Rep-Tiles

NAME _____

You will need several sheets of construction paper, scissors, and a pencil to do the activities below.

1. Draw a triangle below.

Using construction paper, cut out four copies of this triangle. Will your triangles fit together to form a larger triangle?

Is the larger triangle similar to the smaller triangles? Measure the angles and sides of both the larger triangle and one of the smaller triangles to make sure the triangles are similar.

Is your triangle a **rep-tile**? Explain your answer.

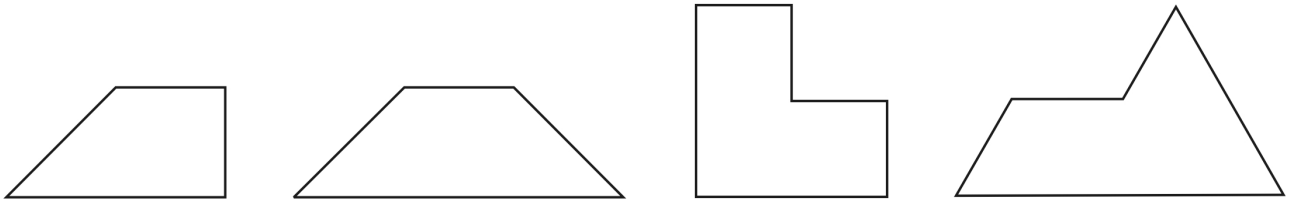
2. Cut out four copies of the larger triangle constructed in part 1. As in part 1, see if the larger triangle is a **rep-tile**. How many triangles were needed?

Were the same number of triangles needed in part 1 and part 2?

3. Repeat parts 1 and 2 with two other triangles.

4. Draw a parallelogram. Make four copies of the parallelogram and see if it is a rep-tile. Discuss why the parallelogram is or is not a **rep-tile**.

5. Mathematicians have shown that any triangle and any parallelogram is a **rep-4 tile**. In other words, four copies of a triangle or a parallelogram create a larger similar triangle or parallelogram. Recall that each of your triangles was a **rep-4 tile**. Use construction paper to create four copies of each of the following figures. State whether or not each figure is a **rep-4 tile**. Explain how you knew.



6. Each **rep-4 tile** you found in parts 1 through 4 is also **rep-9 tile**. That is, nine copies of any of these figures can be used to create a larger, similar figure. Show that each of your reptiles (from parts 1 through 4) is also a **rep-9 tile**. (You may want to show friends or family that the figures in part 5 are also **rep-9 tiles**.)

7. Mathematicians have proved that for any natural number *n* greater than 1, a **rep-*n* tile** exists, for instance, a **rep-2 tile**, a **rep-3 tile**, a **rep-4 tile**, and so on. Draw an isosceles right triangle and show that it is a **rep-2 tile**.

8. Show that a 30°-60°-90° triangle is a **rep-3 tile**.

Show that a right triangle whose legs measure 2 cm and 4 cm is a **rep-5 tile**.

Extensions

9. Each of the polygons in parts 1 through 8 can be divided into smaller shapes that are congruent to each other and similar to the original polygon. For example, a **rep-4 tile** can be subdivided into four smaller congruent copies that are similar to the original tile. Subdivide six of the polygons in parts 1 – 8 in such a way. (Hint: Think about how you put copies of a triangle together to form a larger similar triangle.)

10. Describe the relationship between subdividing **rep-tiles** into smaller figures and putting copies of reptiles together to create larger similar figures.