Module Overview

Topic A: Equivalent Fractions

Topic B: Fraction Addition and Subtraction: Making Like Units Pictorially

Topic C: Fraction Addition and Subtraction: Making Like Units Numerically

Topic D: Fraction Addition and Subtraction: Further Applications

Supplemental Materials

Module Assessments
Lesson 1 Worksheet

NYS COMMON CORE MATHEMATICS CURRICULUM

Lesson 1: Making Equivalent Fractions with the Number Line, Area Model, and with Numbers

Date: 11/28/12

© 2012 Common Core, Inc. All rights reserved. commoncore.org

Name __________________________ Date __________________

Equivalent Fractions

1. Use your folded paper strip to mark the points 0 and 1 above the number line \( \frac{0}{2}, \frac{1}{2}, \frac{2}{2} \) below.

Draw one vertical line down the middle of each rectangle, creating two parts. Shade the left half of each. Partition with horizontal lines to show the equivalent fractions \( \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10} \). Use multiplication to show the change in the units.

\[
\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}
\]

2. Use your folded paper strip to mark the points 0 and 1 above the number line \( \frac{0}{3}, \frac{1}{3}, \frac{2}{3}, \frac{3}{3} \) below. Follow the same pattern as question #1 but with thirds.

\[
\frac{1}{3} = \frac{1 \times 3}{3 \times 3} = \frac{3}{9}
\]
3. Continue the pattern with 3 fourths.

1. Estimate to mark the points 0 and 1 above the number line below. Use the squares below to represent fractions equivalent to 1 sixth using both arrays and equations.

\[ \frac{1}{6} = \frac{1 \times 2}{6 \times 2} = \frac{3}{9} \]
1. Use your folded paper strip to mark the points 0 and 1 above the number line below.

Draw two vertical lines to break each rectangle into thirds. Shade the left third of each. Partition with horizontal lines to show equivalent fractions. Use multiplication to show the change in the units.

\[
\frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{2}{6}
\]

2. Use your folded paper strip to mark the points 0 and 1 above the number line below.

Follow the same pattern as question #1 but with fourths.
3. Continue the pattern with 4 fifths.

4. Continue the process with 9 eighths. Estimate to make the points on the number line. Just do 2 examples.
1) Show each expression on a number line. Solve.

a) $\frac{2}{5} + \frac{1}{5}$

b) $\frac{1}{3} + \frac{1}{3} + \frac{1}{3}$

c) $\frac{3}{10} + \frac{3}{10} + \frac{3}{10}$

d) $2 \times \frac{3}{4} + \frac{1}{4}$

2) Express each fraction as the sum of two or three equal fractional parts. Rewrite each as a multiplication equation. Show letter a) on a number line.

a) $\frac{6}{7}$

b) $\frac{9}{2}$

c) $\frac{12}{10}$

d) $\frac{27}{5}$
3) Express each of the following as the sum of a whole number and a fraction. Show c) and d) on number lines.

a) $\frac{9}{7}$

b) $\frac{9}{2}$

c) $\frac{32}{7}$

d) $\frac{24}{9}$

4) Marisela cut four equivalent lengths of ribbon. Each was $\frac{5}{8}$ of a yard long. How many yards of fabric did she cut? Express your answer as the sum of a whole number and the remaining fractional units. Draw a number line to represent the problem.
1) Show each expression on a number line. Solve.

   a) \( \frac{5}{5} + \frac{2}{5} \)

   b) \( \frac{6}{3} + \frac{2}{3} \)

2) Express each fraction as the sum of two or three equal fractional parts. Rewrite each as a multiplication equation. Show letter b) on a number line.

   a) \( \frac{6}{9} \)

   b) \( \frac{15}{4} \)
1) Show each expression on a number line. Solve.

a) \( \frac{4}{9} + \frac{1}{9} \)

b) \( \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} \)

c) \( \frac{2}{7} + \frac{2}{7} + \frac{2}{7} \)

d) \( 2 \times \frac{3}{5} + \frac{1}{5} \)

2) Express each fraction as the sum of two or three equal fractional parts. Rewrite each as a multiplication equation. Show letter a on a number line.

a) \( \frac{6}{11} \)

b) \( \frac{9}{4} \)

c) \( \frac{12}{8} \)

d) \( \frac{27}{10} \)
3) Express each of the following as the sum of a whole number and a fraction. Show c) and d) on number lines.

a) \( \frac{9}{5} \)  
b) \( \frac{7}{2} \)  

\[
\frac{25}{7} \\
\frac{21}{9}
\]

4) Natalie sawed five boards of equal length to make a stool. Each was 9 tenths of a meter long. How many meters of board did she saw? Express your answer as the sum of a whole number and the remaining fractional units. Draw a number line to represent the problem.
Lesson 3 Worksheet

Name ________________________________ Date __________________

1. For the following problems, draw a picture using the rectangular fraction model and write the answer. Simplify your answer.

   a) \[ \frac{1}{2} + \frac{1}{3} = \]

   b) \[ \frac{1}{3} + \frac{1}{5} = \]

   c) \[ \frac{1}{4} + \frac{1}{3} = \]

   d) \[ \frac{1}{3} + \frac{1}{7} = \]

   e) \[ \frac{3}{4} + \frac{1}{5} = \]

   f) \[ \frac{2}{3} + \frac{2}{7} = \]
Solve the following problems. Draw a picture and/or write the number sentence that proves the answer. Simplify your answer.

2. Jamal used $\frac{1}{3}$ yard of ribbon to tie a package and $\frac{1}{6}$ yard of ribbon to tie a bow. How many yards of ribbon did Jamal use?

3. Over the weekend, Nolan drank $\frac{1}{6}$ quart of orange juice, and Andrea drank $\frac{3}{4}$ quart of orange juice. How many quarts did they drink together?

4. Nadia spent $\frac{1}{4}$ of her money on a shirt and $\frac{2}{5}$ of her money on new shoes. What fraction of Nadia’s money has been spent? What fraction of her money is left?
Solve by drawing the rectangular fraction model.

1. \[ \frac{1}{2} + \frac{1}{5} = \]

2. In one hour, Ed used \( \frac{2}{5} \) of the time to complete his homework and \( \frac{1}{4} \) of the time to check his email. How much time did he spend completing homework and checking email? Write your answer as a fraction. (Bonus: write the answer in minutes.)
1. For the following problems, draw a picture using the rectangular fraction model and write the answer. Simplify your answer.

a) \( \frac{1}{4} + \frac{1}{3} = \)

b) \( \frac{1}{4} + \frac{1}{5} = \)

c) \( \frac{1}{4} + \frac{1}{6} = \)

d) \( \frac{1}{5} + \frac{1}{9} = \)

e) \( \frac{1}{4} + \frac{2}{5} = \)

f) \( \frac{3}{5} + \frac{3}{7} = \)
Solve the following problems. Draw a picture and/or write the number sentence that proves the answer.

2. Rajesh jogged $\frac{3}{4}$ mile, and then walked $\frac{1}{6}$ mile to cool down. How far did he travel?

3. Cynthia completed $\frac{2}{3}$ of the items on her to-do list in the morning, and finished $\frac{1}{8}$ of the items during her lunch break. How much of her to-do list is finished by the end of her lunch break? (Bonus: How much of her to-do list does she still have to do after lunch?)

4. Sam read $\frac{2}{5}$ of her book over the weekend, and $\frac{1}{6}$ of it on Monday. What fraction of the book has she read? What fraction of the book is left?
1) For the following problems, draw a picture using the rectangular fraction model and write the answer. When possible, write your answer as a mixed number.

   a) $\frac{2}{3} + \frac{1}{2} = \quad$  
   b) $\frac{3}{4} + \frac{2}{3} = \quad$

   c) $\frac{1}{2} + \frac{3}{5} = \quad$  
   d) $\frac{5}{7} + \frac{1}{2} = \quad$

   e) $\frac{3}{4} + \frac{5}{6} = \quad$  
   f) $\frac{2}{3} + \frac{3}{7} = \quad$
Solve the following problems. Draw a picture and/or write the number sentence that proves the answer. Simplify your answer.

2) Penny used \(\frac{2}{5}\) lb of flour to bake a vanilla cake. She used another \(\frac{3}{4}\) lb of flour to bake a chocolate cake. How much flour did she use altogether?

3) Carlos wants to practice piano 2 hours each day. He practices piano for \(\frac{3}{4}\) hour before school and \(\frac{7}{10}\) hour when he gets home. How many hours has Carlos practiced piano? How much longer does he need to practice before going to bed in order to meet his goal?
Draw a model to help solve the following problems. Write your answer as a mixed number.

1. \[ \frac{5}{6} + \frac{1}{4} = \]

2. Patrick drank \( \frac{3}{4} \) liter of water Monday before going jogging. He drank \( \frac{4}{5} \) liter of water after his jog. How much water did Patrick drink altogether? Write your answer as a mixed number.
1) Directions: For the following problems, draw a picture using the rectangular fraction model and write the answer. When possible, write your answer as a mixed number.

a) \( \frac{3}{4} + \frac{1}{3} = \)

b) \( \frac{3}{4} + \frac{2}{3} = \)

c) \( \frac{1}{3} + \frac{3}{5} = \)

d) \( \frac{5}{6} + \frac{1}{2} = \)

e) \( \frac{2}{3} + \frac{5}{6} = \)

f) \( \frac{4}{3} + \frac{4}{7} = \)
Solve the following problems. Draw a picture and/or write the number sentence that proves the answer. Simplify your answer.

2) Sam made \(\frac{2}{3}\) liter of punc, and \(\frac{3}{4}\) liter of tea to take to a party. How many liters of beverages did Sam bring to the party?

3) Mr. Sinofsky used \(\frac{5}{8}\) of a tank of gas on a trip to visit relatives for the weekend and another half of a tank commuting to work the next week. He then took another weekend trip and used \(\frac{1}{4}\) tank of gas. How many tanks of gas did Mr. Sinofsky use altogether?
Lesson 5: Subtract Fractions with Unlike Units Using the Strategy of Creating Equivalent Fractions

Name ___________________________ Date ________________________

1) For the following problems, draw a picture using the rectangular fraction model and write the answer. Simplify your answer.

a) \( \frac{1}{3} - \frac{1}{4} = \) 

b) \( \frac{2}{3} - \frac{1}{2} = \)

c) \( \frac{5}{6} - \frac{1}{4} = \)

d) \( \frac{2}{3} - \frac{1}{7} = \)

e) \( \frac{3}{4} - \frac{3}{8} = \)

f) \( \frac{3}{4} - \frac{2}{7} = \)
2) Mr. Penman had 2/3 liter of salt water. He used 1/5 of a liter for an experiment. How much salt water does Mr. Penman have left?

3) Sandra says that $\frac{4}{7} - \frac{1}{3} = \frac{3}{4}$ because all you have to do is subtract the numerators and subtract the denominators. Convince Sandra that she is wrong. You may draw a rectangular fraction model to help.
Name ________________________________ Date __________________

Directions: Draw a model, write a subtraction sentence with like units, and circle your answer for each subtraction problem.

1. \( \frac{1}{2} - \frac{1}{7} = \)

2. \( \frac{3}{5} - \frac{1}{2} = \)
1) The picture shows 3/4 of the square shaded. Use the picture to show how to create equal fractions with like units that would allow you to subtract 1/3, and then find the difference.

\[
\frac{3}{4} - \frac{1}{3} =
\]

2) Find the difference. Use a rectangular fraction model to show how to convert to fractions with common denominators.

a. \[
\frac{5}{6} - \frac{1}{3} =
\]

b. \[
\frac{2}{3} - \frac{1}{2} =
\]

c. \[
\frac{5}{6} - \frac{1}{4} =
\]

d. \[
\frac{4}{5} - \frac{1}{2} =
\]

e. \[
\frac{2}{3} - \frac{2}{5} =
\]

f. \[
\frac{5}{7} - \frac{2}{3} =
\]
3) Robin used $\frac{1}{4}$ pound of butter to make a cake. Afterward she had $\frac{5}{8}$ of a pound left. How much butter did she have at first?

4) Katrina needs $\frac{3}{5}$ kilogram of flour for a recipe. Her mother has $\frac{3}{7}$ kilogram in her pantry. Is this enough flour to make the recipe? If not, how much more will she need?
For the following problems, draw a picture using the rectangular fraction model and write the answer. Simplify your answer.

a) $1\frac{1}{4} - \frac{1}{3} =$ 

b) $1\frac{1}{5} - \frac{1}{3} =$ 

c) $1\frac{3}{8} - \frac{1}{2} =$ 

d) $1\frac{2}{5} - \frac{1}{2} =$ 

e) $1\frac{2}{7} - \frac{1}{3} =$ 

f) $1\frac{2}{3} - \frac{3}{5} =$
2) Jean-Luc jogged around the lake in 1 1/4 hour. William jogged the same distance in 5/6 hour. How much longer did Jean-Luc take than William in hours? How many more minutes?

3) Is it true that \( \frac{2}{5} - \frac{3}{4} = \frac{1}{4} + \frac{2}{5} \)? Prove your answer.
For the following problems, draw a picture using the rectangular fraction model and write the answer. Simplify your answer.

1. \( \frac{1}{5} - \frac{1}{2} = \)

2. \( \frac{1}{3} - \frac{5}{6} = \)
1) Find the difference. Use a rectangular fraction model to show how to convert to fractions with common denominators.

a) \( 1 - \frac{5}{6} = \)
b) \( \frac{3}{2} - \frac{5}{6} = \)

c) \( \frac{4}{3} - \frac{5}{7} = \)
d) \( \frac{1}{8} - \frac{3}{5} = \)

e) \( 1\frac{2}{5} - \frac{3}{4} = \)
f) \( 1\frac{5}{6} - \frac{7}{8} = \)

g) \( 1\frac{2}{7} - \frac{3}{4} = \)
h) \( 1\frac{3}{12} - \frac{2}{3} = \)
2) Sam had 1 1/2 m of rope. He cut off 5/8 m and used it for a project. How much rope does Sam have left?

3) Jackson had 1 3/8 kg of fertilizer. He used some to fertilize a flower bed and he only had 2/3 kg left. How much fertilizer was used in the flower bed?
Solve the word problems using the RDW strategy. Show all your work.

1) George weeded 2/5 of the garden and Tiffany weeded some, too. When they were finished, 4/15 of the garden still needed to be weeded. What fraction of the garden did Tiffany weed?

2) Leonard spent 2 times as much on a gift for his brother as on some comic books. He spent 1/4 of his money on a sandwich. If he had 3/8 of his money left, what fraction of his money did he spend on the comic books?

3) Jing spent 1/3 of her money on a pack of pens, 1/2 of her money on a pack of markers, and 1/6 of her money on a pack of pencils. What fraction of Jing’s money has been spent? What fraction of her money is left?
4) Shelby bought 2 cans of blue paint. She used $\frac{2}{3}$ of a can painting flowers. Then Aaron used $\frac{3}{5}$ of a can for his model car. After painting a picture of the sky, Shelby has $\frac{2}{15}$ of a can left. How much paint did Shelby use for her picture of the sky?

5) Jim sold $\frac{3}{4}$ gallon of lemonade. Dwight sold some lemonade too. Together they sold $1 \frac{5}{12}$ gallons. Who sold more lemonade, Jim or Dwight? How much more?
Name ____________________________ Date ____________________

Solve the word problem using the RDW strategy. Show all your work.

1. Mr. Pham mowed 2/7 of a lawn. His son mowed 1/4 of it. Who mowed the most? How much of the lawn still needs to be mowed?
Lesson 7 Homework

Name _______________________________ Date __________

Solve the word problem using the RDW strategy. Show all your work.

1. Christine baked a pumpkin pie. She ate $\frac{1}{6}$ of the pie. Her brother ate $\frac{1}{3}$ of it, and gave the left overs to his friends. What fraction of the pie did he give to his friends?

2. Liang went to the bookstore. He spent $\frac{1}{3}$ of his money on a pen and $\frac{4}{7}$ of it on books. What fraction of his money did he have left?

3. Tiffany bought $\frac{2}{5}$ kg of cherries. Linda bought $\frac{1}{10}$ kg of cherries less than Tiffany. How many kg of cherries did they buy altogether?
4. Mr. Rivas bought a can of paint. He used $\frac{3}{8}$ of it to paint a bookshelf. He used $\frac{1}{4}$ of it to paint a wagon. He used some of it to paint a birdhouse, and have $\frac{1}{8}$ of paint left. How much paint did he use for the birdhouse?

5. Ribbon A is $\frac{1}{3}$ m long. It is $\frac{2}{5}$ m shorter than ribbon B. What's the total length of two ribbons?
Lesson 8: Add Fractions to and Subtract Fractions from Whole Numbers Using Equivalence and the Number Line as Strategies

Name __________________________________________ Date _______________________

1) Add or Subtract.

a) \(2 + 1\frac{1}{5} = \)

b) \(2 - 1\frac{3}{8} = \)

c) \(5\frac{2}{5} + 2\frac{3}{5} = \)

d) \(4 - 2\frac{2}{7} = \)

e) \(9\frac{3}{4} + 8 = \)

f) \(17 - 15\frac{2}{3} = \)

g) \(15 + 17\frac{2}{3} = \)

h) \(100 - 20\frac{7}{8} = \)

2) Calvin had 30 minutes in time-out. For the first 23 1/3 minutes, Calvin counted spots on the ceiling. For the rest of the time he made faces at his stuffed tiger. How long did Calvin spend making faces at his tiger?
3) Linda planned to spend 9 hours practicing piano this week. By Tuesday, she had spent 2 ½ hours practicing. How much longer does she need to practice to reach her goal?

4) Gary says that $3 - 1\frac{1}{3}$ will be more than 2, since $3 - 1$ is 2. Draw a picture to prove that Gary is wrong.
Name ____________________________________________ Date ____________________

Directions: Add or Subtract.

1) $5 + \frac{7}{8} =$

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

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

4) $4 - \frac{3}{7} =$
Lesson 8 Homework

Name ____________________________ Date ____________________________

1) Add or Subtract.

   a) \(3 + 1\frac{1}{4} =\)

   b) \(2 - 1\frac{5}{8} =\)

   c) \(5\frac{2}{5} + 2\frac{3}{5} =\)

   d) \(4 - 2\frac{5}{7} =\)

   e) \(18 - 15\frac{3}{4} =\)

   f) \(16 + 18\frac{5}{6} =\)

   g) \(100 - 50\frac{3}{8} =\)

2) The total length of two ribbons is 13 meters. If one ribbon is \(7\frac{5}{8}\) meters long, what is the length of the other ribbon?
3) It took Sandy two hours to jog 13 miles. She ran $7 \frac{1}{2}$ miles in the first hour. How far did she run during the second hour?

4) Andre says that $5 \frac{3}{4} + 2 \frac{1}{4} = 7 \frac{1}{2}$ because $\frac{7}{8} = \frac{7}{2}$. Identify his mistake. Draw a picture to prove that he is wrong.
1) First make like units. Then add.

a) \( \frac{3}{4} + \frac{1}{7} = \)  

b) \( \frac{1}{4} + \frac{9}{8} = \)

c) \( \frac{3}{8} + \frac{3}{7} = \)  

d) \( \frac{4}{9} + \frac{4}{7} = \)

e) \( \frac{1}{5} + \frac{2}{3} = \)  

f) \( \frac{3}{4} + \frac{5}{6} = \)

g) \( \frac{2}{3} + \frac{1}{11} = \)  

h) \( \frac{3}{4} + 1 \frac{1}{10} = \)
2) Whitney says that to add fractions with different denominators, you always have to multiply the denominators to find the common unit, for example:

\[
\frac{1}{4} + \frac{1}{6} = \frac{6}{24} + \frac{4}{24}
\]

Show Whitney how she could have chosen a denominator smaller than 24, and solve the problem.

3) Jackie brought \( \frac{3}{4} \) of a gallon of iced tea to the party. Bill brought \( \frac{7}{8} \) of a gallon of iced tea to the same party. How much iced tea did Jackie and Bill bring to the party?

4) Madame Curie made some radium in her lab. She used \( \frac{2}{5} \) kg of the radium in an experiment and had \( 1 \frac{1}{4} \) kg left. How much radium did she have at first? (Bonus: If she performed the experiment twice, how much radium would she have left?)
Name ___________________________________________   Date ________________

Make like units, then add.

1. \[ \frac{1}{6} + \frac{3}{4} = \]

2. \[ 1\frac{1}{2} + \frac{2}{5} = \]
1. Make like units, then add. Use an equation to show your thinking.

a) \( \frac{3}{5} + \frac{1}{3} = \)  

b) \( \frac{3}{5} + \frac{1}{11} = \)  

c) \( \frac{2}{9} + \frac{5}{6} = \)  

d) \( \frac{2}{5} + \frac{1}{4} + \frac{1}{10} = \)  

e) \( \frac{1}{3} + \frac{7}{5} = \)  

f) \( \frac{5}{8} + \frac{7}{12} = \)  

g) \( 1 \frac{1}{3} + \frac{3}{4} = \)  

h) \( \frac{5}{6} + 1 \frac{1}{4} = \)
2. On Monday, Ka practices guitar for \(\frac{2}{3}\) of one hour. When she’s finished, she practices piano for \(\frac{3}{4}\) of one hour. How much time did Ka spend practicing instruments on Monday?

3. Ms. How buys a bag of rice to cook dinner. She used \(\frac{3}{5}\) kg of rice and still had \(2\frac{1}{4}\) kg left. How heavy was the bag of rice that Ms. How bought?

4. Joe spends \(\frac{2}{5}\) of his money on a jacket and \(\frac{3}{8}\) of his money on a shirt. He spends the rest on a pair of pants. What fraction of his money does he use to buy the pants?
Name ___________________________________________ Date ______________________

1) Add.

   a) \(2 \frac{1}{4} + 1 \frac{1}{5} = \)

   b) \(2 \frac{3}{4} + 1 \frac{2}{5} = \)

   c) \(1 \frac{1}{5} + 2 \frac{1}{3} = \)

   d) \(4 \frac{2}{3} + 1 \frac{2}{5} = \)

   e) \(3 \frac{1}{3} + 4 \frac{5}{7} = \)

   f) \(2 \frac{5}{7} + 5 \frac{2}{3} = \)

   g) \(15 \frac{1}{5} + 3 \frac{5}{8} = \)

   h) \(15 \frac{5}{8} + 5 \frac{2}{5} = \)
2) Erin jogged $\frac{1}{4}$ miles on Monday. Wednesday she jogged $\frac{3}{3}$ miles, and on Friday she jogged $\frac{2}{3}$ miles. How far did Erin jog altogether?

3) Darren bought some paint. He used $\frac{3}{4}$ gallons painting his living room. After that, he had $\frac{5}{6}$ gallons left. How much paint did he buy?

4) Clayton says that $\frac{1}{2} + \frac{3}{5}$ will be more than 5 but less than 6 since $2 + 3$ is 5. Is Clayton’s reasoning correct? Prove him right or wrong.
Solve the problems.

1) \( \frac{3}{2} + \frac{1}{3} = \)

2) \( \frac{4}{7} + \frac{3}{4} = \)
Lesson 10 Homework

1) Add.

a) \( \frac{1}{2} + \frac{1}{5} = \)

b) \( \frac{2}{3} + \frac{1}{5} = \)

c) \( \frac{1}{5} + \frac{3}{3} = \)

d) \( \frac{2}{3} + \frac{3}{5} = \)

e) \( \frac{1}{3} + \frac{4}{7} = \)

f) \( \frac{5}{7} + \frac{4}{3} = \)

g) \( 15 \frac{1}{5} + \frac{3}{8} = \)

h) \( 18 \frac{3}{8} + \frac{2}{5} = \)
2) Angela practiced piano for $2 \frac{1}{2}$ hours on Friday, $2 \frac{1}{3}$ hours on Saturday, and $3 \frac{2}{3}$ hours on Sunday. How much time did Angela practice piano during the weekend?

3) String A is $3 \frac{5}{6}$ meters long. String B is $2 \frac{3}{4}$ long. What’s the total length of both strings?

4) Matt says that $5 - 1 \frac{1}{4}$ will be more than 4, since $5 - 1$ is 4. Draw a picture to prove that Matt is wrong.
1) Generate equivalent fractions to get the same unit, then subtract.

a) \( \frac{1}{2} - \frac{1}{3} = \)

b) \( \frac{7}{10} - \frac{1}{3} = \)

c) \( \frac{7}{8} - \frac{3}{4} = \)

d) \( 1\frac{2}{5} - \frac{3}{8} = \)

e) \( 1\frac{3}{10} - \frac{1}{6} = \)

f) \( 2\frac{1}{3} - 1\frac{1}{5} = \)

g) \( 5\frac{6}{7} - 2\frac{2}{3} = \)

h) Draw a number line to show your answer to (g) is reasonable.
2) George says that to subtract fractions with different denominators, you always have to multiply the denominators to find the common unit, for example:

\[
\frac{3}{8} - \frac{1}{6} = \frac{18}{48} - \frac{8}{48}
\]

Show George how he could have chosen a denominator smaller than 48, and solve the problem.

3) Meiling has \(1 \frac{1}{4}\) liter of orange juice. She drinks \(\frac{1}{3}\) liter. How much orange juice does she have left? (Bonus: If her brother then drinks twice as much as Meiling, how much is left?)

4) Harlan used \(3 \frac{1}{2}\) kg of sand to make a large hourglass. To make a small hourglass he only used \(1 \frac{3}{7}\) kg of sand. How much more sand does it take to make the large hourglass than the small one?
Find the common unit and then subtract.

1. \( \frac{3}{4} - \frac{3}{10} = \)

2. \( 3 \frac{1}{2} - 1 \frac{1}{3} = \)
Lesson 11 Homework

Name ___________________________ Date ________________

1) First find a common unit, then subtract.

a. \( \frac{1}{2} - \frac{1}{5} = \)

b. \( \frac{7}{8} - \frac{1}{3} = \)

c. \( \frac{7}{10} - \frac{3}{5} = \)

d. \( 1\frac{5}{6} - \frac{2}{3} = \)

e. \( 2\frac{1}{4} - 1\frac{1}{5} = \)

f. \( 5\frac{6}{7} - 3\frac{2}{3} = \)

g. \( 15\frac{7}{8} - 5\frac{3}{4} = \)

h. \( 15\frac{5}{8} - 3\frac{1}{3} = \)
2) Sandy ate $\frac{1}{6}$ of a candy bar. John ate $\frac{3}{4}$ of it. How much more of the candy bar did John eat than Sandy?

3) $4\frac{1}{2}$ yards of cloth are needed to make a woman’s dress. $2\frac{2}{7}$ yards of cloth are needed to make a girl’s dress. How much more cloth is needed to make a woman’s dress than a girl’s dress?

4) Bill reads $\frac{1}{5}$ of a book on Monday. He reads $\frac{2}{3}$ of the book on Tuesday. If he finishes reading the book on Wednesday, what fraction of the book did he read on Wednesday?

5) Tank A has a capacity of 9.5 gallons. $6\frac{1}{3}$ gallons of the tank’s water are poured out. How much water is left in the tank?
1) Subtract.

a) $3\frac{1}{5} - 2\frac{1}{4} =$

b) $4\frac{2}{5} - 3\frac{3}{4} =$

c) $7\frac{1}{5} - 4\frac{1}{3} =$

d) $7\frac{2}{5} - 5\frac{2}{3} =$

e) $4\frac{2}{7} - 3\frac{1}{3} =$

f) $9\frac{2}{3} - 2\frac{6}{7} =$

g) $17\frac{2}{3} - 5\frac{5}{6} =$

h) $18\frac{1}{3} - 3\frac{3}{8} =$
Lesson 12 Worksheet

2) Toby wrote the following:

\[ \frac{7}{4} - \frac{3}{4} = \frac{4}{2} = \frac{4}{2} \]

Is Toby’s calculation correct? Draw a diagram to support your answer.

3) Mr. Neville Iceguy mixed up \( 12 \frac{3}{5} \) gallons of chili for a party. If \( 7 \frac{3}{4} \) gallons of chili was mild, and the rest was extra spicy, how much extra spicy chili did Mr. N. Iceguy make?

4) Jazmyne determined to spent \( 6 \frac{1}{2} \) hours studying over the weekend. She spent \( 1 \frac{1}{4} \) hours studying on Friday evening and \( 2 \frac{2}{3} \) hours on Saturday. How much longer does she need to spend studying on Sunday in order to reach her goal?
Lesson 12 Exit Ticket

Name _______________________________  Date ___________________________

Solve the problems.

1) \(5 \frac{1}{2} - 1 \frac{1}{3} = \)

2) \(8 \frac{3}{4} - 5 \frac{5}{6} = \)
Name ________________________________________ Date ________________

1) Subtract.
   a) \( 3 \frac{1}{4} - 2 \frac{1}{3} = \)
   b) \( 3 \frac{2}{3} - 2 \frac{3}{4} = \)
   c) \( 6 \frac{1}{5} - 4 \frac{1}{4} = \)
   d) \( 6 \frac{3}{5} - 4 \frac{3}{4} = \)
   e) \( 5 \frac{2}{7} - 4 \frac{1}{3} = \)
   f) \( 8 \frac{2}{3} - 3 \frac{5}{7} = \)
   g) \( 18 \frac{3}{4} - 5 \frac{7}{8} = \)
   h) \( 17 \frac{1}{5} - 2 \frac{5}{8} = \)

2) Tony wrote the following:
   \[
   7 \frac{1}{4} - 3 \frac{3}{4} = 4 \frac{1}{4} - 3 \frac{3}{4}
   \]
   Is Tony’s statement correct? Draw a diagram to support your answer.
3) Ms. Sanger blended $8 \frac{3}{4}$ gallons of iced tea with some lemonade for a picnic. If there were $13 \frac{2}{5}$ gallons in the mixture, how many gallons of lemonade did she use?

4) A carpenter has a $10 \frac{1}{2}$ foot wood plank. He cuts off $4 \frac{1}{4}$ feet to replace the slat of a deck and $3 \frac{2}{3}$ feet to repair a bannister. He uses the rest of the plank to fix a stair. How many feet of wood does the carpenter use to fix the stair?
1) Are the following greater than or less than 1? Circle the correct answer.

a) \( \frac{1}{2} + \frac{2}{7} \)  
greater than 1  
less than 1

b) \( \frac{5}{8} + \frac{3}{5} \)  
greater than 1  
less than 1

c) \( 1\frac{1}{4} - \frac{1}{3} \)  
greater than 1  
less than 1

d) \( 3\frac{5}{8} - 2\frac{5}{9} \)  
greater than 1  
less than 1

2) Are the following greater than or less than \( \frac{1}{2} \)? Circle the correct answer.

a) \( \frac{1}{4} + \frac{2}{3} \)  
greater than \( \frac{1}{2} \)  
less than \( \frac{1}{2} \)

b) \( \frac{3}{7} - \frac{1}{8} \)  
greater than \( \frac{1}{2} \)  
less than \( \frac{1}{2} \)

c) \( 1\frac{1}{7} - \frac{7}{8} \)  
greater than \( \frac{1}{2} \)  
less than \( \frac{1}{2} \)

d) \( \frac{3}{7} + \frac{2}{6} \)  
greater than \( \frac{1}{2} \)  
less than \( \frac{1}{2} \)

3) Use >, <, or = to make the following statements true.

a) \( 5\frac{2}{3} + 3\frac{3}{4} \) _____ \( 8\frac{2}{3} \)

c) \( 5\frac{1}{2} + 1\frac{3}{7} \) _____ \( 6 + \frac{13}{14} \)

b) \( 4\frac{5}{8} - 3\frac{2}{5} \) _____ \( 1\frac{5}{8} + \frac{2}{5} \)

d) \( 15\frac{4}{7} - 11\frac{2}{5} \) _____ \( 4\frac{4}{7} + \frac{2}{5} \)
4) Is it true that $\frac{3}{5} - \frac{2}{3} = 1 + \frac{3}{5} + \frac{2}{3}$? Prove your answer.

5) Jackson needs to be $1\frac{3}{4}$ inches taller in order to ride the roller coaster. Since he can’t wait, he puts on a pair of boots that add $1\frac{1}{6}$ inches to his height, and slips an insole inside to add another $\frac{1}{8}$ inches to his height. Will this make Jackson appear tall enough to ride the roller coaster?

6) A baker needs 5 lbs of butter for a recipe. She found 2 portions that each weigh 1 1/6 lb and a portion that weighs 2 2/7 lb. Does she have enough butter for her recipe?
Name ________________________________ Date ____________________

Circle the correct answer.

1) \( \frac{1}{2} + \frac{5}{12} \) greater than 1 less than 1

2) \( 2 \frac{7}{8} + 1 \frac{2}{9} \) greater than 1 less than 1

3) \( 1 \frac{1}{12} - \frac{7}{10} \) greater than \( \frac{1}{2} \) less than

4) \( \frac{3}{7} + \frac{1}{8} \) greater than \( \frac{1}{2} \) less than \( \frac{1}{2} \)

5) Use >, <, or = to make the following statement true.

\[ \frac{4}{5} + \frac{2}{3} \quad \underline{=} \quad 8 \frac{1}{2} \]
Lesson 13 Homework

1) Are the following greater than or less than 1? Circle the correct answer.
   a) \( \frac{1}{2} + \frac{4}{9} \)  greater than 1  less than 1
   b) \( \frac{5}{8} + \frac{3}{5} \)  greater than 1  less than 1
   c) \( 1\frac{1}{5} - \frac{1}{3} \)  greater than 1  less than 1
   d) \( 4\frac{3}{5} - 3\frac{3}{4} \)  greater than 1  less than 1

2) Are the following greater than or less than \( \frac{1}{2} \)? Circle the correct answer.
   e) \( \frac{1}{5} + \frac{1}{4} \)  greater than \( \frac{1}{2} \)  less than \( \frac{1}{2} \)
   f) \( \frac{6}{7} - \frac{1}{6} \)  greater than \( \frac{1}{2} \)  less than \( \frac{1}{2} \)
   g) \( 1\frac{1}{7} - \frac{5}{6} \)  greater than \( \frac{1}{2} \)  less than \( \frac{1}{2} \)
   h) \( \frac{4}{7} + \frac{1}{8} \)  greater than \( \frac{1}{2} \)  less than \( \frac{1}{2} \)

3) Use >, <, or = to make the following statements true.
   i) \( \frac{5\frac{4}{5} + 2\frac{2}{3}}{3} \)  _____ \( \frac{8}{3} \frac{4}{4} \)
   j) \( \frac{3\frac{4}{7} - 2\frac{3}{5}}{3} \)  _____ \( \frac{1\frac{4}{7} + \frac{3}{5}}{3} \)
   k) \( \frac{4\frac{1}{2} + 1\frac{4}{9}}{3} \)  _____ \( 5 + \frac{13}{18} \)
   l) \( 10\frac{3}{8} - 7\frac{3}{5} \)  _____ \( 3\frac{3}{8} + \frac{3}{5} \)
4) Is it true that \(\frac{2}{3} - \frac{3}{4} = 1 + \frac{2}{3} + \frac{3}{4}\)? Prove your answer.

5) A tree limb hangs \(\frac{1}{4}\) feet from a telephone wire. The city trims back the branch before it grows within \(2\frac{1}{2}\) feet of the wire. Will the city allow the tree to grow \(2\frac{3}{4}\) more feet?

6) Mr. Kreider wants to paint two doors and several shutters. It takes \(2\frac{1}{8}\) gallons of paint to coat each door and \(1\frac{3}{5}\) gallons of paint to coat his shutters. If Mr. Kreider buys three 2-gallon cans of paint, does he have enough to complete the job?
1) Rearrange the terms so that you can add or subtract mentally, then solve.

   a) \( \frac{1}{4} + 2 \frac{2}{3} + \frac{7}{4} + \frac{1}{3} \)

   b) \( 2 \frac{3}{5} - \frac{3}{4} + \frac{2}{5} \)

   c) \( 4 \frac{3}{7} - \frac{3}{4} - 2 \frac{1}{4} - \frac{3}{7} \)

   d) \( \frac{5}{6} + \frac{1}{3} - \frac{4}{3} + \frac{1}{6} \)

2) Fill in the blank to make the statement true.

   a) \( 11 \frac{2}{5} - 3 \frac{2}{3} - \frac{11}{3} = \) ______

   b) \( 11 \frac{2}{8} + 3 \frac{1}{5} - \) ______ = 15

   c) \( \frac{5}{12} - \) ______ + \( \frac{5}{4} = \frac{2}{3} \)

   d) ______ - 30 - \( 7 \frac{1}{4} = 21 \frac{2}{3} \)
e) \( \frac{24}{5} + \_ \_ \_ + \frac{8}{7} = 9 \)  

f) \( 11.1 + 3 \frac{1}{10} - \_ \_ \_ = \frac{99}{10} \)

3) DeAngelo needs 100 lbs of garden soil to landscape a building. In the company’s storage area, he finds 2 cases holding \( 24 \frac{3}{4} \) lbs of garden soil each, and a third case holding \( 19 \frac{3}{8} \) lbs. How much gardening soil does DeAngelo still need in order to do the job?

4) Volunteers helped clean up 8.2 kg of trash in one neighborhood and 11 \( \frac{3}{4} \) kg in another. They sent 1 \( \frac{1}{4} \) kg to be recycled and threw the rest away. How many kilograms of trash did they throw away?
1) \(1 \frac{3}{4} + \frac{1}{6} + \_ = 7 \frac{1}{2}\)

2) \(8 \frac{4}{5} - \frac{2}{3} - \_ = 3 \frac{1}{10}\)
Lesson 14 Homework

Name ____________________________ Date ________________

1) Rearrange the terms so that you can add or subtract mentally, then solve.

   a) \(1 \frac{3}{4} + \frac{1}{2} + \frac{1}{4} + \frac{1}{2}\)

   b) \(3 \frac{1}{6} - \frac{3}{4} + \frac{5}{6}\)

   d) \(5 \frac{5}{8} - 2 \frac{6}{7} - \frac{2}{7} - \frac{5}{8}\)

   d) \(\frac{7}{9} + \frac{1}{2} - \frac{3}{2} + \frac{2}{9}\)

2) Fill in the blank to make the statement true.

   g) \(7 \frac{3}{4} - 1 \frac{2}{7} - \frac{3}{2} = \underline{\hspace{1cm}}\)

   h) \(9 \frac{5}{6} + 1 \frac{1}{4} - \underline{\hspace{1cm}} = 14\)

   i) \(\frac{7}{10} - \underline{\hspace{1cm}} + \frac{3}{2} = \frac{6}{5}\)

   j) \(\underline{\hspace{1cm}} - 20 - 3 \frac{1}{4} = 14 \frac{5}{8}\)

   k) \(\frac{17}{3} + \underline{\hspace{1cm}} + \frac{5}{2} = 10 \frac{4}{5}\)

   l) \(23.1 + 1 \frac{7}{10} - \underline{\hspace{1cm}} = \frac{66}{10}\)
3) Laura bought $8\frac{3}{10}$ yd of ribbon. She used $1\frac{2}{5}$ yd to tie a package and $2\frac{1}{3}$ to make a bow. Joe later gave her $4\frac{3}{5}$ yd. How much ribbon does she now have?

4) Mia bought $10\frac{1}{9}$ lb of flour. She used $2\frac{3}{4}$ lb of flour to bake a banana cake and some to bake a chocolate cake. After baking the two cakes, she had $3\frac{5}{6}$ lb of flour left. How much flour did she use to bake the chocolate cake?
Lesson 15 Worksheet

Solve the word problems using the RDW strategy. Show all your work.

1. In a race, the second place finisher crossed the finish line 1 1/3 minutes after the first place finisher. The third place finisher was 1 3/4 minutes behind the second place finisher. The third place finisher took 34 2/3 minutes. How long did the first place finisher take?

2. John used 1 3/4 kg of salt to melt the ice on his sidewalk. He then used another 3 4/5 kg on the driveway. If he originally bought 10 kg of salt, how much does he have left?

3. Sinister Stan stole 3 3/4 oz of slime from Messy Molly, but his evil plans required 6 3/8 oz of slime. He stole another 2 3/5 oz from Rude Ralph. How much more slime does Sinister Stan need for his evil plan?
4. Gavin went to a book store with $20. He spent $9 \frac{3}{4}$ of his money on a book and $3 \frac{4}{5}$ on a poster. What fraction of his money did he have left? Write the answer in dollars and cents.

5. Matt wants to save 2 \(\frac{1}{2}\) minutes on his 5K race time. After a month of hard training he managed to lower his overall time from 21 \(\frac{1}{5}\) minutes to 19 \(\frac{1}{4}\) minutes. By how many more minutes does Matt need to lower his race time?
Solve the word problems using the RDW strategy. Show all your work.

Cheryl bought a sandwich for \(5\frac{1}{2}\) dollars and a drink for $2.60. If she paid for her meal with a $10 bill, how much money did she have left? Write your answer as a fraction and in dollars and cents.
Solve the word problems using the RDW strategy. Show all your work.

1. A baker buys a 5 lb bag of sugar. She uses $1 \frac{2}{3}$ lb to make some muffins and $2 \frac{3}{4}$ lb to make a cake. How much sugar does she have left?

2. A boxer needs to lose $3 \frac{1}{2}$ kg in a month to be able to compete as a flyweight. In three weeks, he lowers his weight from 55.5 kg to 53.8 kg. How many kg must the boxer lose in the final week to be able to compete as a flyweight?

3. A construction company builds a new rail line from Town A to Town B. They complete $1 \frac{1}{4}$ miles in their first week of work and $1 \frac{2}{3}$ miles in the second week. If they still have $25 \frac{3}{4}$ left to build, what is the distance from Town A to Town B?
4. A catering company needs 8.75 lbs of shrimp for a small party. They buy \(3\frac{2}{3}\) lbs of jumbo shrimp, \(2\frac{5}{8}\) lbs of medium-sized shrimp, and some mini-shrimp. How many pounds of mini shrimp do they buy?

5. Mark breaks up a 9-hour drive into 3 segments. He drives \(2\frac{1}{2}\) hours before stopping for lunch. After driving some more, he stops for gas. If the second segment of his drive was \(1\frac{2}{3}\) hours longer than the first segment, how long did he drive after stopping for gas?
1. Draw the following ribbons. When finished, compare your work to your partner’s.

   a) 1 ribbon. The piece shown below is only 1/3 of the whole. Complete the drawing to show the whole piece of ribbon.

   ![Diagram of 1/3 ribbon]

   b) 1 ribbon. The piece shown below is 4/5 of the whole. Complete the drawing to show the whole piece of ribbon.

   ![Diagram of 4/5 ribbon]

   c) 2 ribbons, A and B. One third of A is equal to all of B. Draw a picture of the ribbons.

   ![Diagram of ribbons A and B]

   d) 3 ribbons, C, D, and E. C is half the length of D. E is twice as long as D. Draw a picture of the ribbons.

   ![Diagram of ribbons C, D, and E]
2. Half of Robert’s piece of wire is equal to 2 thirds of Maria’s wire. The total length of their wires is 10 feet. How much longer is Robert’s wire than Maria’s?

3. Half Sarah’s wire is equal to 2/5 of Daniel’s. Chris has 3 times as much as Sarah. In all, their wire measures 6 ft. How long is Sarah’s wire, in feet?
Name ___________________________ Date _________________

a) 1 ribbon. The piece shown below is only 2/3 of the whole. Complete the drawing to show the whole piece of ribbon.

[Diagram of a ribbon]

b) 1 ribbon. The piece shown below is 1/4 of the whole. Complete the drawing to show the whole piece of ribbon.

[Diagram of a ribbon]

c) 3 ribbons, A, B, and C. 1 third of A is the same length as B. C is half as long as B. Draw a picture of the ribbons.

[Diagram of ribbons A, B, and C]
1. Draw the following ribbons.

   a) 1 road. The piece shown below is only 3/7 of the whole. Complete the drawing to show the whole road.

   ![Diagram of ribbon](image)

   b) 1 road. The piece shown below is 1/6 of the whole. Complete the drawing to show the whole road.

   ![Diagram of ribbon](image)

   c) 3 roads. B is three times longer than A. C is twice as long as B. Draw the roads. What fraction of the total length of the roads is the length of A? If Road B is 7 miles longer than Road A, what is the length of road C?

   ![Diagram of roads](image)

   d) Write your own ribbon or road problem with 2 or 3 lengths.
1) Lila collected the honey from 4 of her beehives. From the first hive she collected \( \frac{5}{6} \) gallon of honey. From the second hive she collected \( \frac{2}{3} \) gallon. The last two hives yielded \( \frac{1}{12} \) gallon each.

   a) How many gallons of honey did Lila collect in all? Draw a diagram to support your answer.

   b) After using some of the honey she collected for baking, Lila found that she only had \( \frac{3}{4} \) gallon of honey left. How much honey did she use for baking? Explain your answer using a diagram, numbers, and words.
c) With the remaining $\frac{3}{4}$ gallon of honey, Lila decided to bake some loaves of bread and several batches of cookies for her school bake sale. The bread needed $\frac{1}{6}$ gallon of honey and the cookies needed $\frac{1}{4}$ gallon. How much honey was left over? Explain your answer using a diagram, numbers, and words.

d) Lila decided to make more baked goods for the bake sale. She used $\frac{1}{8}$ lb less flour to make bread than to make cookies. She used $\frac{1}{4}$ lb more flour to make cookies than to make brownies. If she used $\frac{1}{2}$ lb of flour to make the bread, how much flour did she use to make the brownies? Explain your answer using a diagram, numbers and words.
1) On Sunday, Sheldon bought $4 \frac{1}{2}$ kg of plant food. He used $1 \frac{2}{3}$ kg on his strawberry plants, and used $\frac{1}{4}$ kg for his tomato plants.

   a) How many kilograms of plant food did Sheldon have left? Write one or more equations to show how you reached your answer.

   b) Sheldon wants to feed his strawberry plants 2 more times, and his tomato plants one more time. He will use the same amounts of plant food as before. How much plant food will he need? Does he have enough left to do so? Explain your answer using words, pictures or numbers.
2) Sheldon harvests the strawberries and tomatoes in his garden.

   a) He picks $1 \frac{2}{5}$ kg less strawberries in the morning than in the afternoon. If Sheldon picked $2 \frac{1}{4}$ kg in the morning, how many kilograms of strawberries does he pick in the afternoon? Explain your answer using words, pictures or equations.

b) Sheldon also picks tomatoes from his garden. He picked $5 \frac{3}{10}$ kg but 1.5 kg were rotten. How many kilograms of tomatoes were not rotten? Write an equation that shows how you reached your answer.

c) Did Sheldon’s garden produce more kilograms of strawberries or tomatoes? How many more kilograms? Explain your answer using an equation.
Equal Opportunity Notice
CA BOCES hereby advises students, parents, employees and the general public that it offers employment, programs and educational opportunities, including vocational education opportunities, without regard to gender, race, color, national origin, handicap or any other legally protected status. Inquiries regarding this nondiscrimination policy and grievance procedures may be directed to: Human Resources Director, Cattaraugus-Allegany BOCES, 1825 Windfall Road, Olean, NY 14760; 716-376-8237.