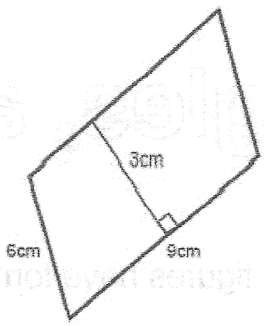


A = bh

A = _____ x _____

A = _____cm squared

Example 2:



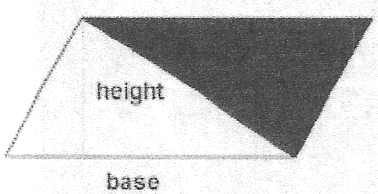
A = bh

A = _____ x _____

A = _____ cm squared

Now we need to find the area of triangles and trapezoids.

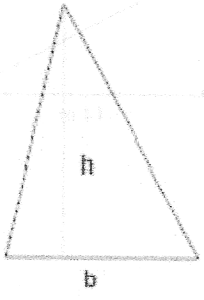
When looking at a parallelogram, we notice that the diagonal of a parallelogram divides the parallelogram into two congruent triangles. Therefore, the area of each triangle is half the area of the parallelogram.



The base of a triangle can be any side. The height of a triangle is the perpendicular distance from the base to the opposite side.

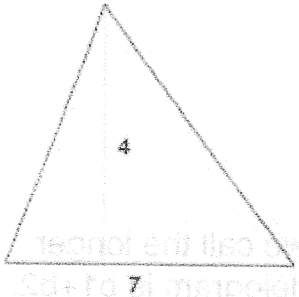
Here is a chart to help you understand how to find the area of a triangle, along with a picture to help you learn.

AREA OF A TRIANGLE

The area A of a triangle is half the product of its base b and its height h.	A=1/2 bh	

Now that we know how to find the area of a triangle, let's do an example together!

Example 1: Find the area of the triangle.



We use the formula and substitute for l and w.

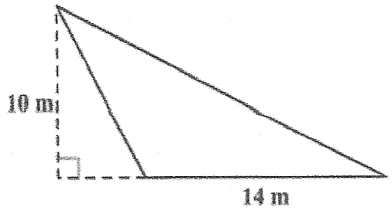
A=1/2(bh)

A = _____ x _____ x _____

A = _____ square units

- Note: Our units are in square units. We do not have a specific unit of measurement to use, so we assume the measurement to be in units.

Example 2:

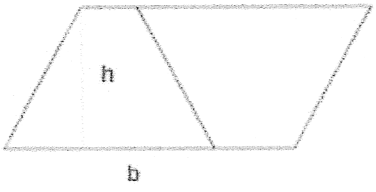


A=1/2(bh)

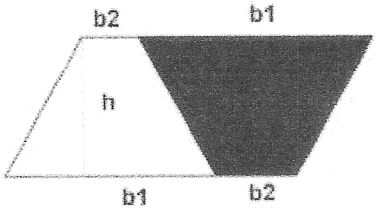
A = _____ x _____ x _____

A = _____ square meters

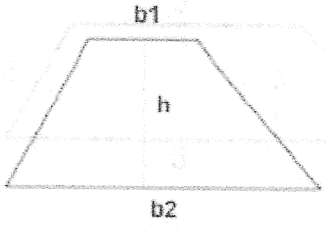
A parallelogram can be divided into two congruent trapezoids. The area of each trapezoid is one-half the area of the parallelogram.



The two parallel sides of a trapezoid are its bases. If we call the longer side b1 and the shorter side b2, then the base of the parallelogram is b1+b2.

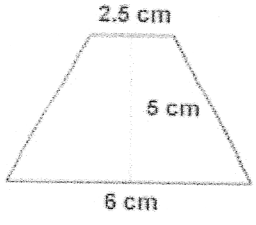


AREA OF A TRAPEZOID

The area A of a trapezoid is half its height multiplied by the sum of the lengths of its two bases.	A=1/2h(b1+b2)	

The only difference between the formulas for _____ and _____ is the _____. A trapezoid has 2 different size _____ _____. They must be _____ together, _____ by the _____, and _____ by ½.

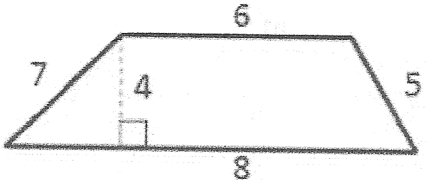
Example 1: Find the area of the trapezoid.



A=1/2h(b1+b2)
A= _____ x _____ x (_____+ _____)

A = _____ cm squared

Example 2:

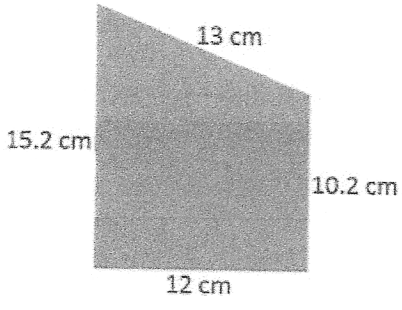


A=1/2h(b1+b2)

A= _____ x _____ x (_____+ _____)

A = _____ square units

Example 3:



A=1/2h(b1+b2)

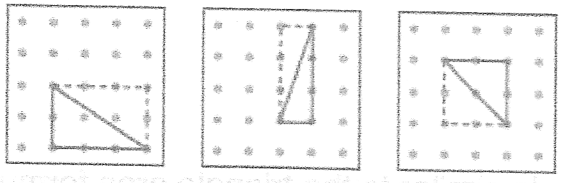
A= _____ x _____ x (_____+ _____)

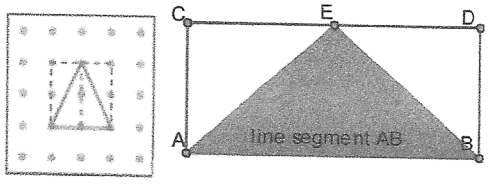
A = _____ cm squared

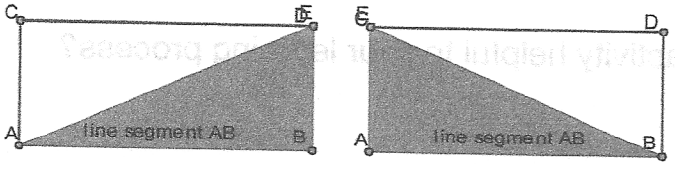
Now that we know how to find the area of a triangle and the area of a trapezoid, let's do an activity utilizing the new concepts that we have just learned.

Activity:

- Draw a triangle (with the use of a ruler) with whole number side lengths. Fit the triangle on a piece of graph paper.
- Now cut out the triangle and use the formula, A = ½ bh, to show that any of the three sides can serve as the base of the triangle.
- In order to find the height, draw a rectangle around the cutout triangle on another sheet of graph paper to find the height of the triangle for each base.







Calculations:

Write responses to the following questions:

- Tell how to use the sides of a right triangle to find its area.

- Explain how to find the area of a trapezoid.

- How is the trapezoid area formula similar to the triangle area formula

- How is this particular activity helpful to your learning process?