

Unit 1 Lesson 11: Adding Up

1 Math Talk: Adding Terms (Warm up)

Student Task Statement

Evaluate mentally.

$$\frac{1}{2} + \frac{1}{4}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}$$

$$\frac{3}{2} + \frac{3}{4} + \frac{3}{8} + \frac{3}{16}$$

2 Paper Trail

Student Task Statement

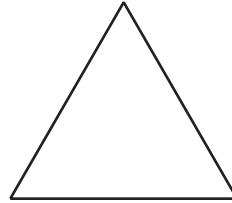
1. Tyler has a piece of paper and is sharing it with Elena, Clare, and Andre. He cuts the paper to create four equal pieces, then hands one piece each to the others and keeps one for himself. What fraction of the original piece of paper does each person have?
2. Tyler then takes his remaining paper and does it again. He cuts the paper to create four equal pieces, then hands one piece each to the others and keeps one for himself. What fraction of the original piece of paper does each person have now?
3. Tyler then takes his remaining paper and does it again. What fraction of the original piece of paper does each person have now? What happens after more steps of the same process?

3 A Threefold Design

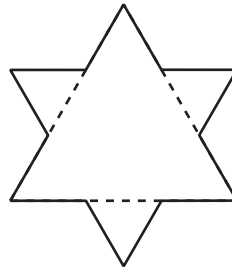
Student Task Statement

Here is a geometric shape built in steps.

- Step 0 is an equilateral triangle.



- To go from Step 0 to Step 1, take every edge of Step 0 and replace its middle third with an outward-facing equilateral triangle.



- To go from Step 1 to Step 2, take every edge of Step 1 and replace its middle third with an outward-facing equilateral triangle.
- This process can continue to create any step of the design.

1. Find an equation to represent function S , where $S(n)$ is the number of sides in Step n . What is $S(2)$?
2. Consider a different function T , where $T(n)$ is the number of *new* triangles added when drawing Step n . Let $T(0) = 1$. How many new triangles are there in Steps 1, 2, and 3? Explain how you know.
3. What is the *total* number of triangles used in building Step 3?