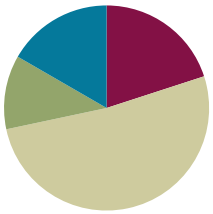
Lesson 16

Objective: Place whole number fractions and unit fractions between whole numbers on the number Line.

Related Topics: More Lesson Plans for the Common Core Math

Suggested Lesson Structure

Fluency Practice	(12 minutes)
Application Problem	(7 minutes)
Concept Development	(31 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (12 minutes)

- Dividing by 9 Sprint **3.OA.4** (7 minutes)
- Counting by Unit Fractions **3.NF.1, 3.NF.3c** (2 minutes)
- Place Fractions on a Number Line Between 0 and 1 **3.NF.2a** (3 minutes)

Dividing by 9 Sprint (7 minutes)

Materials: (S) Dividing by 9 Sprint

Counting by Unit Fractions (2 minutes)

T: (Project a number line.) Count by halves from 1 half to 6 halves and back to 0.

S: $\frac{1}{2}, \frac{2}{2}, \frac{3}{2}, \frac{4}{2}, \frac{5}{2}, \frac{6}{2}, \frac{5}{2}, \frac{4}{2}, \frac{3}{2}, \frac{2}{2}, \frac{1}{2}, 0.$

Continue with possible sequence for: thirds, fifths, and fourths.

Place Fractions on a Number Line Between 0 and 1 (3 minutes)

Materials: (S) Personal white boards

T: (Project a number line with endpoints 0 and 1.) Draw my number line on your board.

S: (Draw.)

T: Estimate to show and label 1 fifth.

NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Check ELL students' listening comprehension of math language as during the fluency activity, Place Fractions on a Number Line Between 0 and 1. Celebrate improvement! "You heard 1 fifth and showed 1 fifth. Great job!"

S: (Estimate 1 fifth of the distance between 0 and 1 and write $\frac{1}{5}$.)

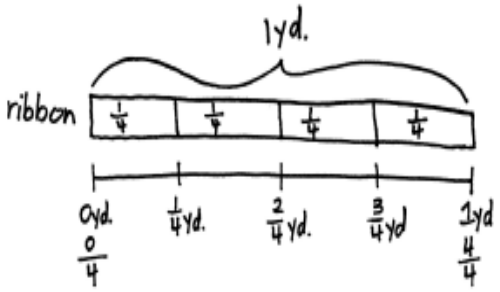
T: Estimate to show and label 4 fifths.

S: (Estimate 4 fifths of the distance between 0 and 1 and write $\frac{4}{5}$.)

Continue with the following possible sequence: $\frac{1}{8}$, $\frac{7}{8}$, $\frac{3}{8}$, $\frac{5}{8}$, $\frac{3}{4}$, $\frac{1}{4}$.

Application Problem (7 minutes)

Hannah bought 1 yard of ribbon to wrap 4 small presents. She wants to cut the ribbon into equal parts. Draw and label a number line from 0 yd. to 1 yd. to show where Hannah will cut the ribbon. Label all the fractions including 0 fourths and 4 fourths. Label 0 yd. and 1 yd., also.



Concept Development (31 minutes)

Materials: (S) Personal white boards

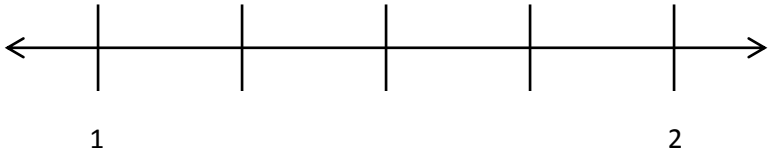
T: Let's draw a number line on our personal boards with the endpoints 1 and 2. The last few days our left endpoint was 0. Where has 0 gone? Tell your partner.

S: It didn't disappear; it is to the left of the 1. → The arrow on the number line tells us that there are more numbers, but we just didn't show them.

T: It's as if we took a picture of a piece of the number line but those missing numbers still exist.

T: We are going to partition this whole into 4 equal lengths.

T: Go ahead and partition your whole into 4 equal lengths.



MP.7

T: Our number line doesn't start at 0 so we can't start at 0 fourths. How many fourths are in 1 whole?

S: 4 fourths.

T: So we will label 4 fourths at whole number 1. Label the rest of the fractions up to 2. Check with your partner to see if you have the same number line. What are the whole number fractions, the fractions equal to 1 and 2?

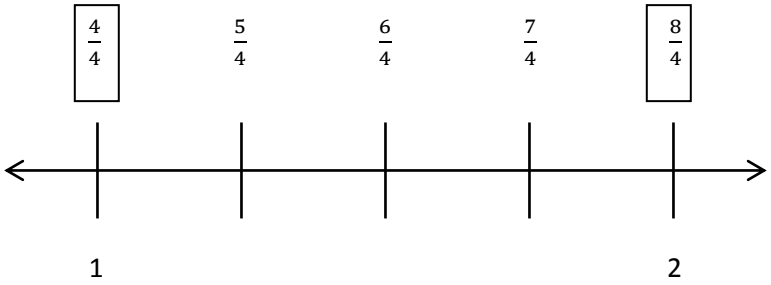
S: 4 fourths and 8 fourths.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

If you gauge that students below grade level need it, build understanding with pictures or concrete materials. Extend the number line back to 0. Have students shade in fourths as they count. Use fraction strips as in Lesson 14, if needed.

T: Let's draw a box around those fractions.

MP.7



T: 4 fourths is the same point on the number line as 1. We call that equivalence. How many fourths would be equivalent to, or at the same point as 2?

S: 8 fourths.

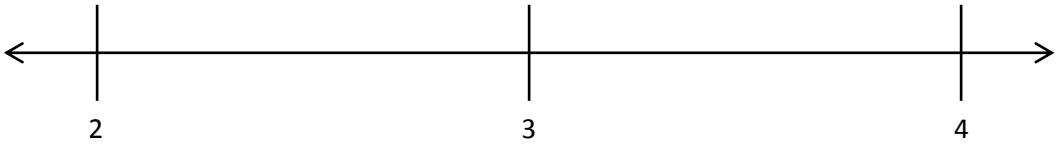
T: Discuss what fraction is equivalent to – at the same point as – 3 with your partner.

S: (After discussion.) 12 fourths.

T: Draw a number line with the end points 2 and 4. What whole number is missing from this number line?

S: The number 3.

T: Let's place the number 3. It should be equally spaced between 2 and 4. Let's draw that in. (Model.)

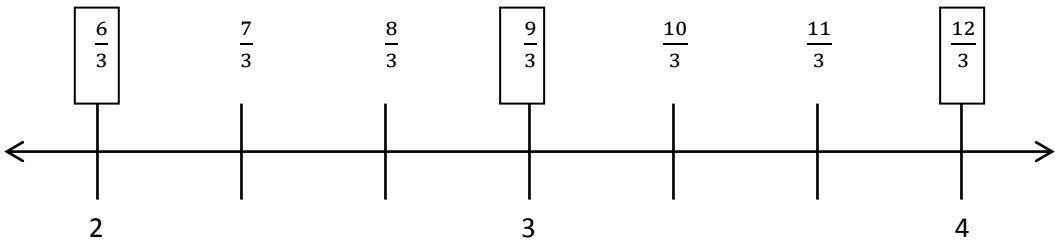


T: We will partition this line into 3 equal lengths. Tell your partner what your number line will look like.

T: To label the number line that starts at 2, we have to know how many thirds are equivalent to 2 wholes. Discuss with your partner how to find the number of thirds in 2 wholes.

S: 3 thirds made 1 whole. So, 6 units of thirds makes 2 wholes. → 6 thirds are equivalent to 2 wholes.

T: Fill in the rest of your number line.



Follow with an example using endpoints 3 and 6 so students place 2 whole numbers on the number line, and then partition into halves.

Close the guided practice by having students work in pairs. Partner A names a number line with endpoints between 0 and 5, and a unit fraction. Partners begin with halves and thirds. When they have demonstrated to you that they have done 2 number lines correctly, they may try fourths and fifths, etc. Partner B draws and Partner A assesses. Then partners switch roles.

NOTES ON MULTIPLE MEANS OF ENGAGEMENT:

Students above grade level may quickly solve with mental math. Push students to notice and articulate patterns and relationships. As they work in pairs to partition number lines, have students make and analyze their predictions.

Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

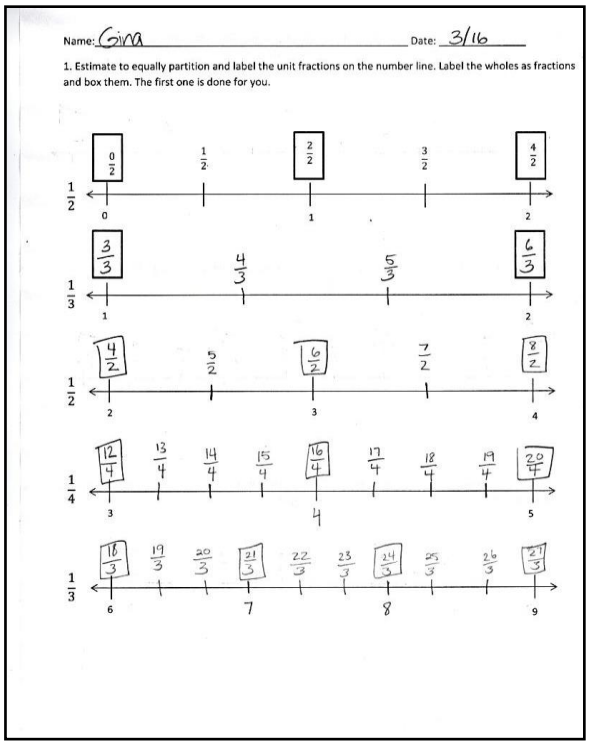
Lesson Objective: Place whole number fractions and unit fractions between whole numbers on the number line.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

You may choose to use any combination of the questions below to lead the discussion.

- What number shares the exact same point as 3 on the number line?
- What number shares the exact same point with 12 fourths?"
- Point out Problem 3, which counts 3 thirds, 6 thirds, 9 thirds, 12 thirds:
  - Look at the fractions you boxed in problem 3. What pattern do you notice?

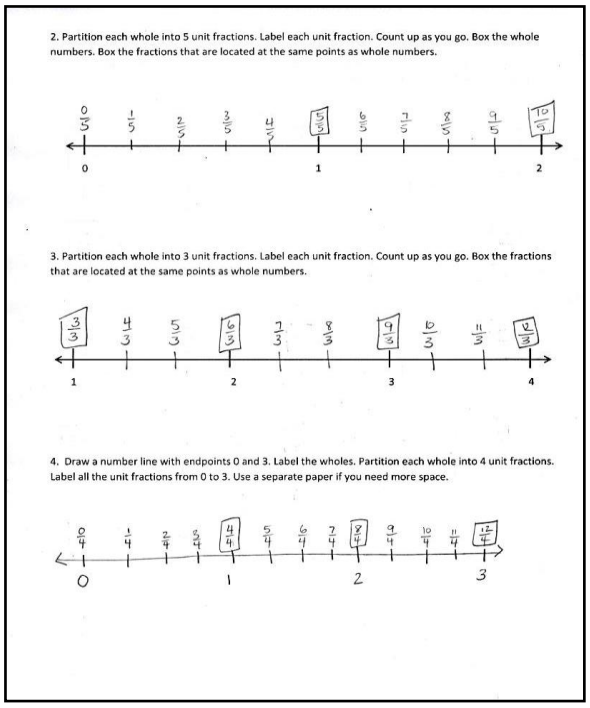

Name: Gina Date: 3/16

1. Estimate to equally partition and label the unit fractions on the number line. Label the wholes as fractions and box them. The first one is done for you.

- What is the connection between multiplication and fractions equal to whole numbers?
- How do you think that strategy might help you to find other whole number fractions?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.



2. Partition each whole into 5 unit fractions. Label each unit fraction. Count up as you go. Box the whole numbers. Box the fractions that are located at the same points as whole numbers.

3. Partition each whole into 3 unit fractions. Label each unit fraction. Count up as you go. Box the fractions that are located at the same points as whole numbers.

4. Draw a number line with endpoints 0 and 3. Label the wholes. Partition each whole into 4 unit fractions. Label all the unit fractions from 0 to 3. Use a separate paper if you need more space.

A

Correct _____

Multiply or divide.

1	2 x 9 =		23	___ x 9 = 90	
2	3 x 9 =		24	___ x 9 = 18	
3	4 x 9 =		25	___ x 9 = 27	
4	5 x 9 =		26	90 ÷ 9 =	
5	1 x 9 =		27	45 ÷ 9 =	
6	18 ÷ 9 =		28	9 ÷ 9 =	
7	27 ÷ 9 =		29	18 ÷ 9 =	
8	45 ÷ 9 =		30	27 ÷ 9 =	
9	9 ÷ 9 =		31	___ x 9 = 54	
10	36 ÷ 9 =		32	___ x 9 = 63	
11	6 x 9 =		33	___ x 9 = 81	
12	7 x 9 =		34	___ x 9 = 72	
13	8 x 9 =		35	63 ÷ 9 =	
14	9 x 9 =		36	81 ÷ 9 =	
15	10 x 9 =		37	54 ÷ 9 =	
16	72 ÷ 9 =		38	72 ÷ 9 =	
17	63 ÷ 9 =		39	11 x 9 =	
18	81 ÷ 9 =		40	99 ÷ 9 =	
19	54 ÷ 9 =		41	12 x 9 =	
20	90 ÷ 9 =		42	108 ÷ 9 =	
21	___ x 9 = 45		43	14 x 9 =	
22	___ x 9 = 9		44	126 ÷ 9 =	

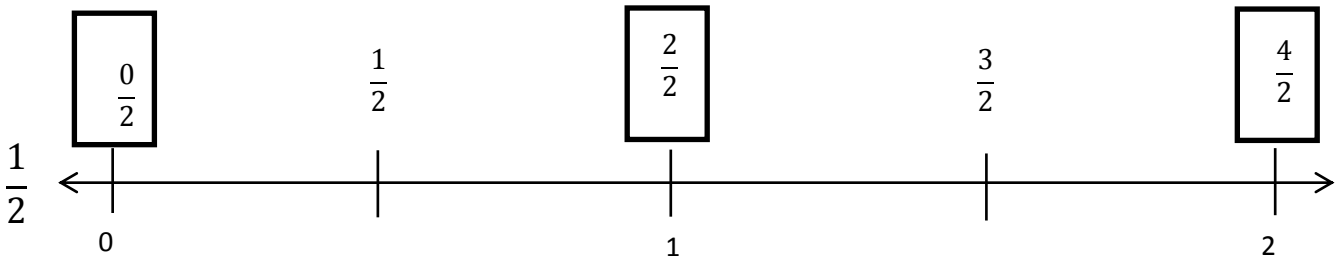
B Improvement _____ # Correct _____

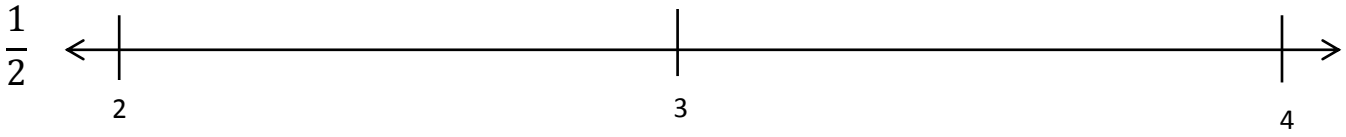
Multiply or divide.

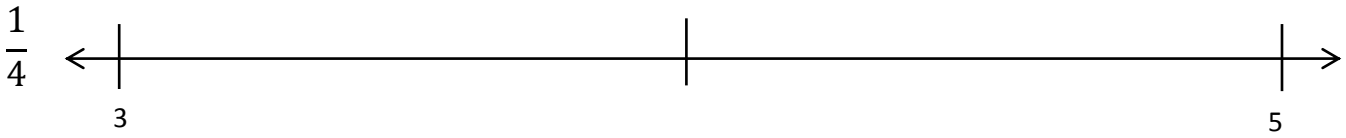
1	1 x 9 =		23	__ x 9 = 18	
2	2 x 9 =		24	__ x 9 = 90	
3	3 x 9 =		25	__ x 9 = 27	
4	4 x 9 =		26	18 ÷ 9 =	
5	5 x 9 =		27	9 ÷ 9 =	
6	27 ÷ 9 =		28	90 ÷ 9 =	
7	18 ÷ 9 =		29	45 ÷ 9 =	
8	36 ÷ 9 =		30	27 ÷ 9 =	
9	9 ÷ 9 =		31	__ x 9 = 27	
10	45 ÷ 9 =		32	__ x 9 = 36	
11	10 x 9 =		33	__ x 9 = 81	
12	6 x 9 =		34	__ x 9 = 63	
13	7 x 9 =		35	72 ÷ 9 =	
14	8 x 9 =		36	81 ÷ 9 =	
15	9 x 9 =		37	54 ÷ 9 =	
16	63 ÷ 9 =		38	63 ÷ 9 =	
17	54 ÷ 9 =		39	11 x 9 =	
18	72 ÷ 9 =		40	99 ÷ 9 =	
19	90 ÷ 9 =		41	12 x 9 =	
20	81 ÷ 9 =		42	108 ÷ 9 =	
21	__ x 9 = 9		43	13 x 9 =	
22	__ x 9 = 45		44	117 ÷ 9 =	

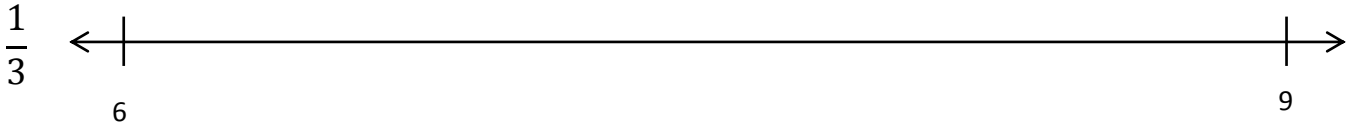
Name _____ Date _____

1. Estimate to equally partition and label the unit fractions on the number line. Label the wholes as fractions and box them. The first one is done for you.

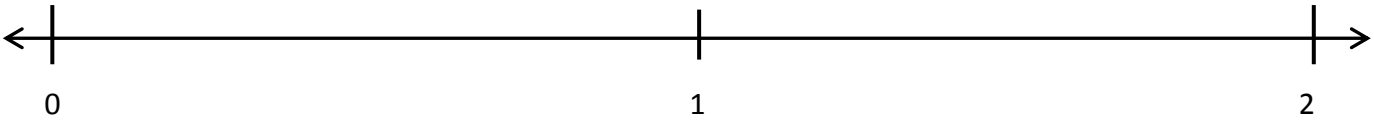




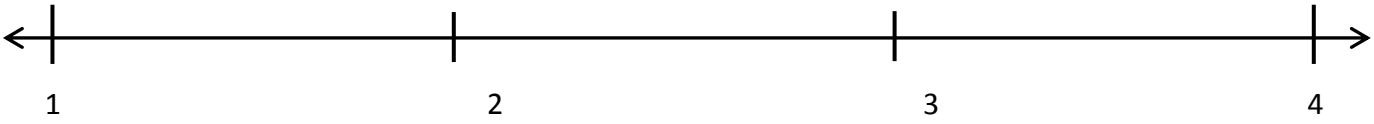




2. Partition each whole into 5 unit fractions. Label each fraction. Count up as you go. Box the whole numbers. Box the fractions that are located at the same points as whole numbers.



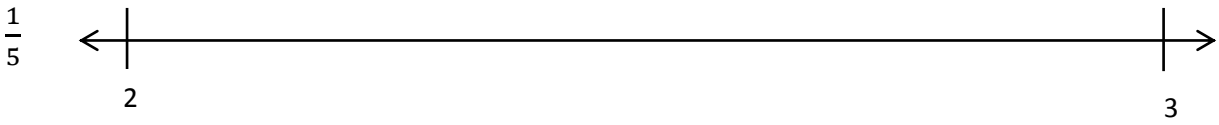
3. Partition each whole into 3 unit fractions. Label each fraction. Count up as you go. Box the fractions that are located at the same points as whole numbers.



4. Draw a number line with endpoints 0 and 3. Label the wholes. Partition each whole into 4 unit fractions. Label all the fractions from 0 to 3. Use a separate paper if you need more space.

Name _____ Date _____

1. Estimate to equally partition and label the unit fractions on the number line. Label the wholes as fractions and box them.

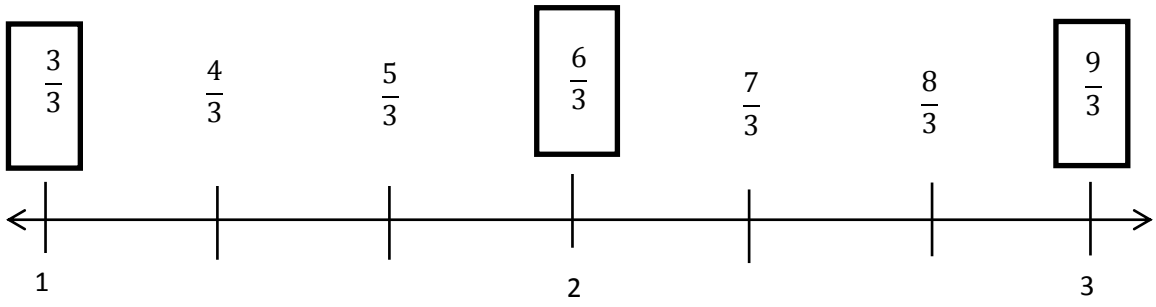


2. Draw a number line with endpoints 0 and 2. Label the wholes. Estimate to partition each whole into 6 unit fractions and label them.

Name _____ Date _____

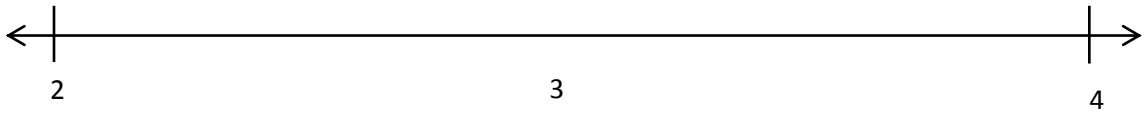
1. Estimate to equally partition and label the fractional units on the number line. Label the wholes as fractions and box them. The first one is done for you.

a. $\frac{1}{3}$

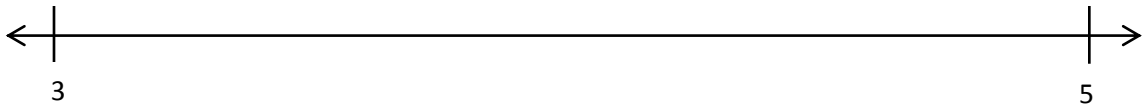


b. $\frac{1}{8}$

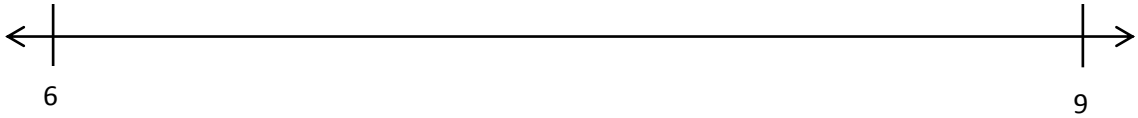
c. $\frac{1}{4}$



d. $\frac{1}{2}$

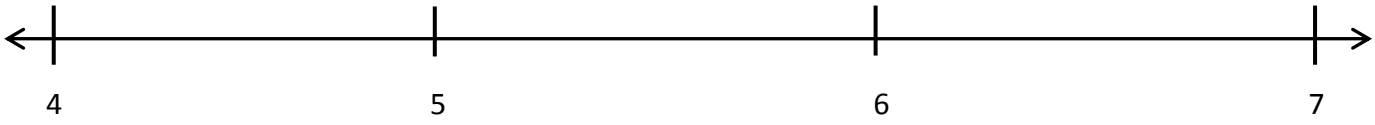


e. $\frac{1}{5}$



2. Partition each whole into 6 unit fractions. Label each fraction. Count up as you go. Box the whole numbers. Box the fractions that are located at the same points as whole numbers.

3. Partition each whole into 2 unit fractions. Label each fraction. Count up as you go. Box the fractions that are located at the same points as whole numbers.



4. Draw a number line with endpoints 0 and 3. Label the wholes. Partition each whole into 5 unit fractions. Label all the fractions from 0 to 3. Use a separate paper if you need more space.