Illustrative Mathematics

5.NF Folding Strips of Paper

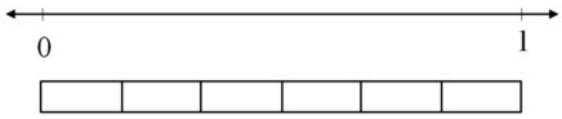
Alignments to Content Standards

- Alignment: 5.NF.B.4

Tags

• *This task is not yet tagged.*

a. Label the points on the number line that correspond to $\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, and $\frac{5}{6}$.



b. Carefully cut out a strip of paper that has a length of $\frac{5}{6}$.
   i. Bring the ends of the strip together to fold the strip of paper in half. How long is half of the strip? Use your strip to mark this point on the number line.
   ii. What two numbers can you multiply to find the length of half the strip? Write an equation to show this.

c. Unfold your paper strip so that you start with $\frac{5}{6}$ again. Now fold the strip of paper in half and then in half again.
   i. How long is half of half of the strip? Use your strip to mark this point on the number line.
   ii. What numbers can you multiply to find the length of half the strip? Write an equation to show this.

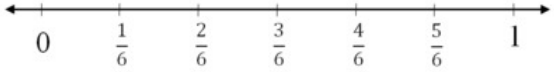
Commentary

The purpose of this task is to provide students with a concrete experience they can relate to fraction multiplication. Perhaps more importantly, the task also purposefully relates length and locations of points on a number line, a common trouble spot for students. This task is meant for instruction and would be a useful as part of an introductory unit on fraction multiplication.

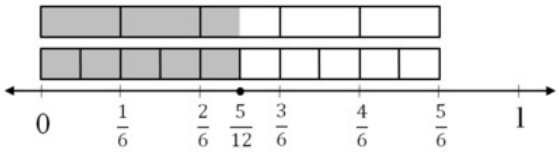
Solutions

Solution: Solution

a.



b. i. Half of the strip has a length of $\frac{5}{12}$; you can see this in the figure below. There are 5 sixths, so when you fold it in half, there are $2\frac{1}{2}$ sixths in half the strip. Since half of a sixth is a twelfth, we can see how long the strip is by dividing every sixth in half and then seeing how many 12ths there are in half the strip.

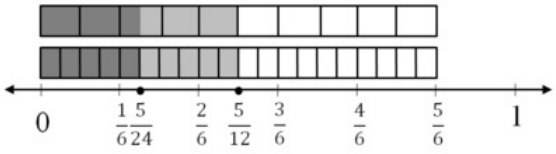


ii. Half of $\frac{5}{6}$ is the same as $\frac{1}{2} \times \frac{5}{6}$. So folding the strip of paper in half will result in a strip of paper that is

$$\frac{1}{2} \times \frac{5}{6} = \frac{5}{12}$$

in length.

c. i. Half of half of the strip has a length of $\frac{5}{24}$; you can see this in the figure below. Half of the strip has a length of $\frac{5}{12}$, so when you fold it in half, there are $2\frac{1}{2}$ twelfths in half of half of the strip. Since half of a twelfth is a twenty-fourth, we can see how long the strip is by dividing every twelfth in half and then seeing how many 24ths there are in half of half of the strip.



ii. Half of half of $\frac{5}{6}$ is the same as $\frac{1}{2} \times \frac{1}{2} \times \frac{5}{6} = \frac{1}{4} \times \frac{5}{6}$So folding the strip of paper in half and then in half again will result in a strip of paper that is

$$\frac{1}{4} \times \frac{5}{6} = \frac{5}{24}$$

in length.

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