



How Many Groups? (Part 1)

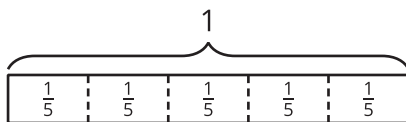
Let's play with blocks and diagrams to think about division with fractions.

4.1 Equal-size Groups

Write a multiplication equation and a division equation for each sentence or diagram.

1. Eight \$5 bills are worth \$40.

2.

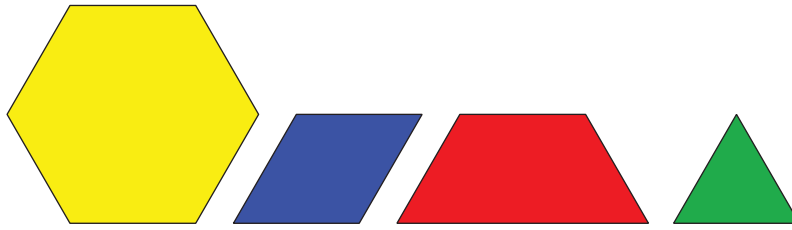


3. There are 9 thirds in 3 ones.

4.2

Reasoning with Pattern Blocks

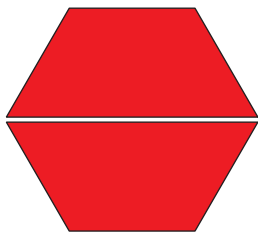
Your teacher will give you pattern blocks as shown here. Use them to answer the questions.



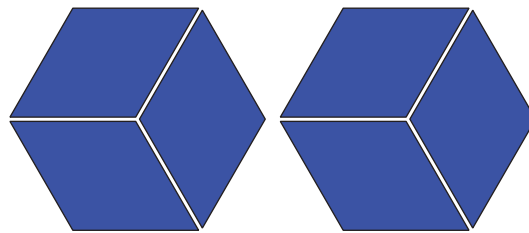
1. If a hexagon represents 1 whole, what fraction does each of the following shapes represent? Be prepared to show or explain your reasoning.

- 1 triangle
- 4 triangles
- 1 hexagon and 1 trapezoid
- 1 rhombus
- 3 rhombuses
- 1 trapezoid
- 2 hexagons

2. Here are Elena's diagrams for $2 \cdot \frac{1}{2} = 1$ and $6 \cdot \frac{1}{3} = 2$. Do you think these diagrams represent the equations? Explain or show your reasoning.



$$2 \cdot \frac{1}{2} = 1$$



$$6 \cdot \frac{1}{3} = 2$$

3. Use pattern blocks to represent each multiplication. Sketch or trace the blocks to record your representation. Remember that a hexagon represents 1 whole.

a. $3 \cdot \frac{1}{6} = \frac{1}{2}$

b. $2 \cdot \frac{3}{2} = 3$

4. Answer each question. If you get stuck, consider using pattern blocks.

a. How many $\frac{1}{2}$ s are in 4?

b. How many $\frac{1}{6}$ s are in $1\frac{1}{2}$?

c. How many $\frac{2}{3}$ s are in 2?



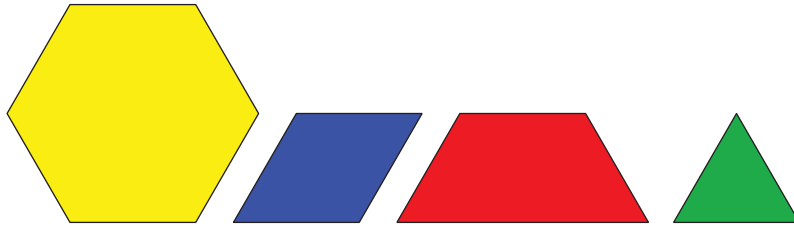
Lesson 4 Summary

Some problems that involve equal-size groups also involve fractions. Here is an example: “How many $\frac{1}{6}$ s are in 2?” We can express this question with multiplication and division equations.

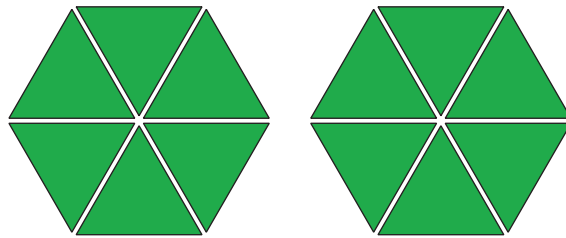
$$? \cdot \frac{1}{6} = 2$$

$$2 \div \frac{1}{6} = ?$$

Pattern-block diagrams can help us make sense of such problems. Here is a set of pattern blocks.



If the hexagon represents 1 whole, then a triangle must represent $\frac{1}{6}$, because 6 triangles make 1 hexagon. We can use the triangle to represent the $\frac{1}{6}$ in the problem.



Twelve triangles make 2 hexagons, which means there are 12 groups of $\frac{1}{6}$ in 2.

If we write the 12 in the place of the “?” in the original equations, we have:

$$12 \cdot \frac{1}{6} = 2$$

$$2 \div \frac{1}{6} = 12$$