Appendices

Fraction Circles
Quizzes
End of Module Assessments
Student Interviews
1. Rachel ate $\frac{3}{8}$ of a small pizza for dinner. The next day she ate $\frac{1}{4}$ of a small pizza. How much of a small pizza did she eat in all?

2. Galen lives $\frac{4}{6}$ of a mile from school. After going $\frac{1}{10}$ of a mile his bike broke down and he had to walk the rest of the way to school. How far did he walk to school?

   ○ Estimate: Did he walk more or less than $\frac{1}{2}$ mile? Explain your thinking.

   ○ Find the actual distance that he walked.
3. Show how to do this problem on the number line: \[ \frac{1}{3} + \frac{5}{6} = \]

4. Explain your choice of a number line to solve the problem.
1. Show this problem on the Decimal +- board.  \(0.55 - 0.3 = \) 

2. Final answer is: 

\[ \square \]
3. What number is shown by the arrow? ________________

4. Show that number on this grid:

5. Imagine 0.75 on a 10 x 10 grid. Add 0.03 to it. Estimate: Is the sum greater or less than one? Explain your thinking.
1. Jessie earns $24 an hour working at Starbucks. How much will she earn if she works $\frac{3}{4}$ of an hour? Please show how you can determine this answer using a number line.

2. Show how to use the square picture below to solve the following problem.

Tasty-Bars are sold in square pans. There is $\frac{2}{3}$ of a pan of bars in the display case at the bakery. Jessica buys $\frac{3}{5}$ of what was left in this pan. How much of a whole pan of Tasty-Bars did she purchase?
3. Randy runs along Hollywood Boulevard every Tuesday evening. He ran \( \frac{2}{3} \) of a block before getting tired. Each block along Hollywood Boulevard is \( \frac{1}{4} \) of a mile long. How far does he run before he gets tired? Show how to solve the problem using the number line below. Circle your final answer.
Fraction Addition and Subtraction Interview

The goal of the student interview is to better understand student’s thinking. Does the student have strong mental images to support their ability to order fractions and estimate reasonable sums and differences? Can the student use models to add and subtract fractions and connect those models to the symbolic procedure? Does the student see the need for common denominators?

Order:

1. Sort these fractions from smallest to largest. Explain your thinking. (If student uses common denominator approach, then ask him/her to sort based on their images of fraction circles)

\[
\frac{2}{3}, \frac{1}{19}, \frac{11}{13}, \frac{10}{20}, \frac{5}{12}
\]

Order these fractions. Explain your thinking. What pictures do you imagine that help you order these fractions?

2. 8/9 4/5

3. 4/11 6/8
Addition and Subtraction - Estimation:

Estimate the answer to this problem by deciding about where on the number line the answer would be. For example, if you think the answer is between 0 and \( \frac{1}{2} \), then put an x here. (Show this on a sample number line.) **Tell me what you are picturing in your mind as you estimate.**

4. \( \frac{3}{4} + \frac{1}{5} \)

5. \( \frac{14}{15} - \frac{5}{7} \)

6. \( 1\frac{3}{5} - \frac{3}{8} \)
Addition and Subtraction - exact answer

7. Find the actual answer to this problem using fraction circles. Explain how you did this.

\[
\frac{3}{8} + \frac{1}{4}
\]

8. Now show how to solve that problem with symbols. Explain how this represents what you did with the fraction circles.

9. Hamdi lives \(1 \frac{2}{3}\) mile from school. She rode her bike \(\frac{1}{4}\) of a mile when the tire went flat. She had to walk the rest of the way. How far did she walk? Solve this problem using symbols.

10. Look at your answer. Use your estimation skills to determine if your answer is reasonable. Explain your thinking,
Fraction Interview Addition and Subtraction
Materials for Interview

Cards for Question 1 (cut apart):

\[
\begin{array}{cc}
\frac{2}{3} & \frac{1}{19} \\
\frac{11}{13} & \frac{10}{20} \\
\frac{5}{12} & \\
\end{array}
\]

Cards for Question 2:

\[
\begin{array}{cc}
\frac{8}{9} & \frac{4}{5} \\
\end{array}
\]

Card for Question 3:

\[
\begin{array}{cc}
\frac{4}{11} & \frac{6}{8} \\
\end{array}
\]
\[ \frac{3}{4} + \frac{1}{5} \]

\[ \frac{14}{15} - \frac{5}{7} \]

\[ 1\frac{3}{5} - \frac{3}{8} \]
Now show how to solve that problem with symbols. Explain how this represents what you did with the fraction circles.

Hamdi lives $1\frac{2}{3}$ mile from school. She rode her bike $\frac{1}{4}$ of a mile when the tire went flat. She had to walk the rest of the way. How far did she walk? Solve this problem using symbols.

Look at your answer. Use your estimation skills to determine if your answer is reasonable. Explain your thinking.
Decimal Interview

The goal of the student interview is to better understand student’s thinking. Does the student have strong mental images to support their ability to order decimals and to estimate reasonable sums and differences? Can the student use the models to add and subtract decimals and connect those models to the symbolic procedure?

1. Sort these decimals from smallest to largest. Explain your thinking. (If student uses a procedural approach, then ask him/her to sort based on their images of the 10 x 10 grid)

   0.245  0.025  0.249  0.3

For problems 2 – 5:

Name each decimal. Describe the picture you have in your mind when you think of this decimal. Which decimal is larger or are they equal? Explain your thinking.

(2) 0.9  0.009

(3) 0.11  0.110

(4) 0.75  0.9
(5) 0.055 0.5

For problems 6 – 8

Imagine the decimal +- board. Use that image to solve each problem below. Do not use paper and pencil. Describe what you are thinking.

(6) .37 + .4 =

(7) .55 – 0.3 =

(8) 2.3 - .05 =

(9) Picture 57-hundredths on the decimal +- board. If you took away 9-thousandths would the amount left shaded be more than ½ or less than ½? Explain without finding the exact answer.
(10) Picture 28-hundredths on the decimal +- board. If you added 6-hundredths more, would the amount shaded be more than \( \frac{1}{2} \) or less than \( \frac{1}{2} \)? Explain without finding the exact answer.

(11) Show the same problem using the Decimal + - board. (Show the symbol card here)

(12) Show how to solve this problem using symbols. Explain what you are doing. Do you get the same answer as with the Decimal +- board? If not, which answer is correct?

(13) Show how to subtract .67 - .5 using the Decimal + - board. Explain your steps. Now record those actions with symbols. Are the answers the same?

(14) Now show 1.85 - .4 on the number line. Explain how to do this. How is solving the problem on the number line similar to solving with symbols?
Decimal Interview - Materials for Interview

Card for question 1

0.245 0.025 0.249 0.3

Cards for questions 2 – 5

0.9 0.009 0.055 0.5

0.11 0.110 0.75 0.9

Cards for questions 6 – 8

0.37 + .4 = 0.55 – 0.3 = 2.3 – .05 =
0.57

0.28 + .06 =

Decimal + - board for question 11
Decimal + - board for question 13

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Card for Questions 14

1.85 - .4 =

Number line for question 14

0 1 2
Directions for Questions 1 – 3

Estimate this product by putting an X on the number line where you think the exact will be. For example, if you think the answer is between 0 and 5 put an X here (Point to the space between 0 and 5 on the number line). Tell me what you are picturing in your mind as you estimate.

1. 10 groups of \( \frac{3}{7} \) = ?

2. \( \frac{4}{3} \times 10 = ? \)

3. \( 3 \frac{3}{4} \div \frac{1}{2} = ? \)
4. Draw pictures to show how to solve the problem. Explain what you are doing.

Michael ate $\frac{2}{3}$ of a candy bar each day for 4 days. How many candy bars did he eat in all?

5. Show how to use the patty paper to solve this problem. Explain each step and how to determine the final answer from folding the patty paper.

Torie’s family had a pie for dessert last night. They didn’t like it so there was $\frac{3}{4}$ of the pie left. In the morning Torie ate $\frac{1}{4}$ of the left over pie. How much of the whole pie did she eat in the morning?

6. Draw a number line to solve this problem. Explain each step and how to determine the final answer from the number line

Joshkin earns $12.00 an hour mowing lawns. If he works $\frac{5}{6}$ of an hour how much money did he earn?
7. Show how to solve this problem on the number line. Explain each step.

Lauren lives 1/2 of a mile from school. She rode her bike 2/3 of the way when the tire went flat. How much of a mile did Lauren ride her bike before the tire went flat?

8. Draw a picture to solve the problem. Explain each step.

A bird feeder holds about 1 \( \frac{1}{4} \) cups of seed. The scoop you use to fill the bird feeder holds about \( \frac{3}{8} \) of a cup. How many scoops does it take to fill the feeder?

9. Draw a picture to solve the problem. Explain each step.

You have a piece of ribbon 4 yards long. How many pieces of ribbon 4/5 of a yard long can you cut from this ribbon? If the answer is not a whole number, what name can you give to the remainder?
Card for Question 1

10 groups of $\frac{3}{7}$

Card for Question 2

$\frac{4}{3} \times 10$

Card for Question 3

$\frac{3\frac{3}{4}}{\frac{1}{2}}$
Michael ate $\frac{2}{3}$ of a candy bar each day for 4 days. How many candy bars did he eat in all?

Torie’s family had a pie for dessert last night. They didn’t like it so there was $\frac{3}{4}$ of the pie left. In the morning Torie ate $\frac{1}{4}$ of the left over pie. How much of the whole pie did she eat in the morning?

Joshkin earns $12.00 an hour mowing lawns. If he works $\frac{5}{6}$ of an hour how much money did he earn?

Lauren lives $\frac{1}{2}$ of a mile from school. She rode her bike $\frac{2}{3}$ of the way when the tire went flat. How much of a mile did Lauren ride her bike before the tire went flat?
A bird feeder holds about $\frac{1}{4}$ cups of seed. The scoop you use to fill the bird feeder holds about $\frac{3}{8}$ of a cup. How many scoops does it take to fill the feeder?

You have a piece of ribbon 4 yards long. How many pieces of ribbon $\frac{4}{5}$ of a yard long can you cut from this ribbon? If the answer is not a whole number, what name can you give to the remainder?
Thank you for doing your very best on this assessment.

Your teacher will first show you 3 problems on the overhead. ESTIMATE the answer to each problem by writing the whole number you think the actual answer is closest to. Write the number in the appropriate box found below.

(1)

(2)

(3)
Now your teacher will show you two more problems. Estimate by placing an X on the number line to show about how big the actual answer is. For example, if you think the actual answer is between 0 and 5 put an x anywhere on the number line between 0 and 5.

(4)

(5)

Continue to work on the rest of the test. Show all your work so we know how you solved the problems. Thank you.
Circle the larger of each pair or both if they are equal. Explain how you solved each problem.

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<td>0.12</td>
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(20) Rewrite the fractions so they are from smallest to largest.

<table>
<thead>
<tr>
<th>$\frac{9}{10}$</th>
<th>$\frac{5}{9}$</th>
<th>$\frac{1}{6}$</th>
<th>$\frac{5}{12}$</th>
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Put answer here: smallest ______ largest ______

(21) Rewrite the decimals so they are from smallest to largest.

<table>
<thead>
<tr>
<th>0.345</th>
<th>0.035</th>
<th>0.4</th>
<th>0.357</th>
<th>0.038</th>
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</table>

Put answer here: smallest ______ largest ______
For these last problems use your **estimation** skills. Don’t find the actual answer.

<table>
<thead>
<tr>
<th>Imagine the decimal .54 on a 10 x 10 grid. Take off 9-thousandths.</th>
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<tr>
<td>(22) Is your answer greater than $\frac{1}{2}$ or less than $\frac{1}{2}$?</td>
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<td>(23) Explain your thinking</td>
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<tr>
<th><strong>Joshua ran 3.7 kilometers. Bryce ran 3.09 kilometers.</strong></th>
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<td>(24) Who ran the furthest?</td>
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<td>(25) Explain your thinking</td>
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Note to teacher: These are the first 5 test questions. Duplicate on an overhead transparency. Show one problem at a time for about 30 seconds.

(1) \[
\frac{7}{8} + \frac{12}{13}
\]

(2) \[
\frac{3}{8} + \frac{5}{12}
\]

(3) \[
\frac{8}{9} - \frac{7}{8}
\]

(4) \[
20 \times \frac{2}{3}
\]

(5) \[
5 \div \frac{3}{4}
\]
Thank you for doing your best on this assessment.

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<th>Addition and Subtraction Problems</th>
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<td>Show how to do these problems on the Decimal + - board</td>
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<tr>
<th>Problem</th>
<th>Expression</th>
<th>Final answer</th>
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<tr>
<td>(26)</td>
<td>.27 + .4 =</td>
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<td>(28)</td>
<td>.6 - .05 =</td>
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(27) Final answer: 

(29) Final answer: 
(30) Chase’s plant was .25 units on Monday. It grew .3 units in two weeks. How tall was his plant at the end of the two weeks? Show how to solve this problem on the number line. Record the final answer in the box.

(31) Final answer is:

(32) 0.83 + 0.9 =

(33) 3.45 − 1.7 =
(34) Molly rode her bike \( \frac{3}{2} \) miles on Monday. On Wednesday, she rode \( \frac{2}{4} \) miles. On Saturday she rode \( \frac{5}{8} \) miles. How many miles did Molly ride in the 3 days. Show all your work below.

(35) Use the information in the table to answer this question: *How much taller is Michael than Paola?*. Show your work below.

<table>
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<tr>
<th>Name</th>
<th>Height in Inches</th>
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<tr>
<td>Michael</td>
<td>( \frac{67}{6} )</td>
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<td>Paola</td>
<td>( \frac{61}{4} )</td>
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Addis reads \( \frac{3}{4} \) of an hour each day. How many hours does she read in 5 days?

(36) Draw a picture that shows how to find the answer for this problem.

(37) Write a number sentence with the answer that shows how to solve this problem.
Laura notices that she has \( \frac{2}{3} \) of a pan of birthday cake in her refrigerator. She eats \( \frac{3}{4} \) of the leftover cake. How much of one pan of cake does she eat?

(38) Draw a picture that shows how to find the answer for this problem.

\[
\text{Pan of cake}
\]

(39) Write a number sentence with the answer that shows how to solve this problem.
Emily runs down Grand Avenue. Each block is $\frac{1}{4}$ of a mile long.

She runs $\frac{2}{3}$ of a block before she gets tired and stops. How much of a mile did she run?

(40) Solve the problem using the number line below. Be sure to show all your work.

(41) Write a mathematical sentence with the answer that shows how to solve this problem.

Bryce makes $20 an hour selling ice cream at the Lake Nokomis concession stand during the summer. How much will Bryce make if he works $\frac{4}{5}$ of an hour?

(42) Solve the problem using the number line below. Be sure to show all your work.

(43) Write a number sentence with the answer that shows how to solve this problem.
(44) A scoop holds $\frac{1}{5}$ kg of flour. How many scoops of flour are needed to fill a bag with 6 kg of flour? Draw a picture to solve this problem. Circle the final answer.

(45) You have $3 \frac{1}{2}$ pounds of fish. Each serving is $\frac{3}{4}$ of a pound. How many full servings are possible? If there is an amount left over, what fraction of a serving is that?

Show how to solve the problem using the picture below. Circle your final answer.
Pictures of the Fraction Circles

- Black: 2 pieces
- Yellow: 3 pieces
- Brown: 4 pieces
- Blue: 5 pieces
- Orange: 6 pieces
- Pink: 7 pieces
- Light Blue: 8 pieces
- Gray: 9 pieces
- White: 10 pieces
- Purple: 12 pieces
- Red: 15 pieces
- Green: 17 pieces
BLUE
ORANGE
PINK
LIGHT BLUE
GRAY
PURPLE
RED
GREEN
Pictures of the Fraction Circles

Black

Yellow
2 pieces

Brown
3 pieces

Blue
4 pieces

Orange
5 pieces

Pink
6 pieces

Light Blue
7 pieces

Gray
8 pieces

White
9 pieces

Purple
10 pieces

Red
12 pieces

Green
15 pieces
Fraction Circles
Colored Masters

The following pages can be used to print colored fraction circles on transparencies.