Dear Teachers,

During the listening tour, the Eureka Math Team enjoyed the opportunity to witness our curriculum being implemented in St. Charles classrooms. We listened carefully to the feedback you provided about additional resources that could support implementation and are excited to deliver a pilot version of a new resource, Eureka Math Homework Guides, intended to help bridge the gap between the classroom and home.

Our writers have begun creating Homework Guides to provide families with insight of the understandings and skills gained during each math lesson. The guides are designed to deliver guidance for the problems on the homework pages (K-5)/problem sets (6-12). The problems and their worked out solutions included in each Homework Guide were chosen intentionally and closely align with at least one problem on the homework/problem set.

After examining your curriculum maps, we created ten Homework Guides for each grade level, K-10, and have done our best to create these documents for immediate use. In order for these to support student learning, please make them available for families at home. Students and their families can use the Homework Guides to receive helpful hints when homework becomes challenging.

In order for you to help us continue to improve our curriculum and accompanying resources, we welcome any and all feedback you and/or your students' families can provide. After receiving feedback, our goal is to create a Homework Guide for every lesson in the curriculum and make them available to the public.

We are excited to provide you with this pilot set of Homework Guides and even more excited to improve this resource through your valued feedback.

Many Thanks,
The Eureka Math Team

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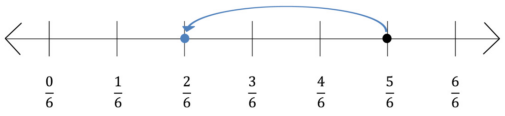
G4-M5-Lesson 16: Use visual models to add and subtract two fractions with the same units.

Solve for the difference or the sum using a number line.

5 sixths – 3 sixths = 2 sixths

$\frac{5}{6} - \frac{3}{6} = \frac{2}{6}$

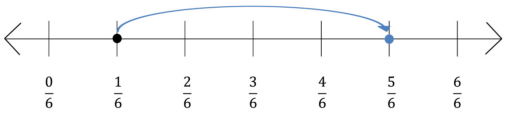
I plot a point at $\frac{5}{6}$ because that is the whole. Then I slide back $\frac{3}{6}$.



1 sixth + 4 sixths = 5 sixths

$\frac{1}{6} + \frac{4}{6} = \frac{5}{6}$

Denominators, the bottom number, are units and can be written in word form. Since the units are the same, I can just add the numerators, the number of units.

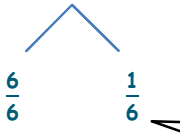


Solve. Use a number bond to convert the difference or sum to a mixed number.

I subtract the numerators, or number of units: 12 sixths minus 5 sixths equals 7 sixths.

$\frac{12}{6} - \frac{5}{6} = \frac{7}{6} = 1\frac{1}{6}$

7 sixths is a fraction greater than one, or an improper fraction. It can be renamed as a mixed number.



A number bond separates, or decomposes, a fraction greater than one to rename it as a mixed number.

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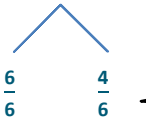
$\frac{5}{6} + \frac{5}{6} = \frac{10}{6} = 1\frac{4}{6}$



I can decompose 10 sixths into 2 parts: a whole number, 6 sixths, and a fraction, 4 sixths. 6 sixths is equal to 1.

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G4-M5-Lesson 17: Use visual models to add and subtract two fractions with the same units, including subtracting from one.

Use the three fractions to write two addition and two subtraction number sentences.

$\frac{8}{8}$ $\frac{3}{8}$ $\frac{5}{8}$

$\frac{3}{8}+\frac{5}{8}=\frac{8}{8}$ $\quad$ $\frac{8}{8}-\frac{3}{8}=\frac{5}{8}$

$\frac{5}{8}+\frac{3}{8}=\frac{8}{8}$ $\quad$ $\frac{8}{8}-\frac{5}{8}=\frac{3}{8}$

This is like the relationship between 1, 2, and 3. 1+2=3. 2+1=3. 3-1=2. 3-2=1.

Fact families are 3 sets of numbers that can be written as 2 addition and 2 subtraction number sentences.

Solve by subtracting and counting up. Model with a number line.

Subtracting: If the units are eighths, then 1 is equal to $\frac{8}{8}$.

$1-\frac{5}{8}$

$\frac{8}{8}-\frac{5}{8}=\frac{3}{8}$

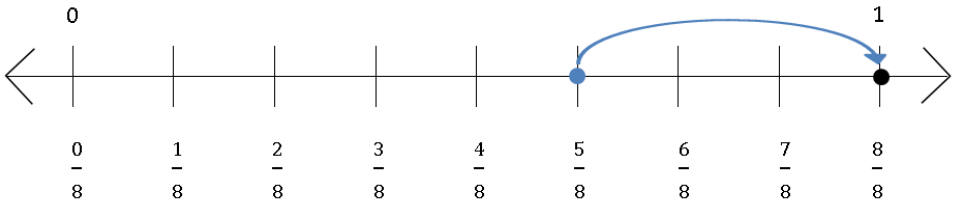
Counting up is adding an amount to what is being subtracted until you reach the whole. The number line below shows counting up. I can also start at 1 and show the subtraction on the number line model.

Counting up: How much more do I need from $\frac{5}{8}$ to reach $\frac{8}{8}$?

$\frac{5}{8}+\frac{3}{8}=\frac{8}{8}$

$\frac{5}{8}+x=\frac{8}{8}$

$x=\frac{3}{8}$



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Find the difference in two ways. Use number bonds to decompose the whole.

$1\frac{5}{8} - \frac{7}{8}$

$\frac{8}{8}$ $\frac{5}{8}$

The number bond renames $1\frac{5}{8}$ as $\frac{8}{8}$ and $\frac{5}{8}$.

One Way: Rename the mixed number as a fraction greater than 1. $\frac{8}{8}$ and $\frac{5}{8}$ is $\frac{13}{8}$, which is equal to $1\frac{5}{8}$.

$\frac{8}{8} + \frac{5}{8} = \frac{13}{8}$

$\frac{13}{8} - \frac{7}{8} = \frac{6}{8}$

Now I can subtract $\frac{7}{8}$, from $\frac{13}{8}$ to get $\frac{6}{8}$.

Another Way: Subtract from 1

$\frac{8}{8} - \frac{7}{8} = \frac{1}{8}$

$\frac{1}{8} + \frac{5}{8} = \frac{6}{8}$

Now I can subtract $\frac{7}{8}$ from $\frac{8}{8}$, or 1.

Then add the difference, $\frac{1}{8}$, to the remaining part of the whole, $\frac{5}{8}$ to get $\frac{6}{8}$.

$$1\frac{5}{8} - \frac{7}{8} = \frac{6}{8}$$

Both ways show that $1\frac{5}{8} - \frac{7}{8}$ is $\frac{6}{8}$.

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G4-M5-Lesson 18: Add and subtract more than two fractions.

Show two ways to solve each problem. Express the answer as a mixed number when possible. Use a number bond when it helps you.

Addition

$$\frac{2}{5} + \frac{3}{5} + \frac{1}{5}$$

One Way: If I try adding $6 + 3 + 4$ in my head, it's easiest to first add 6 and 4 to make 10, and then just add 3 more. (That's called Make a 10 strategy in Grade 1.

For fractions, I can use a strategy similar to Make a 10. I can Make a 1 by adding $\frac{2}{5}$ and $\frac{3}{5}$ to make $\frac{5}{5}$, or 1. Then I can just add $\frac{1}{5}$ more.

$$= \frac{5}{5} + \frac{1}{5}$$

$$= 1\ \frac{1}{5}$$

$$\frac{2}{5} + \frac{3}{5} + \frac{1}{5}$$

$$= \frac{6}{5}$$

$\frac{5}{5}$ $\frac{1}{5}$

$$= 1\ \frac{1}{5}$$

Another Way: Since the units, or denominators are the same for each addend, fifths, I can just add up the number of units, or numerators.

$\frac{6}{5}$ can be renamed as a mixed number. I can show my work with a number bond. $\frac{5}{5}$ is equal to 1.

Subtraction

$$1 - \frac{3}{12} - \frac{4}{12}$$

One Way: I combined $\frac{3}{12}$ and $\frac{4}{12}$ to subtract a total of $\frac{7}{12}$ from 1 or $\frac{12}{12}$.

$$1 - \frac{3}{12} - \frac{4}{12}$$

$$= 1 - \frac{7}{12}$$

$$= \frac{5}{12}$$

$$1 - \frac{3}{12} - \frac{4}{12}$$

$$= \frac{9}{12} - \frac{4}{12}$$

$$= \frac{5}{12}$$

Another Way: First, I'll subtract $\frac{3}{12}$ from 1, or $\frac{12}{12}$. That equals $\frac{9}{12}$. Then, I can subtract $\frac{4}{12}$ more.

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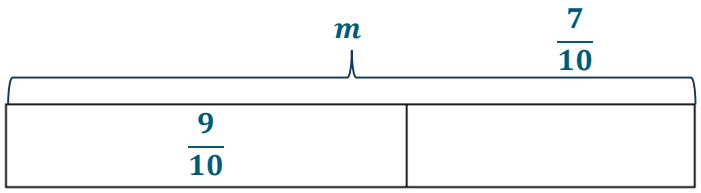
G4-M5-Lesson 19: Solve word problems involving addition and subtraction of fractions.

Use the RDW process to solve.

RDW stands for **R**ead, **D**raw, **W**rite. The key steps to remember are the following:

1. Model the problem.
2. Calculate to solve and write a statement.
3. Assess the solution for reasonableness. Does my answer make sense? Did I find what I was looking for?

Sue ran $\frac{9}{10}$ mile on Monday and $\frac{7}{10}$ mile on Tuesday. How many miles did Sue run in the 2 days?



Model the problem. (Step 1)

The two parts of my tape diagram show the distances run on Monday and Tuesday. I am looking for the number of miles run over the 2 days. I put a bracket around those two parts and labeled it "m."

My model shows that if I combine the distances run on the two days I will find the total I am looking for.

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One Possible Solution

$\frac{9}{10} + \frac{7}{10} = \frac{10}{10} + \frac{6}{10} = 1\frac{6}{10}$

$\frac{1}{10}$ $\frac{6}{10}$

Calculate to solve. (Step 2)
I used addition to combine the distances run on Monday and Tuesday. $\frac{9}{10}$ is almost 1 mile. So I broke out $\frac{1}{10}$ mile out of the $\frac{7}{10}$ mile to complete the mile and get a total of $1\frac{6}{10}$.

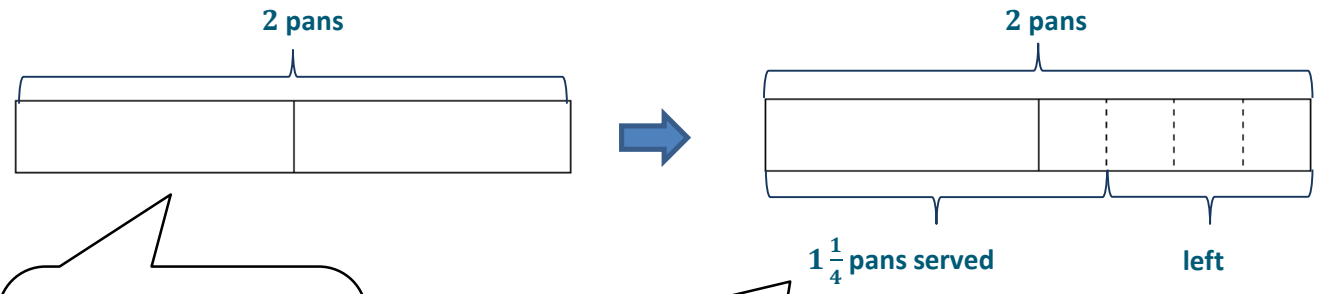
Sue ran $1\frac{6}{10}$ miles.

Write a Statement. (Step 2)
My statement puts my answer back into context of the problem to answer the question

Assess Reasonableness. (Step 3)
The distances run on both days are less than 1 so I would expect to get a total less than 2 miles. My answer of $1\frac{6}{10}$ miles is a reasonable total distance.

A baker had 2 pans of corn bread. He served $1\frac{1}{4}$ pans. What fraction of a pan was left?

One Possible Solution



Model the problem. (Step 1)
I started by drawing a model of the 2 pans of cornbread that he had at the start.

To show that he served $1\frac{1}{4}$ pans of cornbread, I partitioned one of the whole pans into fourths. Now I can cross out and label the part that was served and the part that is left. (Note: you can show your thinking on just one model. I drew it twice to show how I created it.)

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$$2 - 1\frac{1}{4} = \frac{3}{4}$$

1 $\frac{4}{4}$

The baker has $\frac{3}{4}$ pan of cornbread left.

Calculate to solve. (Step 2)

The number bond shows my strategy of decomposing a whole pan into fourths so I could subtract $1\frac{1}{4}$ pans. I see that I have $\frac{3}{4}$ pan remaining.

Write a Statement. (Step 2)

My statement puts my answer back into the context of the problem to answer the question

Assess Reasonableness. (Step 3)

The baker started with 2 pans of cornbread. He served some so he will have less than 2 pans left. My answer of $\frac{3}{4}$ pan is a reasonable amount left. It's important to say that the unit is pans because the fractions given in the problem were in terms of pans not pieces of cornbread.

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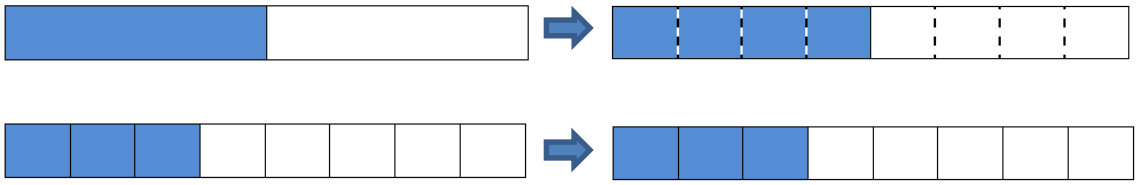
G4-M5-Lesson 20: Use visual models to add two fractions with related units using the denominators 2, 3, 4, 5, 6, 8, 10, and 12.

Use a tape diagram to represent each addend. Decompose one of the tape diagrams to make like units. Then write the complete number sentence.

$\frac{1}{2} + \frac{3}{8}$

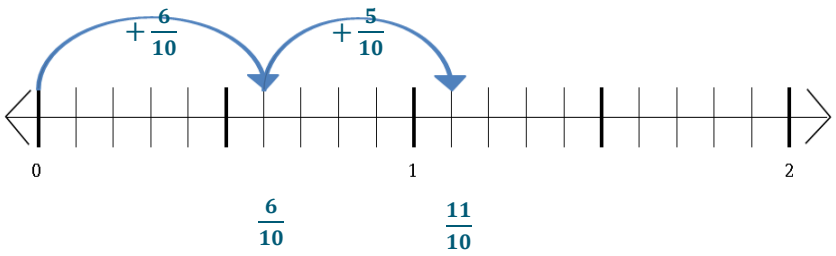
I drew a tape diagram to model my first addend, $\frac{1}{2}$, and my second addend, $\frac{3}{8}$.
I need to create a common unit to add.

I decomposed (broke apart) the halves to make eighths. Now I can add the like units.



$\frac{4}{8} + \frac{3}{8} = \frac{7}{8}$

Estimate to determine if the sum is between 0 and 1 or 1 and 2. Draw a number line to model the addition. Then, write a complete number sentence.



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$\frac{6}{10} + \frac{1}{2}$

$\frac{1}{2} + \frac{1}{2} = 1$.
$\frac{6}{10}$ is greater than $\frac{1}{2}$ so my sum will be more than 1.
I estimate my sum will be between 1 and 2

$\frac{6}{10} + \frac{5}{10} = \frac{11}{10}$

I decomposed $\frac{1}{2}$ into $\frac{5}{10}$ to create like units.

Solve the following addition problem without drawing a model. Show your work.

$\frac{2}{3} + \frac{4}{6}$

$\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ $\frac{4}{6} + \frac{4}{6}$

I decomposed $\frac{2}{3}$ into $\frac{4}{6}$ by multiplying both the numerator and denominator of $\frac{2}{3}$.

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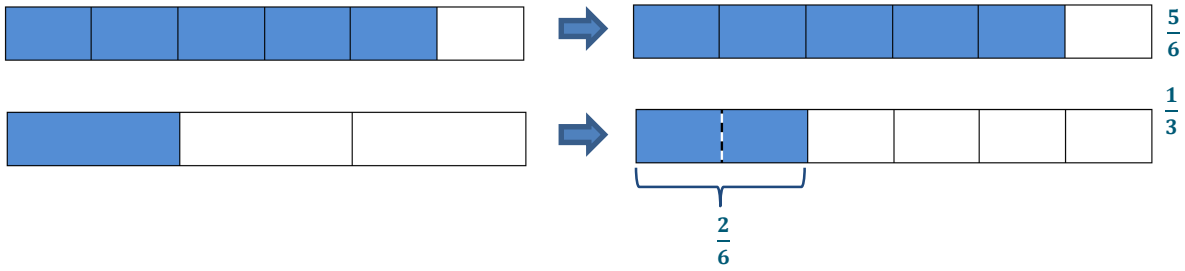
G4-M5-Lesson 21: Use visual models to add two fractions with related units using the denominators 2, 3, 4, 5, 6, 8, 10, and 12.

Use a tape diagram to represent each addend. Decompose one of the tape diagrams to make like units. Then write the complete number sentence. Use a number bond to write each sum as a mixed number.

$\frac{5}{6} + \frac{1}{3}$

I drew a tape diagram to model my first addend, $\frac{5}{6}$, and my second addend, $\frac{1}{3}$. I need to create a common unit to add.

I decomposed (broke apart) the thirds to make sixths. Now I can add the like units.



$\frac{5}{6} + \frac{2}{6} = \frac{7}{6}$

$\frac{6}{6}$ $\frac{1}{6}$

$1 + \frac{1}{6} = 1\frac{1}{6}$

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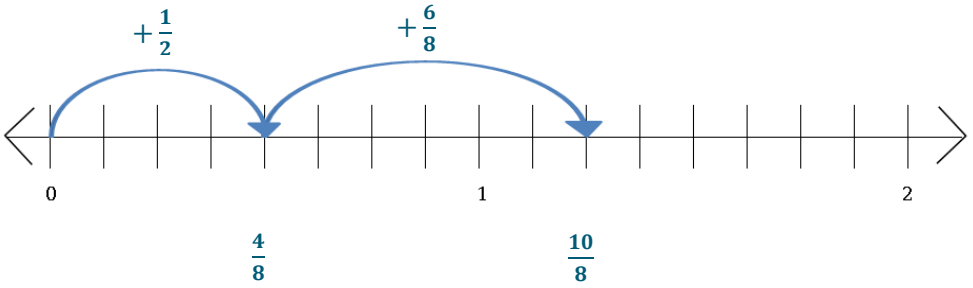
Draw a number line to model the addition. Then, write a complete number sentence. Use a number bond to write each sum as a mixed number.

$\frac{1}{2} + \frac{6}{8}$



$\frac{4}{8} + \frac{6}{8} =$ $\frac{10}{8}$ ($\frac{8}{8}$, $\frac{2}{8}$)

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

Solve. Write the sum as a mixed number. Draw a model if needed.

$\frac{4}{6} + \frac{2}{3} = \frac{4}{6} + \frac{4}{6} = \frac{8}{6} = 1\frac{2}{6}$

$\frac{8}{6}$ = $\frac{6}{6}$, $\frac{2}{6}$

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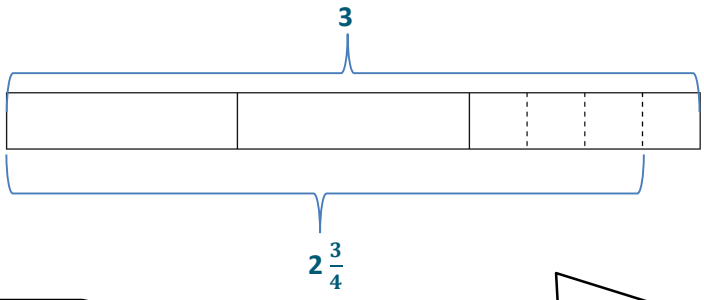
G4-M5-Lesson 22: Add a fraction less than 1 to, or subtract a fraction less than 1 from, a whole number using decomposition and visual models.

Draw a tape diagram to match each number sentence. Then, complete the number sentence.

$3 - \frac{1}{4} = \_\_\_\_\_$

$3 - \frac{1}{4} = 2\frac{3}{4}$



My number sentence shows that $2\frac{3}{4}$ is remaining after I subtract $\frac{1}{4}$

My tape diagrams shows I decomposed a 1 into 4 fourths so I could subtract 1 fourth.

Use the following three numbers to write two subtraction and two addition number sentences.

This is like the relationship between 1, 2 and 3. 1+2=3. 2+1=3. 3-1=2. 3-2=1.

$\frac{4}{7}$, 9, $8\frac{3}{7}$

$\frac{4}{7} + 8\frac{3}{7} = 9$

$8\frac{3}{7} + \frac{4}{7} = 9$

$9 - \frac{4}{7} = 8\frac{3}{7}$

$9 - 8\frac{3}{7} = \frac{4}{7}$

Fact families are 3 sets of numbers that can be written as 2 addition and 2 subtraction number sentences.

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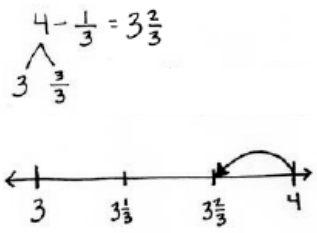
Solve using a number bond. Draw a number line to represent each number sentence. The first one has been done for you.

The number bond shows that I decomposed one of my ones into $\frac{3}{3}$ so I can subtract $\frac{1}{3}$.

a. $4 - \frac{1}{3} = 3\frac{2}{3}$



I only need a number line that goes from 3 to 4 because I am starting at 4 and just going back $\frac{1}{3}$. My number line shows that I counted back $\frac{1}{3}$ from 4 and stopped at $3\frac{2}{3}$.

Complete the subtraction sentences using number bonds.

$6 - \frac{6}{8} =$ _____

5 $\frac{8}{8}$

$\frac{8}{8} - \frac{6}{8} = \frac{2}{8}$

$6 - \frac{6}{8} = 5\frac{2}{8}$

The number bond shows that I decomposed one of my ones into $\frac{8}{8}$ to subtract $\frac{6}{8}$. I have 5 and $\frac{2}{8}$ remaining.

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G4-M5-Lesson 23: Add and multiply unit fractions to build fractions greater than 1 using visual models.

Circle any fractions that are equivalent to a whole number. Record the whole number below the fraction

Count by 1 thirds. Start at 0 thirds. End at 6 thirds.

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

0 1 2

I know that 3 thirds equals 1 whole. 6 thirds would equal 2 wholes.

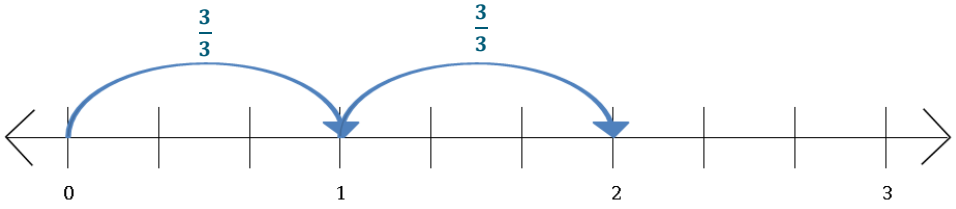
Use parentheses to show how to make ones in the following number sentence.

$$\left[\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}\right] + \left[\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}\right] + \left[\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4}\right] = 3$$

The denominator (fourths) tells me how many unit fractions to group to make a whole.

Multiply as shown below. Draw a number line to support your answer.

$6 \times \frac{1}{3} =$



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

My number line shows that 6 copies of 1 third

equals 2 copies of 3 thirds

and it also equals 2 wholes.

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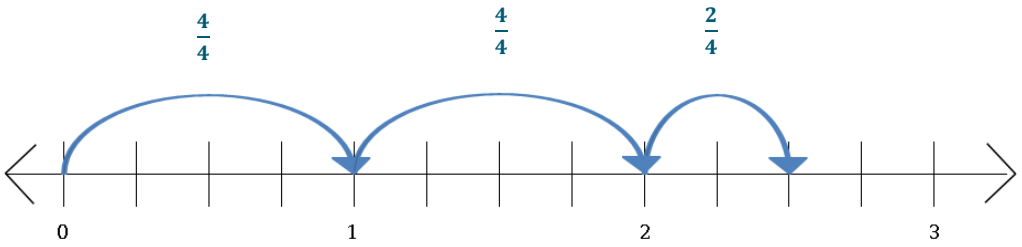
Multiply, as shown below. Write the product as a mixed number. Draw a number line to support your answer.

$10 \times \frac{1}{4}$



$$\mathbf{10 \times \frac{1}{4} = 2 \times \frac{4}{4} + \frac{2}{4} = 2 + \frac{2}{4} = 2\frac{2}{4}}$$

My number line shows that 10 copies of 1 fourth

equals 2 copies of 4 fourths plus 2 fourths

and it also equals 2 + 2 fourths. The mixed number $2\frac{2}{4}$ is another way to write 2 + 2 fourths.

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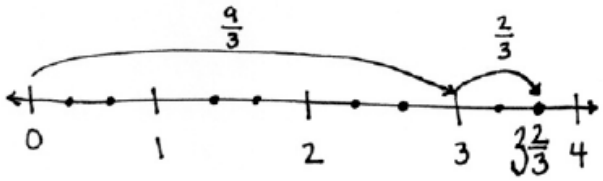
G4-M5-Lesson 24: Decompose and compose fractions greater than 1 to express them in various forms.

Rename each fraction as a mixed number by decomposing it into two parts as shown below. Model the decomposition with a number line and a number bond.

$\frac{11}{3}$

$\frac{11}{3} = \frac{9}{3} + \frac{2}{3} = 3 + \frac{2}{3} = 3\frac{2}{3}$

$\frac{9}{3}$ $\frac{2}{3}$



I used a number bond to break out $\frac{9}{3}$ because $\frac{9}{3}$ is 3 groups of $\frac{3}{3}$ or 3 wholes.

The other part to make $\frac{11}{3}$ is $\frac{2}{3}$. So my equation shows that I have $3 + \frac{2}{3}$ or $3\frac{2}{3}$.

The number line shows that $3\frac{2}{3}$ is equal to $\frac{11}{3}$. The top labels show that $\frac{9}{3} + \frac{2}{3}$ is $\frac{11}{3}$ and the bottom labels show that same point could also be named as $3\frac{2}{3}$.

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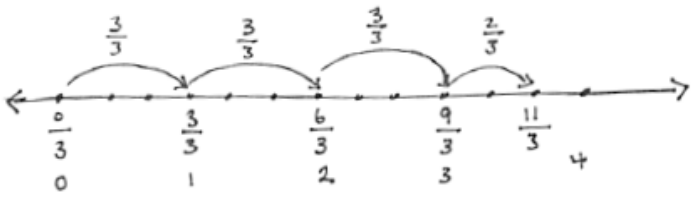
Multiply as shown below. Draw a number line to support your answer.

$\frac{11}{3}$

$\frac{11}{3} = \frac{3 \times 3}{3} + \frac{2}{3} = 3 + \frac{2}{3} = 3\frac{2}{3}$



In this work I am thinking about the part that's $\frac{9}{3}$ as being 3 copies of $\frac{3}{3}$. This helps me recognize that $\frac{9}{3}$ is 3 wholes.

The other part to make $\frac{11}{3}$ is $\frac{2}{3}$. So my equation shows that I have $3 + \frac{2}{3}$ or $3\frac{2}{3}$.

My number line shows each of the groups of $\frac{3}{3}$ I made out of the $\frac{11}{3}$. Each group of $\frac{3}{3}$ is a whole. When I get to $\frac{9}{3}$ another group of $\frac{3}{3}$ would take me beyond $\frac{11}{3}$. I just need $\frac{2}{3}$ more to get to $\frac{11}{3}$ or $3\frac{2}{3}$.

Convert each fraction to a mixed number.

$\frac{14}{3}$

$\frac{14}{3} = \frac{4 \times 3}{3} + \frac{2}{3} = 4 + \frac{2}{3} = 4\frac{2}{3}$

I can make 4 groups of $\frac{3}{3}$ from $\frac{12}{3}$.

The other part of the $\frac{14}{3}$ is $\frac{2}{3}$.

So when I convert $\frac{14}{3}$ into a mixed number I get $4\frac{2}{3}$.

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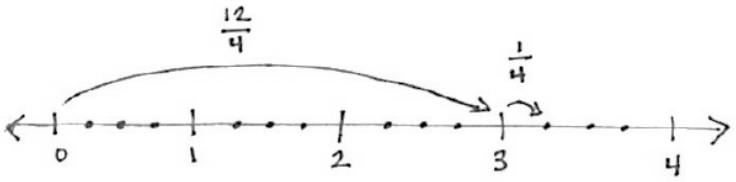
G4-M5-Lesson 25: Decompose and compose fractions greater than 1 to express them in various forms.

Convert each mixed number to a fraction greater than 1. Draw a number line to model your work.

In Lesson 24 we converted fractions greater than 1 into mixed numbers. In this lesson we are going from a mixed number to a fraction greater than 1. We need to be able to flexibly shift the form of the number to express the same value as either a mixed number or a fraction greater than 1.

a. $3\frac{1}{4}$



$3\frac{1}{4} = 3 + \frac{1}{4} = \frac{12}{4} + \frac{1}{4} = \frac{13}{4}$

I have $3 + \frac{1}{4}$. There are 12 fourths in 3 wholes. When I combine the 12 fourths with the 1 fourth, I get at total of 13 fourths.

The number line shows that $3\frac{1}{4}$ is equal to $\frac{13}{4}$. The top labels show that $\frac{12}{4} + \frac{1}{4}$ is $\frac{13}{4}$ and the bottom labels show that same point could also be named as $3\frac{1}{4}$.

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Convert each mixed number to a fraction greater than 1. Show your work as in the example.

This note reminds me that $3 \times \frac{4}{4}$ is just another way to show $\frac{3\times4}{4}$ or 3 copies of $\frac{4}{4}$.

(Note: $3 \times \frac{4}{4} = \frac{3 \times 4}{4}$)

$3\frac{3}{4}$

$3\frac{3}{4} = 3 + \frac{3}{4} = \left(3 \times \frac{4}{4}\right) + \frac{3}{4} = \frac{12}{4} + \frac{3}{4} = \frac{15}{4}$

When I take $3 \times \frac{4}{4}$ I find that there are $\frac{12}{4}$ in 3 wholes. I combine $\frac{12}{4}$ with the $\frac{3}{4}$ to see that there are a total of $\frac{15}{4}$ in $3\frac{3}{4}$.

Convert each mixed number to a fraction greater than 1.

$5\frac{2}{3}$

$5 + \frac{2}{3} = \frac{15}{3} + \frac{2}{3} = \frac{17}{3}$

I have 5 groups of $\frac{3}{3}$ in 5 which is $\frac{15}{3}$.

I combine the number of thirds in 5 wholes and $\frac{2}{3}$ to get a total of $\frac{17}{3}$.

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