

write the equation $\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$.

- Remove the fourths strips and invite another volunteer to use sixths strips to find an amount equivalent to $\frac{1}{2}$. Then write the equation $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$.
- Remove the sixths strips and invite a volunteer to use eighths strips to find a fraction equivalent to $\frac{1}{2}$. Ask students to name the fraction this student represented. Then write the equation $\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$.

Repeating Model

Name _____

Ordering Fractions

How can you order fractions?
Order $\frac{1}{2}, \frac{1}{3}$ from least to greatest.

Find equivalent fractions with a common denominator.

Compare the numerators.
Order the fractions from least to greatest:
 $\frac{1}{2} < \frac{1}{3}$

Order the fractions from least to greatest.

1. $\frac{3}{4}, \frac{2}{3}, \frac{3}{5}$
 $\frac{9}{12}, \frac{8}{12}, \frac{6}{10}$

2. $\frac{3}{4}, \frac{1}{2}, \frac{3}{5}$
 $\frac{9}{12}, \frac{6}{12}, \frac{6}{10}$

3. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

4. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

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

6. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

7. $\frac{3}{4}, \frac{1}{2}, \frac{1}{3}$
 $\frac{9}{12}, \frac{6}{12}, \frac{4}{12}$

8. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

Find equivalent fractions with a common denominator and order from least to greatest.

1. $\frac{6}{9}, \frac{8}{9}$
 $\frac{12}{18}, \frac{16}{18}$

2. $\frac{4}{12}, \frac{1}{3}, \frac{2}{3}$
 $\frac{4}{12}, \frac{4}{12}, \frac{8}{12}$

3. $\frac{5}{6}, \frac{3}{4}$
 $\frac{10}{12}, \frac{9}{12}$

4. $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}$
 $\frac{6}{12}, \frac{8}{12}, \frac{9}{12}$

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

6. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

7. $\frac{3}{4}, \frac{1}{2}, \frac{1}{3}$
 $\frac{9}{12}, \frac{6}{12}, \frac{4}{12}$

8. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

Sample answers given.

Also available in print

Partner Talk

Play against! Talk about how you know that a fraction is less than $\frac{1}{2}$ or greater than $\frac{1}{2}$.

$\frac{1}{2}$ and $\frac{1}{3}$	NO	YES	NO	YES
$\frac{1}{2}$ and $\frac{1}{6}$	YES	NO	YES	NO
$\frac{2}{3}$ and $\frac{1}{3}$	NO	YES	NO	YES
$\frac{3}{10}$ and $\frac{1}{2}$	NO	YES	NO	YES

Great timing! 119

Partner Talk

Play against! Talk about your strategies as you play.

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$	$\frac{1}{6}$
C	B	A	B	C
$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{5}$
C	B	A	B	C
$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$
C	B	A	A	B

Great timing! 119

Partner Talk Listen for evidence of number sense. For example, a student might say, "I know that $\frac{2}{3}$ and $\frac{3}{4}$ are both greater than $\frac{1}{2}$, so $\frac{1}{2}$ cannot be between those two fractions."

Practice Master

Name _____

Ordering Fractions

Order the fractions from least to greatest.

1. $\frac{3}{4}, \frac{2}{3}, \frac{3}{5}$
 $\frac{9}{12}, \frac{8}{12}, \frac{6}{10}$

2. $\frac{3}{4}, \frac{1}{2}, \frac{3}{5}$
 $\frac{9}{12}, \frac{6}{12}, \frac{6}{10}$

3. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

4. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

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

6. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

7. $\frac{3}{4}, \frac{1}{2}, \frac{1}{3}$
 $\frac{9}{12}, \frac{6}{12}, \frac{4}{12}$

8. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

9. $\frac{3}{4}, \frac{1}{2}, \frac{1}{3}$
 $\frac{9}{12}, \frac{6}{12}, \frac{4}{12}$

10. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$
 $\frac{6}{12}, \frac{4}{12}, \frac{3}{12}$

11. Which fraction is greater than $\frac{1}{2}$?
 A $\frac{1}{3}$ B $\frac{1}{4}$ C $\frac{1}{5}$ D $\frac{1}{6}$

12. Writing to Explain Explain how you know that $\frac{1}{3}$ is greater than $\frac{1}{4}$ but less than $\frac{1}{2}$.
 Sample answer: $\frac{1}{3}$ is an equivalent fraction to $\frac{4}{12}$ and $\frac{1}{2}$ is an equivalent fraction to $\frac{6}{12}$. Because $\frac{4}{12}$ is greater than $\frac{3}{12}$ and less than $\frac{6}{12}$, it falls between $\frac{1}{3}$ and $\frac{1}{2}$.

Also available in print

Triangle Fractions

Name _____

1. What fraction of the spotted triangle is a shaded rectangle? What fraction of the spotted triangle is a shaded triangle? Use $>$, $<$, or $=$ to compare the two fractions.
 $\frac{4}{16}, \frac{1}{4} > \frac{1}{16}$

2. What fraction of the spotted triangle is a white triangle? What fraction of a striped triangle is a white triangle? Use $>$, $<$, or $=$ to compare the two fractions.
 $\frac{1}{16}, \frac{3}{16} < \frac{3}{4}$

3. What fraction of the spotted triangle is two striped triangles? What fraction of the largest triangle is one spotted triangle? Use $>$, $<$, or $=$ to compare the two fractions.
 $\frac{1}{16}, \frac{1}{16} > \frac{1}{16}$

4. What fraction of the largest triangle is one striped triangle? What fraction of a striped triangle is one striped triangle? Use $>$, $<$, or $=$ to compare the two fractions.
 $\frac{1}{16}, \frac{1}{16} = \frac{1}{16}$

Also available in print

Be enough for Denise to have one!

- Invite students to explain if and how Denise can have a drink.
- Students can draw a model to explain their solution.
- Have students write their solution and explanation down in words.

Denise has $\frac{1}{2}$ of a pizza. She wants to have one whole pizza. How much more pizza does she need? Explain your thinking.

Choose one of these problems. Explain your thinking in writing. Use words and pictures or words and numbers.

1. A pizza is divided into 8 equal slices. If 3 slices are eaten, how much of the pizza is left? Explain your thinking.

2. A pizza is divided into 8 equal slices. If 3 slices are eaten, how much more pizza is needed to have one whole pizza? Explain your thinking.

Students have glasses and cash. They have $\frac{1}{2}$ of the cash and $\frac{1}{3}$ of the glasses. How much more cash and glasses do they need to have one whole? Explain your answer.

3. Create a new problem. Decide how to solve it. Solve it and explain your thinking in two different ways.

4. A pizza is divided into 8 equal slices. If 3 slices are eaten, how much more pizza is needed to have one whole? Explain your thinking.

Levelled Homework

Retrieving Master

Name _____ Retrieving 11-8

Problem Solving: Writing to Explain

Gina and her brother Don made homemade pasta with their mother. Gina made $\frac{2}{3}$ of a pan of pasta. Don made $\frac{1}{3}$ of a pan. Which person made more pasta?

Writing to Explain

- Write your explanation in steps to make it clear.
- Tell what the numbers mean in your explanation.
- Tell why you took certain steps.

Example

• Reason: $\frac{2}{3}$ and $\frac{1}{3}$ have different denominators. I multiplied the numerator and denominator of $\frac{1}{3}$ by 2 to get $\frac{2}{6}$.

• Then I could compare the numerators of $\frac{2}{3}$ and $\frac{2}{6}$. Since $\frac{2}{3}$ is greater than $\frac{2}{6}$, Gina made more pasta.

1. Rick has a collection of 6 video games. He has his best friend borrow 1 of them. He then gives the remaining 5 to his sister. Explain how you came up with the fractions.

Sample answer: For the first fraction, I divided both the numerator and denominator by 2 to get the fraction $\frac{1}{3}$. Then I multiplied both the numerator and denominator of $\frac{2}{3}$ by 2 to get the fraction $\frac{4}{6}$.

Practice Master

Name _____ Practice 11-8

Problem Solving: Writing to Explain

1. Mary has 12 marbles. $\frac{2}{3}$ of the marbles are yellow and $\frac{1}{3}$ of the marbles are blue. The rest of the marbles are green. How many marbles are green? Explain how you know.

There are 7 green marbles. $\frac{2}{3}$ means there are 3 yellow marbles and $\frac{1}{3}$ means there are 2 blue marbles, for a total of 5 marbles. So, there are only 7 marbles left that must all be green.

2. Adam wants to compare the fractions $\frac{3}{4}$, $\frac{1}{2}$, and $\frac{1}{3}$. He wants to order them from least to greatest and explain how. Adam can rewrite them so that they all have a denominator of 12. $\frac{3}{4}$ has a denominator of 12. $\frac{1}{2}$ becomes $\frac{6}{12}$, and $\frac{1}{3}$ becomes $\frac{4}{12}$. Then he can order them.

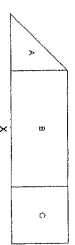
$\frac{3}{4}$ or $\frac{9}{12}$, $\frac{1}{2}$ or $\frac{6}{12}$, $\frac{1}{3}$ or $\frac{4}{12}$.

3. Adam used the three fractions to make a circle graph and colored each a different color. What fraction of the graph is not colored? Explain your answer.

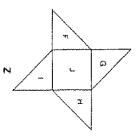
Adam could divide his circle into 12 parts. There would be 3 parts not colored. $\frac{3}{12}$ or $\frac{1}{4}$ would not be colored.

Shape Fractions

Name _____ Equivalent 11-8



1. What fraction of trapezoid X is square A? Explain your answer. **$\frac{1}{4}$; Divide the trapezoid into seven equal parts.**
2. What fraction of trapezoid X is rectangle B? Explain your answer. **$\frac{2}{7}$; Rectangle B contains 4 parts.**
3. What fraction of trapezoid X is triangle C? Explain your answer. **$\frac{2}{7}$; Triangle C contains 4 parts.**
4. What fraction of shape Z is square J? Explain your answer. **$\frac{1}{6}$ or $\frac{2}{12}$; Divide the shape into 6 equal parts.**
5. What fraction of shape Z is triangle G? Explain your answer. **$\frac{1}{6}$; Triangle G is 1 part.**



Also available in print

Also available in print

Also available in print

$$\begin{aligned} & * \frac{1}{6} + \frac{2}{6} \left[\frac{1}{2} \right] \\ & * \frac{2}{10} + \frac{4}{10} \left[\frac{3}{5} \right] \\ & * \frac{3}{8} + \frac{3}{8} \left[\frac{3}{4} \right] \\ & * \frac{1}{3} + \frac{1}{3} \left[\frac{2}{3} \right] \\ & * \frac{1}{4} + \frac{1}{4} \left[\frac{1}{2} \right] \\ & * \frac{5}{12} + \frac{4}{12} \left[\frac{3}{4} \right] \\ & * \frac{1}{8} + \frac{2}{8} \left[\frac{3}{8} \right] \end{aligned}$$

Repeating Master

Name _____
Modeling Addition of Fractions

Repeating 12-1

Eight friends want to see a movie. Four of them want to see a comedy. You want to see an action movie, and you want to see either a science-fiction movie. What fraction of the group wants to see either a comedy or a science-fiction movie? You can use a model to add fractions.



Look at the circle. It is divided into eighths, because there are eight people in the group. Each person represents $\frac{1}{8}$ of the group. Four people want to see a comedy. Shade in four of the sections to represent $\frac{4}{8}$. Two people want to see a science-fiction movie. Shade in two more sections. There are six shaded sections. Count the number of shaded sections. There are six. So $\frac{4}{8} + \frac{2}{8}$ equals $\frac{6}{8}$. Group wants to see either a comedy or a science-fiction movie.

$$\frac{4}{8} + \frac{2}{8} = \frac{6}{8} \quad \text{While the sum is simplest form, } \frac{6}{8} = \frac{3}{4}$$

Find each sum. Simplify, if possible.

- $\frac{3}{4} + \frac{1}{5}$ $\frac{2}{8} + \frac{1}{6}$ $\frac{3}{8} + \frac{6}{8}$ $\frac{6}{10} \text{ or } \frac{3}{5}$
- $\frac{2}{6} \text{ or } \frac{1}{3}$ $\frac{5}{6} \text{ or } 1$ $\frac{6}{10} + \frac{1}{10}$ $\frac{5}{10} \text{ or } \frac{1}{2}$
- $\frac{4}{6} + \frac{1}{6}$ $\frac{5}{6} + \frac{1}{6}$ $\frac{4}{10} \text{ or } \frac{2}{5}$ $\frac{4}{10} \text{ or } \frac{2}{5}$
- $\frac{7}{8} + \frac{3}{8}$ $\frac{9}{10} + \frac{1}{10}$ $\frac{4}{5} \text{ or } 1$ $\frac{4}{10} \text{ or } \frac{2}{5}$
- $\frac{10}{10} + \frac{6}{10}$ $\frac{9}{11} + \frac{1}{11} + \frac{6}{11}$ $\frac{3}{4} \text{ or } \frac{3}{4}$ $\frac{8}{12} = \frac{2}{3}$

13. Number Sense We can express time as a fraction of an hour. For example, 15 minutes is $\frac{1}{4}$ hour. 30 minutes is $\frac{1}{2}$ hour. What fraction of an hour is 45 minutes?

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Play again! Talk about how you know that your answer is reasonable.

$\frac{1}{12}$	$\frac{2}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{3}{12}$	$\frac{7}{12}$
$\frac{4}{12}$	$\frac{14}{12}$	$\frac{12}{12}$	$\frac{5}{12}$	$\frac{11}{12}$	$\frac{5}{12}$
$\frac{3}{12}$	$\frac{6}{12}$	$\frac{11}{12}$	$\frac{8}{12}$	$\frac{8}{12}$	$\frac{8}{12}$
$\frac{1}{12}$				$\frac{8}{12}$	$\frac{2}{12}$

Partner Talk Listen for evidence that a student is using correct vocabulary. For example, a student might say: "To find $\frac{3}{12} + \frac{7}{12}$, you add 3 + 7 to get 10 for the numerator and keep twelfths for the denominator."

Leveled Homework

Practice Master

Name _____
Modeling Addition of Fractions

Practice 12-1

Find each sum. Simplify, if possible. You may use fraction strips.

- $\frac{1}{2} + \frac{1}{2} = 1$ $\frac{2}{3} + \frac{1}{3} = 1$ $\frac{3}{12} + \frac{9}{12} = 1$ $\frac{4}{5} = \frac{4}{5}$
- $\frac{4}{5} + \frac{1}{5} = 1$ $\frac{5}{12} + \frac{7}{12} = 1$ $\frac{6}{8} + \frac{2}{8} = 1$ $\frac{7}{10} + \frac{3}{10} = 1$
- $\frac{8}{10} = \frac{4}{5}$ $\frac{9}{10} + \frac{1}{10} = 1$ $\frac{9}{10} + \frac{1}{10} = 1$ $\frac{3}{6} = \frac{1}{2}$



11. Each day, Steven walked $\frac{1}{3}$ mile more than the previous day. The first day he walked $\frac{1}{3}$ mile. How far did he walk on the 5th day? Did the sum of his walks total at least 1 complete mile?

12. Aisha found the missing value in the equation.

$$\frac{3}{10} + \frac{1}{10} + \frac{2}{10} = \frac{3}{10}$$

13. There are five people sitting around the dinner table. Each person is $\frac{1}{5}$ of a pie on their plate. How much pie is left? Explain.

Sample answer: None. $\frac{2}{10} + \frac{2}{10} + \frac{2}{10} + \frac{2}{10} + \frac{2}{10} = 1$, so the entire pie has been served.

Also available in print

Play again! Talk about your strategies as you play.

$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$
$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$
$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$
$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$

Figuring Fractions

Enrichment 12-1

- Joe and Sam shared a chessboard and had 12 pieces. Joe ate 3 pieces and Sam ate 5 pieces. What fraction of the chessboard did they eat in all? Show how you found your answer.
- Kim baked $\frac{1}{2}$ of a mile to Hazel's house and they both biked $\frac{1}{2}$ of a mile to the library. How far did Kim bike? Show how you found your answer.
- Mrs. Green added $\frac{1}{8}$ of a teaspoon of salt to her tomato sauce. While she was preparing the tomato sauce, How much salt was added to the tomato sauce? Show how you found your answer.
- A pitcher holds 10 glasses of punch. Luke drank 2 glasses and Bill drank 4 glasses. What fraction of the punch did they drink? Show how you found your answer.
- Scott swam $\frac{1}{10}$ of a mile across the lake to visit a friend. On the way back, he swam the same $\frac{1}{10}$ of a mile. How far did Scott swim? Show how you found your answer.
- Ben compares six up their tents along a stream. On the fraction of the tents are yellow or green? Show how you found your answer.

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What is $\frac{2}{10} + \frac{2}{10}$? [$\frac{4}{10}$]
 Can the sum be simplified? Yes, divide both numbers by 2, $\frac{4}{10} = \frac{2}{5}$
 What is $\frac{2}{8} + \frac{3}{8}$? [$\frac{5}{8}$]
 Can the sum be simplified? [No, there are no common factors other than 1.]

Reaching Master

Name _____ Reaching 12-2
Adding Fractions with Like Denominators

When you add fractions with like denominators, add the numerators and keep the denominator the same.

Find the sum of $\frac{1}{4} + \frac{1}{4}$

Add the numerators, $1 + 1 = 2$

Keep the denominator the same, $\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$

Is this fraction expressed in simplest form? Remember, a fraction is in simplest form when the greatest common factor (GCF) of the numerator and denominator is 1.

$\frac{2}{4} = \frac{1}{2}$ is in simplest form, because the GCF of 1 and 2 is 1.

Find each sum. Simplify if possible.

- | | | | |
|---|---------------------------------|-----------------------------------|---------------------------------|
| $1. \frac{1}{4} + \frac{1}{4}$ | $\frac{2}{4}$ | $2. \frac{3}{10} + \frac{6}{10}$ | $\frac{9}{10}$ |
| $3. \frac{5}{12} + \frac{2}{12}$ | $\frac{7}{12}$ | $4. \frac{3}{12} + \frac{7}{12}$ | $\frac{10}{12} = \frac{5}{6}$ |
| $5. \frac{5}{10} + \frac{3}{10}$ | $\frac{8}{10}$ or $\frac{4}{5}$ | $6. \frac{2}{4} + \frac{4}{4}$ | $\frac{6}{4}$ or $\frac{3}{2}$ |
| $7. \frac{7}{10} + \frac{3}{10}$ | $\frac{10}{10}$ or 1 | $8. \frac{1}{8} + \frac{4}{8}$ | $\frac{5}{8}$ |
| $9. \frac{1}{10} + \frac{3}{10}$ | $\frac{4}{10}$ or $\frac{2}{5}$ | $10. \frac{1}{10} + \frac{3}{10}$ | $\frac{4}{10}$ or $\frac{2}{5}$ |
| $11. \frac{3}{8} + \frac{1}{8} + \frac{4}{8}$ | $\frac{8}{8}$ | $12. \frac{1}{12} + \frac{1}{12}$ | $\frac{2}{12} = \frac{1}{6}$ |

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Partner Talk Listen for an explanation that describes the process of simplifying the answers. For example, a student might say: "To simplify $\frac{4}{8}$, I divide the numerator by 4 and the denominator by 4."

You will get the first to get four connected rectangles, like this.

$\frac{1}{2}$	$\frac{2}{4}$	$\frac{3}{6}$	$\frac{4}{8}$
$\frac{5}{8}$	$\frac{7}{10}$	$\frac{11}{12}$	$\frac{3}{4}$
$\frac{7}{12}$	$\frac{3}{5}$	$\frac{5}{6}$	$\frac{4}{5}$
$\frac{1}{2}$	$\frac{11}{12}$	$\frac{5}{8}$	$\frac{7}{10}$

Play again!

You will get the first to get four connected rectangles, like this.

$\frac{9}{9}$	1	$\frac{3}{4}$	$\frac{5}{8}$
$\frac{5}{8}$	$\frac{4}{7}$	$\frac{1}{4}$	$\frac{7}{8}$
$\frac{1}{2}$	$\frac{2}{3}$	$\frac{5}{8}$	$\frac{7}{8}$
$\frac{7}{8}$	$\frac{5}{6}$	$\frac{4}{7}$	$\frac{3}{4}$

Play again!

Practice Master

Name _____ Practice 12-2
Adding Fractions with Like Denominators

Find each sum. Simplify if possible.

- | | | | |
|--|------------------------------|--|---------------------|
| $1. \frac{2}{4} + \frac{3}{4}$ | $\frac{5}{4}$ | $2. \frac{5}{10} + \frac{7}{10}$ | $\frac{12}{10}$ |
| $3. \frac{3}{8} + \frac{1}{8}$ | $\frac{4}{8} = \frac{1}{2}$ | $4. \frac{3}{6} + \frac{2}{6}$ | $\frac{5}{6}$ |
| $5. \frac{2}{10} + \frac{7}{10}$ | $\frac{9}{10}$ | $6. \frac{1}{8} + \frac{4}{8}$ | $\frac{5}{8}$ |
| $7. \frac{1}{4} + \frac{3}{4}$ | $\frac{4}{4} = 1$ | $8. \frac{12}{12} + \frac{1}{12}$ | $\frac{13}{12}$ |
| $9. \frac{1}{12} + \frac{5}{12}$ | $\frac{6}{12} = \frac{1}{2}$ | $10. \frac{3}{12} + \frac{9}{12}$ | $\frac{12}{12} = 1$ |
| $11. \frac{1}{6} + \frac{2}{6} + \frac{3}{6}$ | $\frac{6}{6} = 1$ | $12. \frac{2}{10} + \frac{1}{10} + \frac{6}{10}$ | $\frac{9}{10}$ |
| $13. \frac{1}{12} + \frac{2}{12} + \frac{1}{12}$ | $\frac{4}{12} = \frac{1}{3}$ | $14. \frac{3}{4} + \frac{1}{4} + \frac{1}{4}$ | $\frac{5}{4}$ |
15. Geometry A side of an equilateral triangle is $\frac{6}{8}$ cm long. Draw a picture that shows the triangle. What is the perimeter of the triangle?
16. Or the computer games, turn each $\frac{1}{4}$ into a sport game or educational game?
17. Rob and Nancy are working on a project. Rob completes $\frac{1}{4}$ of it on Wednesday and $\frac{3}{8}$ of it on Thursday. How much of the project does Nancy complete? Explain.
18. No, they have only completed $\frac{7}{8}$ of the project, so it is not complete.

Also available in print

Enrichment

Name _____ Enrichment 12-2
Survey Scores

1. The table shows the results of a fifth-grade class survey about their favorite pet. Show how you got your answer. Write your answer in simplest form, if possible.

4	2	6	3
$\frac{4}{16}$	$\frac{2}{16}$	$\frac{6}{16}$	$\frac{3}{16}$

Favorite Pet	Fraction of Students Who Chose
Horse	$\frac{4}{16}$
Cat	$\frac{2}{16}$
Dog	$\frac{6}{16}$
Bird	$\frac{3}{16}$

2. Using the pet survey, find two pets whose number of votes add up to $\frac{7}{16}$.
 Horse, $\frac{4}{16}$; dog, $\frac{3}{16}$

3. Darla made a beaded necklace that was $\frac{3}{4}$ of a yard long and a friend's necklace that was $\frac{1}{4}$ of a yard long. What are 3 equivalent fractions for the total length of Darla's necklaces?
 Sample answer: $\frac{4}{12}$, $\frac{1}{3}$, $\frac{2}{6}$

4. The table shows the results of a survey of cousins. What fraction of the cousins answer "English" for their favorite answer? Explain. Write your answer in simplest form, if possible.

$\frac{2}{12}$	$\frac{1}{12}$	$\frac{3}{12}$	$\frac{1}{12}$
$\frac{2}{12} + \frac{1}{12} = \frac{3}{12}$	$\frac{3}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

5. Using the dessert survey, find two desserts whose numbers of votes add up to $\frac{5}{12}$.
 Sample answer: Brownies, $\frac{5}{12}$; cookies, $\frac{2}{12}$

Also available in print

- 10 represent the 1/2 months in a year.
- Have students subtract the months in the year before March and show the remaining part of the year. [$\frac{10}{12}$ or $\frac{5}{6}$]
- Have students put all 12 fraction strips back together.
- Ask students to show the part of the year that does not include winter. [Possible response: $\frac{9}{12}$ or $\frac{3}{4}$]


Also available in print

Reaching Mastery

Name _____ Reaching 12-3

Modeling Subtraction of Fractions

Karla made a pizza and cut it into 10 slices. She ate two slices. What fraction of the pizza is left?
You can use a model to subtract fractions.



Vertically, pizza is divided into 10 slices. One way to show this is $\frac{10}{10}$. Karla ate two slices of the pizza. Cross out two of the slices. Count the number of slices left. There are 8 slices or $\frac{8}{10}$ of the pizza left.

$$\frac{10}{10} - \frac{2}{10} = \frac{8}{10}$$

Write the answer in simplest form, if possible.

$$\frac{8}{10} = \frac{4}{5}$$

Use fraction strips or models to subtract. Simplify if possible.

- $\frac{3}{5} - \frac{3}{5} = \frac{0}{5}$ 2. $\frac{7}{10} - \frac{3}{10} = \frac{4}{10}$ or $\frac{2}{5}$ 3. $\frac{3}{4} - \frac{3}{4} = \frac{0}{4}$ 4. $\frac{4}{10} - \frac{4}{10} = \frac{0}{10}$ 5. $\frac{8}{8} - \frac{6}{8} = \frac{2}{8}$ or $\frac{1}{4}$ 6. $\frac{11}{12} - \frac{7}{12} = \frac{4}{12}$ or $\frac{1}{3}$ 7. $\frac{8}{8} - \frac{2}{8} = \frac{6}{8}$ or $\frac{3}{4}$ 8. $\frac{4}{4} - \frac{2}{4} = \frac{2}{4}$ or $\frac{1}{2}$ 9. $\frac{11}{12} - \frac{8}{12} = \frac{3}{12}$ or $\frac{1}{4}$ 10. $\frac{12}{12} - \frac{6}{12} = \frac{6}{12}$ or $\frac{1}{2}$ 11. $\frac{10}{10} - \frac{4}{10} = \frac{6}{10}$ or $\frac{3}{5}$ 12. $\frac{9}{9} - \frac{6}{9} = \frac{3}{9}$ or $\frac{1}{3}$ 13. Algebra: Find x .
 $x - \frac{1}{3} = \frac{1}{3}$ $x = \frac{2}{3}$

Also available in print

Practice Master

Name _____ Practice 12-3

Modeling Subtraction of Fractions

Use fraction strips to subtract. Simplify if possible.

- $\frac{6}{12} - \frac{5}{12} = \frac{1}{12} = \frac{1}{12}$ 2. $\frac{6}{12} - \frac{4}{12} = \frac{2}{12} = \frac{1}{6}$ 3. $\frac{1}{2} - \frac{1}{2} = 0$ 4. $\frac{4}{6} - \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$ 5. $\frac{5}{6} - \frac{4}{6} = \frac{1}{6}$ 6. $\frac{10}{10} - \frac{7}{10} = \frac{3}{10}$ 7. $\frac{8}{8} - \frac{3}{8} = \frac{5}{8}$ 8. $\frac{7}{8} - \frac{5}{8} = \frac{2}{8} = \frac{1}{4}$ 9. $\frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$ 10. $\frac{3}{5} - \frac{2}{5} = \frac{1}{5}$ 11. $\frac{8}{8} - \frac{1}{8} = \frac{7}{8}$ 12. $\frac{9}{12} - \frac{1}{12} = \frac{8}{12} = \frac{2}{3}$

13. Algebra: Evaluate $\frac{3}{8} - \frac{1}{8} = \frac{2}{8}$

14. Draw a Diagram: Harriet has $\frac{3}{4}$ tank of gas left in her car. If she needs $\frac{1}{4}$ tank to go to her friend's house and another $\frac{1}{4}$ tank to get back home, does she have enough gas? Draw a diagram and explain your answer.
Yes, she will have enough. Check students' diagrams.

15. Alicia had $\frac{3}{8}$ yard of fabric. She used $\frac{5}{8}$ for a pillow. How much fabric did she have left? Explain how you found your answer.
 $\frac{3}{8}$ or $\frac{3}{8}$ yard: Sample answer: Subtract $\frac{10}{8} - \frac{8}{8}$ and simplify the result.

Also available in print

Agility Fun Run

Name _____ Enrichment 12-3

The dog agility Fun Run is about to begin. Answer the Fun Run questions below. Simplify, if possible.

- Twelve dogs read up and down the contact zone on the side and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{9}{12} = \frac{3}{4}$
- Ten dogs read through the tunnel. Four dogs entered through the wrong end and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{6}{10} = \frac{3}{5}$
- Six dogs leapt over the triple jump bars. Three dogs headed down the top bar and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{3}{6} = \frac{1}{2}$
- Eight dogs read up and down the walk-on ramp. Five dogs did not read the score on the up side and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{3}{8}$
- Six dogs ran up and down the seesaw. Two dogs jumped over the top bar and were disqualified. What fraction remains in the Fun Run?
 $\frac{4}{6} = \frac{2}{3}$
- Five dogs zoomed through the tire jump. One dog jumped over the top bar and was disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{4}{5}$
- Ten dogs were headed over to a new event but five of these dogs went to take a break?
 $\frac{5}{10}$ or $\frac{1}{2}$

Levelled Homework

Partner Talk Listen for evidence that a student subtracts the numerators and names the same denominators to find the difference. For example, a student might say, "7 twelfths is 2 twelfths more than 5 twelfths. So, 7 twelfths minus 5 twelfths is 2 twelfths."

Play again! Talk about how you know that a fraction can be simplified.

$\frac{1}{2}$	$\frac{2}{8}$	$\frac{1}{6}$	$\frac{1}{8}$	$\frac{3}{6}$	$\frac{1}{6}$
$\frac{1}{2}$	$\frac{2}{6}$	$\frac{5}{6}$	$\frac{7}{6}$	$\frac{1}{4}$	$\frac{11}{6}$
$\frac{9}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{6}$	$\frac{3}{6}$	$\frac{11}{6}$

Play again! Talk about your strategies as you play.

$\frac{1}{3}$	$\frac{2}{4}$	$\frac{5}{6}$	$\frac{6}{8}$	$\frac{6}{6}$	$\frac{11}{12}$	$\frac{1}{2}$
$\frac{2}{3}$	$\frac{15}{16}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{10}{16}$	$\frac{10}{16}$	$\frac{1}{2}$
$\frac{3}{4}$	$\frac{22}{24}$	$\frac{13}{14}$	$\frac{15}{16}$	$\frac{15}{16}$	$\frac{20}{24}$	$\frac{1}{2}$

to represent the 12 months in a year.

- Have students subtract the months in the year before March and show the remaining part of the year. [$\frac{10}{12}$ or $\frac{5}{6}$]
- Have students put all 12 fraction strips back together.

• Ask students to show the part of the year that does not include winter.
 [Possible response: $\frac{9}{12}$ or $\frac{3}{4}$]

Partner Talk Listen for evidence that a student subtracts the numerators and names the same denominators to find the difference. For example, a student might say, "7 twelfths is 2 twelfths more than 5 twelfths. So, 7 twelfths minus 5 twelfths is 2 twelfths."

Play Again! Talk about how you know that a fraction can be simplified.

$\frac{1}{2}$	$\frac{2}{8}$	$\frac{1}{6}$	$\frac{1}{8}$	$\frac{2}{6}$
$\frac{1}{6}$	$\frac{3}{16}$	$\frac{5}{16}$	$\frac{7}{16}$	$\frac{1}{4}$
$\frac{1}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{11}{16}$

Play Again! Talk about your strategies as you play.

$\frac{1}{3}$	$\frac{7}{4}$	$\frac{20}{20}$	$\frac{6}{6}$	$\frac{12}{12}$
$\frac{2}{5}$	$\frac{15}{16}$	$\frac{7}{4}$	$\frac{10}{10}$	$\frac{6}{10}$
$\frac{3}{4}$	$\frac{22}{24}$	$\frac{13}{14}$	$\frac{15}{16}$	$\frac{19}{20}$
$\frac{1}{5}$			$\frac{15}{12}$	$\frac{2}{2}$

Repeating Master

Name _____ Repeating 12-3

Modeling Subtraction of Fractions

Karla made a pizza and cut it into 10 slices. She ate two slices. What fraction of the pizza is left? You can use a model to subtract fractions.



Karla's pizza is divided into 10 slices. One way to show this is $\frac{10}{10} = 1$ whole pizza. Karla ate two slices of the pizza. Cross out two of the slices. Count the number of slices left. There are 8 slices or $\frac{8}{10}$ of the pizza left.

Write the answer in simplest form, if possible.

$\frac{10}{10} - \frac{2}{10} = \frac{8}{10}$

Use fraction strips or models to subtract. Simplify if possible.

- $1. \frac{3}{3} - \frac{3}{3} = \frac{4}{10}$ or $\frac{2}{5}$
- $2. \frac{7}{10} - \frac{3}{10} = \frac{4}{10}$ or $\frac{2}{5}$
- $3. \frac{6}{10} - \frac{3}{10} = \frac{3}{10}$ or $\frac{3}{10}$
- $4. \frac{8}{10} - \frac{6}{10} = \frac{2}{10}$ or $\frac{1}{5}$
- $5. \frac{6}{10} - \frac{3}{10} = \frac{3}{10}$ or $\frac{3}{10}$
- $6. \frac{7}{10} - \frac{7}{10} = \frac{12}{10}$ or $\frac{6}{5}$
- $7. \frac{8}{8} - \frac{6}{6} = \frac{3}{2}$ or $\frac{1}{2}$
- $8. \frac{3}{8} - \frac{3}{8} = \frac{3}{8}$ or $\frac{3}{8}$
- $9. \frac{11}{12} - \frac{6}{12} = \frac{5}{12}$ or $\frac{5}{12}$
- $10. \frac{7}{12} - \frac{5}{12} = \frac{2}{12}$ or $\frac{1}{6}$
- $11. \frac{6}{10} - \frac{4}{10} = \frac{2}{10}$ or $\frac{1}{5}$
- $12. \frac{8}{12} - \frac{6}{12} = \frac{2}{12}$ or $\frac{1}{6}$
- $13. \text{ Algebra Find } x.$
 $x - \frac{6}{6} = \frac{1}{6}$ $x = \frac{7}{6}$

Also available in print

Practice Master

Name _____ Practice 12-3

Modeling Subtraction of Fractions

Use fraction strips to subtract. Simplify if possible.

- $1. \frac{11}{12} - \frac{5}{12} = \frac{6}{12} = \frac{1}{2}$
- $2. \frac{5}{12} - \frac{10}{12} = \frac{2}{12} = \frac{1}{6}$
- $3. \frac{4}{6} - \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$
- $4. \frac{8}{10} - \frac{3}{10} = \frac{5}{10} = \frac{1}{2}$
- $5. \frac{8}{8} - \frac{4}{8} = \frac{4}{8} = \frac{1}{2}$
- $6. \frac{9}{10} - \frac{3}{10} = \frac{6}{10} = \frac{3}{5}$
- $7. \frac{10}{10} - \frac{4}{10} = \frac{6}{10} = \frac{3}{5}$
- $8. \frac{7}{8} - \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$
- $9. \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$
- $10. \frac{3}{5} - \frac{2}{5} = \frac{1}{5}$
- $11. \frac{2}{3} - \frac{1}{3} = \frac{1}{3}$
- $12. \frac{1}{12} - \frac{1}{12} = \frac{8}{12} = \frac{2}{3}$

- 13. Algebra** Evaluate $\frac{8}{3} - 7 = \frac{3}{3} = 1$
- 14. Draw a Diagram** Harriet has $\frac{1}{4}$ tank of gas left in her car. If she needs $\frac{1}{2}$ tank to go to her friend's house and another $\frac{1}{4}$ tank to get back home, does she have enough gas? Draw a diagram and explain your answer.
Yes, she will have enough. Check students' diagrams.
- 15. Alicia** had $\frac{10}{12}$ yard of fabric. She used $\frac{2}{6}$ for a pillow. How much fabric did she have left? Explain how you found your answer.
 $\frac{10}{12}$ or $\frac{8}{12}$ yard; Sample answer: Subtract $\frac{10}{12} - \frac{4}{12} = \frac{6}{12}$ and simplify the result.

Also available in print

Name _____ Enrichment 12-3

Agility Fun Run

The dog agility Fun Run is about to begin. Answer the Fun Run questions below. Simplify, if possible.

- Twelve dogs raced up and down the A-frame. Three dogs did not touch the contact zone on the A-frame. What fraction of these dogs remains in the Fun Run?
 $\frac{9}{12} = \frac{3}{4}$
- Ten dogs raced through the tunnel. Four dogs entered through the wrong end and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{6}{10} = \frac{3}{5}$
- Six dogs leapt over the triple jump bars. Three dogs knocked down the top bar and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{3}{6} = \frac{1}{2}$
- Eight dogs raced up and down the walk-on ramp. Five dogs did not touch the contact zone on the up side and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{3}{8}$
- Six dogs set up and down the saw. Two dogs jumped off before the sawyer touched the ground and were disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{4}{6} = \frac{2}{3}$
- Five dogs zoomed through the tire jump. One dog was disqualified. What fraction of these dogs remains in the Fun Run?
 $\frac{4}{5}$
- Seven dogs went to take a break and get water. What fraction of these dogs went to take a break?
 $\frac{5}{10}$ or $\frac{1}{2}$

Also available in print

Who is $\frac{7}{10} - \frac{4}{10}$?

Can the difference be simplified?
Yes, divide both the numerator and denominator by 2, $\frac{2}{8} = \frac{1}{4}$.

Who is $\frac{7}{10} - \frac{4}{10}$?

Can the difference be simplified?
[No, there are no common factors in the numerator and denominator.]

Reaching Mastery

Name _____ Reaching 12.4

Subtracting Fractions with Like Denominators

When subtracting with two fractions having the same denominator, the difference also has the same denominator.

Find $\frac{2}{8} - \frac{1}{8}$

Step 1: Subtract the numerators.
 $2 - 1 = 1$

Step 2: Write the difference over the same denominator.
 $\frac{1}{8}$

Step 3: Simplify the answer if possible.
 $\frac{1}{8}$

So, $\frac{2}{8} - \frac{1}{8} = \frac{1}{8}$

Subtract the fractions. Simplify if possible.

- | | | | |
|---|---------------------------------|-----------------------------------|---------------------------------|
| 1. $\frac{4}{5} - \frac{3}{5}$ | $\frac{1}{5}$ | 2. $\frac{8}{12} - \frac{3}{12}$ | $\frac{5}{12}$ |
| 3. $\frac{9}{6} - \frac{1}{6}$ | $\frac{8}{6}$ or $\frac{4}{3}$ | 4. $\frac{8}{10} - \frac{1}{10}$ | $\frac{7}{10}$ |
| 5. $\frac{11}{12} - \frac{4}{12}$ | $\frac{7}{12}$ or $\frac{1}{2}$ | 6. $\frac{5}{8} - \frac{1}{8}$ | $\frac{4}{8}$ or $\frac{1}{2}$ |
| 7. $\frac{27}{100} - \frac{40}{100}$ | $\frac{57}{100}$ | 8. $\frac{5}{8} - \frac{1}{8}$ | $\frac{4}{8}$ or $\frac{1}{2}$ |
| 9. $\frac{7}{10} - \frac{2}{10}$ | $\frac{5}{10}$ or $\frac{1}{2}$ | 10. $\frac{7}{12} - \frac{1}{12}$ | $\frac{6}{12}$ or $\frac{1}{2}$ |
| 11. $\frac{3}{4} - \frac{1}{4}$ | $\frac{2}{4}$ or $\frac{1}{2}$ | 12. $\frac{8}{9} - \frac{1}{9}$ | $\frac{7}{9}$ |
| 13. Reasoning During Inquiry practice, Mason hit the target 7 times out of 10 hits. What fraction of the arrows did NOT hit the target? | $\frac{3}{10}$ | | |

Also available in print

You want if you are the first to get four connected rectangles, like this.

$\frac{3}{8}$	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{3}{4}$
$\frac{1}{2}$	$\frac{7}{10}$	$\frac{2}{3}$	$\frac{1}{2}$
$\frac{7}{12}$	$\frac{3}{4}$	0	$\frac{3}{8}$
$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{2}$

Partner Talk Listen for a complete explanation that describes the process used to simplify each difference.

Leveled Homework

Practice Master

Name _____ Practice 12.4

Subtracting Fractions with Like Denominators

In 1 through 12, find each difference. Simplify if possible.

- $\frac{1}{3} - \frac{1}{3} = 0$
- $\frac{2}{10} - \frac{6}{10} = \frac{4}{10} = \frac{2}{5}$
- $\frac{3}{8} - \frac{3}{8} = 0$
- $\frac{4}{8} - \frac{1}{8} = \frac{3}{8}$
- $\frac{5}{10} - \frac{8}{10} = \frac{1}{10}$
- $\frac{6}{8} - \frac{5}{8} = \frac{1}{8}$
- $\frac{7}{8} - \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$
- $\frac{8}{4} - \frac{1}{4} = \frac{7}{4}$
- $\frac{9}{12} - \frac{1}{12} = \frac{8}{12} = \frac{2}{3}$
- $\frac{10}{12} - \frac{12}{12} = \frac{4}{12} = \frac{1}{3}$
- $\frac{11}{12} - \frac{6}{12} = \frac{5}{12}$
- $\frac{12}{12} - \frac{8}{12} = \frac{4}{12} = \frac{1}{3}$
- Geometry The area of rectangle A is $\frac{3}{4}$ square meters. The area of rectangle B is $\frac{1}{4}$ square meters. How much larger is rectangle A?
- Joan counted that $\frac{2}{5}$ of her jelly beans were red. Dean counted that $\frac{1}{5}$ of his jelly beans were red. How much greater is the fraction of red jelly beans counted by Dean?
- Think About the Process On the weekends, Paul logs $\frac{3}{10}$ miles on the weekdays. Paul logs $\frac{1}{10}$ mile. Which expression shows how many more miles Paul logs on the weekends than on a weekday?
- In a classroom, $\frac{2}{5}$ of the students play baseball, $\frac{1}{5}$ play football, $\frac{1}{5}$ are in the chorus, and the rest participate in volunteer programs. What fraction of the students participate in volunteer programs? Explain your answer.
- Volunteer programs. Sample answer: Add $\frac{2}{5} + \frac{1}{5}$ and $\frac{1}{5}$ and subtract the result from $\frac{1}{2}$.

Also available in print

You want if you are the first to get four connected rectangles, like this.

$\frac{8}{10}$	$\frac{7}{10}$	$\frac{3}{4}$	$\frac{1}{9}$
$\frac{1}{4}$	$\frac{2}{3}$	$\frac{7}{8}$	$\frac{3}{5}$
$\frac{1}{7}$	$\frac{1}{2}$	$\frac{1}{6}$	$\frac{7}{10}$
$\frac{1}{6}$	$\frac{1}{9}$	$\frac{5}{8}$	$\frac{1}{4}$

Partner Talk Listen for a complete explanation that describes the process used to simplify each difference.

Cooking Up Fractions

1. A bronze recipe calls for $\frac{3}{8}$ cup of chocolate chips for each pan of brownies. Nadine has 1 cup of chips. Does she have enough chocolate chips to make 2 pans of brownies? Explain.

Sample answer: No; she would need $\frac{4}{8}$ cup, and one cup is only $\frac{3}{8}$ cup.

2. In the question above, if Nadine's neighbor gave her 2 cups of chocolate chips, would she have enough chocolate chips to make 2 pans of brownies? Explain.
Sample answer: Yes; she would need $\frac{4}{8}$ cup, and two cups is $\frac{16}{8}$ cup.

3. Tini's oatmeal recipe calls for $\frac{2}{7}$ of a cup of oatmeal. Tini only has $\frac{3}{7}$ of a cup of oatmeal. How much more oatmeal does he need to make the cookies?

$\frac{2}{12}$ or $\frac{1}{6}$ cup

4. There are 14 cake decorations in a box. $\frac{7}{14}$ are balloons, $\frac{3}{14}$ are stars, and $\frac{4}{14}$ are hearts. How many more decorations are left in the box?

$\frac{12}{14} = \frac{6}{7}$

5. Tom had 17 chocolate. She will garnish each with $\frac{1}{3}$ cup of chocolate. How many batches of brownies can she make with the chocolate she has? Explain.

$\frac{9}{3} = 3$

6. The Bluebird Cooking School's cake decorating class is $\frac{1}{10}$ full. What fraction of the class is still open to students?

$\frac{10}{10} - \frac{4}{10} = \frac{6}{10} = \frac{3}{5}$

Also available in print

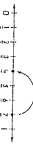
- and write $\frac{5}{6}$ below the dot.
- Have students draw a green arc from the $\frac{5}{6}$ point to the $\frac{2}{6}$ point and write $-\frac{3}{6}$ above the arc.
 - Students use blue to mark the location of the answer to $\frac{5}{6} - \frac{3}{6}$. [$\frac{2}{6} = \frac{1}{3}$]
 - Repeat the process by drawing a number line divided into eighths and showing $\frac{2}{8} + \frac{3}{8}$.

Receding Master

Adding and Subtracting on the Number Line

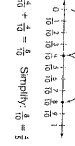
Receding
12-5

Bernadette has $\frac{3}{4}$ yard of ribbon. She cuts off $\frac{1}{4}$ yard to make a collar for her dog. How much ribbon does Bernadette have left? You can use a number line to help you subtract fractions.



$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$ Simplify: $\frac{2}{4} = \frac{1}{2}$ There is $\frac{1}{2}$ yard of ribbon left.

Keen and Duane are recycling aluminum cans. Each boy has collected $\frac{3}{8}$ pound. How many pounds have they collected in all? Draw the number line into tenths. Start at zero and draw an arrow to each place a point at $\frac{3}{8}$ for each boy's amount of aluminum Keen collected. Now draw another arrow $\frac{3}{8}$ of a unit long to the right to show Duane's amount.



$\frac{3}{8} + \frac{3}{8} = \frac{6}{8}$ Simplify: $\frac{6}{8} = \frac{3}{4}$ The boys collected $\frac{3}{4}$ pound of aluminum.

Add or subtract the fractions. You may use a number line. Simplify your answer, if possible.

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

2. $\frac{6}{12} - \frac{2}{12} = \frac{4}{12}$ or $\frac{1}{3}$

3. $\frac{3}{10} - \frac{1}{10} = \frac{2}{10}$ or $\frac{1}{5}$

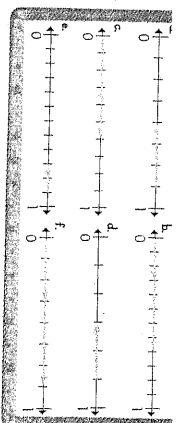
4. $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$ or $\frac{6}{8}$

5. $\frac{2}{5} - \frac{1}{5} = \frac{1}{5}$ or $\frac{2}{10}$

6. $\frac{1}{100} + \frac{99}{100} = \frac{100}{100}$ or 1

7. $4\frac{1}{4} - 1\frac{3}{4} = 3$ or $\frac{12}{4} - \frac{3}{4} = \frac{9}{4}$

Also available in print



Work as a team. Draw a number line that you could use to compare running distances.

Partner Talk Listen for the word because. For example, a student might say: "7/8 is close to 1 because 8/8 equals 1."

Level 1 Homework

Practice Master

Practice
12-5

Adding and Subtracting on the Number Line

Write the addition shown by each number line. Write your answer. Simplify, if possible.

1. $\frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$

2. $\frac{5}{6} - \frac{2}{6} = \frac{3}{6} = \frac{1}{2}$

Draw a number line to solve. Simplify, if possible.

3. $\frac{3}{8} - \frac{1}{8} = \frac{2}{8} = \frac{1}{4}$

4. $\frac{4}{12} + \frac{2}{12} = \frac{6}{12} = \frac{1}{2}$

5. Draw a Diagram. Ann is growing two different plants for a science project. Plant A grew $\frac{2}{3}$ inch the first week, and $\frac{1}{3}$ inch the second week. Plant B grew $\frac{1}{3}$ inch the first week on a different number line. Which plant is taller now?

6. Which equation is represented by the number line below?

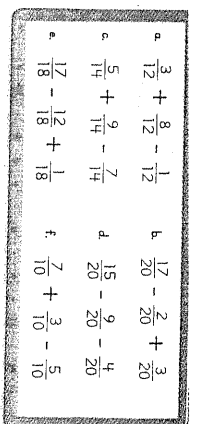
Plant A: $\frac{1}{2} + \frac{1}{2} = 1$

Plant B: $\frac{1}{2} - \frac{1}{2} = 0$

7. Dave made fruit punch for his party, but accidentally spilled and spilled $\frac{3}{4}$ of the punch. How much of the punch was left? Explain how you found your answer.

Sample answer: subtract $1 - \frac{3}{4} = \frac{1}{4}$

Also available in print



Work as a team. Talk about when someone might need to compute with three fractions like these.

Number Lines

Enrichment
12-5

1. In the dog walk, Antwanze for the humane society, Tanya walked $\frac{2}{3}$ miles, Bruce walked $\frac{2}{3}$ miles, and Jack walked $\frac{1}{3}$ miles. Show these distances on the number line. Who walked the farthest?

Jack walked the farthest.

2. Carl made a salad for the school picnic. He used $\frac{3}{8}$ pounds of cucumbers, $\frac{1}{8}$ pounds of tomatoes, and $\frac{3}{8}$ pounds of lettuce. Show these amounts on the number line. Which salad ingredient weighed the most?

The cucumbers weighed the most.

3. Jefferson was putting the following fractions on a number line: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{2}{3}$. How should the number line be labeled to greatest? Explain how Jefferson would find his answer.

Sample answer: Find the common denominator. 12. Convert the fractions: $\frac{1}{2} = \frac{6}{12}$, $\frac{1}{3} = \frac{4}{12}$, $\frac{2}{3} = \frac{8}{12}$. From least to greatest, the fractions should be ordered: $\frac{1}{3}$, $\frac{1}{2}$, and $\frac{2}{3}$.

4. Rachel labeled a number line by tenths. She wrote from $\frac{1}{10}$ through $\frac{9}{10}$ and put a point at each tenth. Between which two tenths and $\frac{6}{10}$ does $\frac{3}{5}$ lie?

Also available in print

1 and the extra fourth as $\frac{1}{4}$. Then ask students what mixed number is shown.

Ask students to name the number of fourths that are shown. If necessary, count up with students: "one fourth, two fourths," and so on.

Have students put the fourths together and explain that the model shows $1\frac{1}{4}$ and $\frac{5}{4}$, so $1\frac{1}{4} = \frac{5}{4}$. Students should write this equation.

Repeat this process with other fractions greater than 1.

Play Again

$\frac{10}{8} = 2\frac{2}{8}$	$\frac{7}{8} = 2\frac{2}{8}$	$\frac{1}{2} = 3\frac{2}{8}$	$\frac{1}{2} = 5\frac{2}{8}$	$\frac{1}{2} = 4\frac{2}{8}$	$\frac{1}{2} = 5\frac{2}{8}$
$\frac{10}{8} = 3\frac{2}{8}$	$\frac{3}{4} = 2\frac{2}{8}$	$\frac{3}{4} = 6\frac{2}{8}$	$\frac{1}{4} = 1\frac{2}{8}$	$\frac{1}{4} = 2\frac{2}{8}$	$\frac{1}{4} = 3\frac{2}{8}$
$\frac{3}{4} = 5\frac{2}{8}$	$\frac{1}{3} = 3\frac{2}{8}$	$\frac{5}{4} = 4\frac{2}{8}$	$\frac{1}{4} = 2\frac{2}{8}$	$\frac{1}{4} = 3\frac{2}{8}$	$\frac{1}{4} = 4\frac{2}{8}$
$\frac{1}{3} = 4\frac{2}{8}$	$\frac{1}{3} = 4\frac{2}{8}$	$\frac{1}{2} = 2\frac{2}{8}$	$\frac{1}{4} = 4\frac{2}{8}$	$\frac{1}{4} = 5\frac{2}{8}$	$\frac{1}{4} = 6\frac{2}{8}$

Play Again

$\frac{10}{8} = 2\frac{2}{8}$	$\frac{3}{4} = 8\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 3\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$
$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 11\frac{2}{8}$	$\frac{1}{2} = 4\frac{2}{8}$	$\frac{1}{2} = 5\frac{2}{8}$	$\frac{1}{2} = 3\frac{2}{8}$
$\frac{1}{2} = 8\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 7\frac{2}{8}$	$\frac{1}{2} = 7\frac{2}{8}$	$\frac{1}{2} = 7\frac{2}{8}$
$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 0\frac{2}{8}$	$\frac{1}{2} = 4\frac{2}{8}$	$\frac{1}{2} = 7\frac{2}{8}$	$\frac{1}{2} = 7\frac{2}{8}$

Farmer Talk Listen for language that describes a mental math strategy. For example, a student might say, "I know that one whole is three thirds, so eight thirds is two and two thirds."

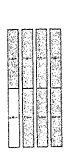
Repeating Master

Name _____ Repeating 12-6

Improper Fractions and Mixed Numbers

You can use fraction strips to write a mixed number as an improper fraction.

$\frac{3}{4}$ of the model below is shaded.



How many strips are completely shaded? 2. This is your denominator. What fraction of the model strip is shaded? $\frac{3}{4}$. This is your numerator. $\frac{3}{4}$ is the same as the improper fraction $\frac{3}{4}$.

You can also use fraction strips to write an improper fraction as a mixed number.

$\frac{11}{4}$ of the model below is shaded.



How many strips are completely shaded? 2. This is your denominator. What fraction of the model strip is shaded? $\frac{11}{4}$. This is your numerator. $\frac{11}{4}$ is the same as the mixed number $2\frac{3}{4}$.

Write each mixed number as an improper fraction.

1. $2\frac{2}{3}$ 2. $4\frac{1}{5}$ 3. $2\frac{2}{4}$ 4. $4\frac{5}{6}$ 5. $\frac{32}{6}$

Write each improper fraction as a mixed number of a whole number.

6. $\frac{11}{12}$ 7. $\frac{5}{5}$ 8. $\frac{23}{10}$ 9. $\frac{21}{8}$

Write each improper fraction as a mixed number or a whole number.

10. $\frac{11}{12}$ 11. $\frac{5}{5}$ 12. $\frac{23}{10}$ 13. $\frac{21}{8}$

Sample answer: Whole number, because if you divide the numerator by the denominator, the quotient is 9 and there is no remainder.

Also available in print

Leveled Homework

Practice Master

Name _____ Practice 12-6

Improper Fractions and Mixed Numbers

Write each mixed number as an improper fraction.

1. $3\frac{1}{3}$ 2. $6\frac{1}{4}$ 3. $2\frac{2}{3}$ 4. $2\frac{1}{10}$ 5. $\frac{27}{10}$

Write each improper fraction as a mixed number or whole number.

6. $\frac{25}{3}$ 7. $\frac{12}{2}$ 8. $\frac{21}{10}$ 9. $\frac{4}{10}$

Number Sense Matt had to write $3\frac{2}{3}$ as an improper fraction. How did he write the mixed number to do so?

Sample answer: The easiest way is to first write $\frac{12}{3}$ in simplest form as 4. That makes the multiplication easier. $(3 \times 3) + 1 = 10$, so $3\frac{2}{3} = \frac{10}{3}$.

All has 5 ounces of hot sauce. Write the weight of jars in mill as a mixed number.

11. Rick had $\frac{1}{3}$ gal of milk. Write the amount of milk Rick has as an improper fraction.

12. Which is NOT an improper fraction equal to $8\frac{1}{2}$?
 A. $\frac{17}{2}$ B. $\frac{17}{4}$ C. $\frac{17}{8}$ D. $\frac{17}{16}$

13. Writing in Exponent Write three different improper fractions that equal $\frac{1}{2}$. (Hint: Find equivalent fractions.)

Sample answer: $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$

Also available in print

Name _____ Enrichment 12-6

Recreation Time!

1. Timothy has computer class 3 times a week. Each class is 25 minutes long. How many hours of computer class does Timothy have per week? In 4 weeks?

2. Aho practices soccer 4 times a week for 50 minutes each practice. How many total hours does Aho practice soccer per week? In 2 weeks?

3. Laurel went swimming 7 times in 3 weeks. One time she swam for 45 minutes. How many hours did Laurel swim in 3 weeks?

4. Caitlin, Cindy, and Corrie went jogging at the recreation center. Caitlin jogged for 30 minutes, Cindy jogged for 20 minutes, and Corrie jogged for 70 minutes. What was the total amount of time they jogged altogether?

5. Dena takes tennis classes every Tuesday and every Wednesday. How many hours of tennis does Dena have in 3 weeks?

6. Jack spent 91 hours practicing ice hockey with his team. How many $\frac{1}{2}$ hours is that?

7. Misti takes 3 dance classes each week. Ballet class is 45 minutes long, modern dance is 50 minutes long, and jazz dance is 35 minutes long. How many hours of dance class does Misti have in 2 weeks?

8. Carlos practices piano every Monday, Wednesday, and Friday for 35 minutes each day. He also practices guitar every Tuesday, Thursday, and Saturday for 30 minutes each day. How many hours of music practice does Carlos have in 3 weeks?

$2\frac{1}{4}$ h, 9 h

$3\frac{1}{3}$ h, $6\frac{2}{3}$ h

$4\frac{1}{2}$ h

$2\frac{1}{3}$ h

$5\frac{1}{2}$ h

39

$4\frac{1}{2}$ h

$4\frac{3}{4}$ h

$3\frac{1}{4}$ h

Also available in print

- Have students use fraction strips or tiles to show the first problem.
- Have each student, in turn, tell the next step until the solution is found and students agree it is correct.
- Repeat with the second problem.
- Repeat with other examples as time allows.

Repeating Media

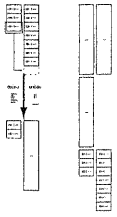
Name _____

Repeating
12-7

Modeling Addition and Subtraction of Mixed Numbers

Example 1: Draw a model to add $1\frac{1}{2} + 2\frac{2}{8}$

Step 1: Model each mixed number using fraction strips.



Step 2: Add the whole numbers to the equivalent fractions. Write the sum. Simplify, if possible.

$$\text{So, } 1\frac{1}{2} + 2\frac{2}{8} = 4\frac{3}{4}$$

Example 2: Draw a model to subtract $2\frac{1}{2} - 1\frac{1}{3}$

Step 1: Model the number you are subtracting from $2\frac{1}{2}$.



Express the part of the model that is not crossed out as a fraction or mixed number. So, $2\frac{1}{2} - 1\frac{1}{3} = 1\frac{1}{6}$

Use fraction strips to find each sum or difference. Simplify, if possible.

$$1. \quad 3\frac{1}{2} + 1\frac{1}{2} = 5 \quad 2. \quad 2\frac{2}{8} + \frac{1}{8} = 2\frac{3}{8} \quad 3. \quad 5\frac{6}{8} + 3\frac{1}{8} = 9\frac{7}{8} \quad 4. \quad 2\frac{2}{4} + 6\frac{1}{4} = 8\frac{3}{4}$$

Also available in print

Level of Homework

Practice Master

Name _____

Practice
12-7

Modeling Addition and Subtraction of Mixed Numbers

For 1 and 2, use each model to find each sum or difference.



Use fraction strips to find each sum or difference. Simplify, if possible.

- | | | | |
|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|
| 3. $2\frac{1}{2} + 1\frac{1}{2}$ | 4. $3\frac{1}{2} + 4\frac{1}{2}$ | 5. $5\frac{1}{2} - 1\frac{1}{2}$ | 6. $12\frac{1}{2} - 2\frac{1}{2}$ |
| 4 | 8 $\frac{1}{2}$ | 3 $\frac{3}{4}$ | 9 $\frac{1}{4}$ |
| 7. $8\frac{1}{8} - 3\frac{3}{8}$ | 8. $4\frac{1}{10} + 5\frac{1}{10}$ | 9. $7\frac{1}{3} + 4\frac{2}{3}$ | 10. $6\frac{2}{3} + 3\frac{1}{3}$ |
| $4\frac{1}{3}$ | $10\frac{2}{10}$ | $2\frac{2}{3}$ | $10\frac{1}{2}$ |
| 11. $1\frac{1}{6} + 9\frac{5}{6}$ | 12. $2\frac{1}{6} + 6\frac{2}{6}$ | 13. $6\frac{2}{3} + 4\frac{1}{3}$ | 14. $5\frac{1}{2} + 4\frac{1}{2}$ |
| 5 | 9 $\frac{3}{8}$ | 2 | $\frac{2}{3}$ |

15. Jerome's rain gauge showed $13\frac{5}{8}$ centimeters (cm) at the end of last month. At the end of this month, the rain gauge showed $15\frac{1}{8}$ centimeters. How many more centimeters of rain fell this month?
A. $28\frac{6}{8}$ cm B. $15\frac{3}{8}$ cm C. $2\frac{4}{8}$ cm D. $1\frac{6}{8}$ cm
16. You are adding $2\frac{1}{2} + 2\frac{1}{2}$ using fraction strips. Explain how you rename the fraction part of the problem.
Since $\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$, I can rename $\frac{4}{2}$ as 1 whole strip and $\frac{1}{2}$ strip.

Also available in print

Partner Talk Listen for evidence that a student can relate a mixed number to a pictorial model of that number. For example, a student might say, "We have to have as many full bars as the whole number, and then we still need part of a bar to show the fraction."

Modeling Create an expression with mixed numbers that your team can solve by drawing a picture of fraction strips.

Level of Homework **12-7**

Modeling Create an expression with mixed numbers that your team can solve by drawing a picture of fraction strips.

Level of Homework **12-7**

Name _____

Enrichment
12-7

Prime Time

Remember that a prime number is a whole number greater than 1 that has exactly two factors: itself and 1. Every number greater than 5 can be written as the sum of three 5's - 3 + 7.

Express the number below as the sum of three prime numbers. Write the primes in the squares. **Sample answers are given.**

- | | | | | | | |
|-------|---|----|---|----|---|----|
| 1. 7 | + | 7 | + | 3 | = | 17 |
| 2. 2 | + | 3 | + | 5 | = | 10 |
| 3. 3 | + | 5 | + | 7 | = | 15 |
| 4. 11 | + | 7 | + | 3 | = | 21 |
| 5. 2 | + | 13 | + | 17 | = | 32 |
| 6. 11 | + | 2 | + | 17 | = | 30 |
| 7. 13 | + | 11 | + | 2 | = | 26 |
| 8. 29 | + | 2 | + | 19 | = | 50 |

Also available in print

4. Simplify the fraction if possible.

Ask them to write the problem $4\frac{8}{10} + 5\frac{5}{10}$ in the first section.

• Within each section, have them complete the named step.

$$\frac{8}{10} + \frac{5}{10} = \frac{13}{10}, 4 + 5 = 9,$$

$$9\frac{13}{10} = 10\frac{3}{10}$$

• Repeat with other pieces of paper and other problems.

$$11\frac{6}{10} + 10\frac{8}{10} = 22\frac{14}{10}$$

a	b	c	d	e
f	g	h	i	j

Make up another addition puzzle with mixed numbers. Ask your partner to display the answers with 0-9 tiles.

Game Activity

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

f	g	h	i	j
---	---	---	---	---

Make up another addition puzzle with mixed numbers. Ask your partner to display the answers with 0-9 tiles.

Game Activity

Partner Talk Listen for evidence that a student is using estimation and number sense to find a missing addend. For example, a student might say, "I have to add $5\frac{1}{4}$ and $2\frac{1}{8}$. The sum will begin with 26 if the sum of the fractions is less than 1, or 27 if the sum of the fractions is greater than 1."

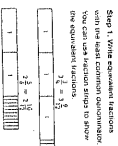
Levelled Homework

Practice Master

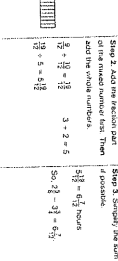
Practice 12-8

Adding Mixed Numbers

Step 1. Write equivalent fractions with the least common denominator. You can use fraction strips to show the common base.



Step 2. Add the fraction part of the mixed number first. Then add the whole numbers.



Step 3. Simplify the sum if possible.

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

$$1 + 1 = 2$$

$$2\frac{5}{6}$$

Adding Mixed Numbers

In 1 through 6, find each sum. Simplify, if possible. Estimate for reasonableness.

1. $7\frac{2}{3} + 6\frac{1}{3} = 13$

2. $4\frac{3}{4} + 2\frac{1}{4} = 6\frac{4}{4} = 7$

3. $11\frac{2}{5} + 3\frac{3}{5} = 15\frac{5}{5} = 16$

4. $7\frac{1}{8} + 2\frac{7}{8} = 10\frac{8}{8} = 11$

5. $5\frac{2}{3} + 3\frac{1}{3} = 9\frac{3}{3} = 10$

6. $2\frac{1}{2} + 1\frac{1}{2} = 4$

7. Number Sense. Write two mixed numbers that have a sum of 3.

Sample answer: $1\frac{1}{2} + 1\frac{1}{2} = 3$

8. What is the total measure of an average man's brain and heart in kilograms (kg)?

1 kg

Average woman's brain: $\frac{1}{3}$ kg

Average man's brain: $\frac{1}{2}$ kg

Average human heart: $\frac{3}{10}$ kg

2 kg

9. What is the total weight of an average woman's brain and heart in pounds (lb)?

3 1/2 lb

10. What is the sum of the measures of an average man's brain and an average woman's brain in kilograms?

2 7/10 kg

11. Which is a good comparison of the estimated sum and the actual sum of $7\frac{1}{2} + 2\frac{1}{2}$?

A. Estimated < actual

B. Actual = estimated

C. Actual > estimated

D. Estimated > actual

12. Can the sum of two mixed numbers be equal to 27? Explain why or why not.

No. Sample answer: It is impossible for two mixed numbers to equal 2 because every mixed number is greater than 1.

Name _____

Mixed Sums

Enrichment 12-8

1. Anne walked her dog $2\frac{1}{4}$ miles from her house to the dog park and $\frac{3}{4}$ miles around the park. Then she walked the same distance home. How many miles did she walk in all?

9 3/8 miles

2. John's full backpack weighs $5\frac{1}{2}$ pounds, and Trone's full backpack weighs $6\frac{1}{2}$ pounds. What is the total weight of both boys' backpacks?

12 1/2 pounds

3. Julie has two extension cords with lengths of $22\frac{1}{2}$ feet and $28\frac{1}{2}$ feet. How long a cord can she make by attaching them together?

48 1/2 feet

4. Terry weighed his two cats at the veterinarian's office. Becca weighed $12\frac{3}{4}$ pounds, and Tiger weighed 13 1/2 pounds. What is the total weight of both cats?

26 3/4 pounds

5. David ran $\frac{3}{4}$ miles on Saturday and $\frac{7}{8}$ miles on Sunday. How many miles did he run on the weekend?

1 17/20 miles

6. Amanda's heavy books weigh $\frac{1}{4}$ pounds, and her water bottle weighs $\frac{1}{2}$ pounds. What is the total weight of her books and water bottle?

5 1/4 pounds

5 1/6 pounds

5 1/6 pounds

5 1/6 pounds

5 1/6 pounds

5 1/6 pounds

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5 1/6 pounds

Also available in print

Also available in print

Also available in print

- Subtract Whole Numbers
- Simplify if Necessary
- Have them write the problem $12\frac{1}{6} - 5\frac{3}{6}$ in the first section.
- Complete the four steps.

$$[12\frac{1}{6} = 11\frac{7}{6}; 7\frac{3}{6} = \frac{3}{6} = \frac{1}{2};$$

$$11 - 5 = 6; 6\frac{4}{6} = 6\frac{2}{3}]$$
- Repeat with other problems.

1 Make up a subtraction problem with mixed numbers. Ask your team to complete steps 1-4 for your problem.

(Grade 5)

$$\begin{array}{r} 5 - 1\frac{2}{3} \\ - 2\frac{1}{6} \\ \hline 8 - 2\frac{1}{6} \\ \hline 6 - 3\frac{1}{3} \\ \hline 7 - 2\frac{1}{6} \\ \hline \end{array}$$

1 Make up a subtraction problem with mixed numbers. Ask your team to complete steps 1-4 for your problem.

(Grade 5)

$$\begin{array}{r} 8\frac{3}{4} \\ - 2\frac{1}{4} \\ \hline 5\frac{1}{2} - 2\frac{3}{4} \\ \hline 9\frac{7}{10} \\ - 3\frac{3}{10} \\ \hline 7\frac{3}{8} - 1\frac{1}{4} \\ \hline 11\frac{4}{9} \\ - 1\frac{1}{3} \\ \hline \end{array}$$

311D Report Back To check understanding, ask a student to repeat and complete this sentence: *When subtracting mixed numbers, you may have to* _____ [rename the first mixed number]

Reading Model

Name _____ Enrichment 12-9

Subtracting Mixed Numbers

The number 200 has had digits for 125 years. The zoo has had digits for $2\frac{1}{2}$ years. How many years longer has the zoo had digits?

Step 1: Write equivalent fractions with the same denominator. You can use fraction strips.

$$200 - 2\frac{1}{2} = 197\frac{1}{2}$$

Step 2: Find the difference of $197\frac{1}{2} - 2\frac{1}{2}$. Subtract the fractions. Then subtract the whole numbers. Simplify the difference if possible.

$$197\frac{1}{2} - 2\frac{1}{2} = 195$$

Example: $2\frac{1}{2} - 1\frac{1}{2} = 1$

- $4\frac{3}{8} - 2\frac{1}{8}$
- $5\frac{7}{12} - 1\frac{5}{12}$
- $3 - 1\frac{1}{4}$
- $6\frac{5}{6} - 5\frac{2}{6}$

For 1 through 4, find each difference. Simplify, if possible. Remember: You may have to rename a fraction in order to subtract.

5. Number Sense To find the difference of $7 - 3\frac{1}{2}$, how do you rename the 7 ? I know that $1\frac{1}{2} = 1.1$ can rename 7 as $6\frac{12}{12}$.
6. Ribbon ran $\frac{1}{2}$ miles last week. She ran $\frac{1}{4}$ miles this week. How many more miles did she run last week? $1\frac{1}{2}$ more miles

Also available in print

Leveled Homework

Practice Master

Name _____ Practice 12-9

Subtracting Mixed Numbers

For 1 through 10, find each difference. Simplify, if possible.

- $10\frac{1}{2} - 7\frac{1}{4}$
- $7\frac{2}{3} - 2\frac{1}{6}$
- $3\frac{1}{3} - 1\frac{1}{3}$
- $1\frac{7}{8} - 12\frac{3}{8}$
- $2\frac{3}{6} = 2\frac{1}{2}$
- $6\frac{2}{3} - 2\frac{2}{3}$
- $8\frac{2}{3} - 2\frac{1}{3}$
- $4\frac{1}{5} - 2\frac{1}{5}$
- $6\frac{1}{2} - 7\frac{1}{2}$
- $2 = 1$
- $10\frac{2}{10} - 2\frac{8}{10}$
- $4 = 2$

Strategy Practice The table shows the length and width of several kinds of bird eggs.

Bird	Length (in.)	Width (in.)
Canada goose	$3\frac{1}{4}$	$2\frac{3}{8}$
Robin	$\frac{9}{10}$	$\frac{7}{10}$
Turdouze	$1\frac{1}{2}$	$\frac{9}{10}$
Raven	$1\frac{9}{10}$	$1\frac{3}{10}$

11. How much longer is the Canada goose egg than the robin egg?
12. How much wider is the turdouze egg than the robin egg?
13. Which is the difference of $2\frac{1}{4} - 1\frac{3}{4}$?
 - $2\frac{1}{4}$
 - $2\frac{3}{4}$
 - $2\frac{1}{2}$
 - $2\frac{1}{4}$

14. Explain why it is necessary to rename $\frac{1}{4}$ if you subtract $\frac{1}{8}$ from 1 . Sample answer: You cannot subtract $\frac{1}{8}$ from 1 , so you must borrow 1 whole from the 4 and rename $4\frac{1}{4}$ as $3\frac{5}{4}$.

Also available in print

Name _____ Enrichment 12-9

Mixed Differences

Answer each question. Write your answers in simplest form.

- Jenna bought a spool of ribbon for her cat projects. It contained $5\frac{1}{2}$ meters of ribbon. She used $3\frac{1}{4}$ meters of ribbon for a project. How many meters of ribbon does Jenna have left? $2\frac{1}{4}$ meters
- Benson has a male puppy with a mass of $3\frac{1}{2}$ kilograms and a female puppy with a mass of $2\frac{1}{4}$ kilograms. How much greater is the male puppy's mass than the female puppy's? $1\frac{1}{4}$ kilograms
- Jane's sister drove $1\frac{1}{2}$ miles to her college, but this brother only drove $5\frac{1}{2}$ miles to the college. How much farther does Jane's sister drive than this brother? $4\frac{1}{2}$ miles

4. Akonai bought a spool of string for making kits. It contained $10\frac{3}{8}$ meters of string. He used $6\frac{1}{8}$ meters of string to make $10\frac{3}{8}$ meters of string. How much string does he have left? $3\frac{1}{4}$ meters

5. Janet grew a pumpkin that weighs $1\frac{3}{4}$ pounds and a melon that weighs $8\frac{1}{4}$ pounds. How much heavier is the pumpkin than the melon? $5\frac{1}{4}$ pounds

6. Aidan collected $3\frac{1}{2}$ miles around the lake. Josh collected $2\frac{1}{4}$ miles around the park. How much further did Aidan ride-shake than Josh? 3 mile

Also available in print

- One student can choose two fractions with the same denominator to add together. The student should color in the fraction circle, using a different color for each fraction.
- Have the other student select and color two different fractions that add to the same sum.
- Have the students switch roles with each other as they find the sums.

Partner Activity

Play again! Say an equation that includes the two fractions you chose and their sum. The sum is greater than 1. Explain why.

$\frac{1}{8}$	$\frac{2}{8}$	$\frac{3}{8}$	$\frac{4}{8}$	$\frac{5}{8}$	$\frac{6}{8}$	$\frac{7}{8}$	$\frac{8}{8}$
$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$

Partner Activity

Play again! Talk about your strategies as you play.

$\frac{1}{10}$	$\frac{2}{10}$	$\frac{3}{10}$	$\frac{4}{10}$	$\frac{5}{10}$	$\frac{6}{10}$	$\frac{7}{10}$	$\frac{8}{10}$	$\frac{9}{10}$	$\frac{10}{10}$
$\frac{1}{12}$	$\frac{2}{12}$	$\frac{3}{12}$	$\frac{4}{12}$	$\frac{5}{12}$	$\frac{6}{12}$	$\frac{7}{12}$	$\frac{8}{12}$	$\frac{9}{12}$	$\frac{10}{12}$

Partner Talk Listen for students to make number sentences. For example, a student might say "Five-eighths and two-eighths is equal to seven-eighths."

Reasoning Master

Name _____ Reaching 12-10

Decomposing and Composing Fractions

Example 1
 The denominators are the same, so you can add the numerators.
 $\frac{1}{3} + \frac{2}{3} = \frac{3}{3}$ Rewrite $\frac{3}{3}$ as 1.

Example 2
 Show another way to make this sum.
 $\frac{1}{3} + \frac{2}{3} = \frac{3}{3} = 1$

Add or subtract fractions and write answers in simplest form. Check students' work by using the same sum and using two or more fractions.

1. $\frac{1}{2} + \frac{1}{2} = 1$ 2. $\frac{1}{3} + \frac{2}{3} = 1$ 3. $\frac{1}{4} + \frac{3}{4} = 1$ 4. $\frac{1}{5} + \frac{4}{5} = 1$ 5. $\frac{1}{6} + \frac{5}{6} = 1$
6. $\frac{1}{7} + \frac{6}{7} = 1$ 7. $\frac{1}{8} + \frac{7}{8} = 1$ 8. $\frac{1}{9} + \frac{8}{9} = 1$ 9. $\frac{1}{10} + \frac{9}{10} = 1$
10. $\frac{1}{11} + \frac{10}{11} = 1$ 11. $\frac{1}{12} + \frac{11}{12} = 1$
11. At lunch, Alice ate $\frac{1}{2}$ of her sandwich. Later, for a snack, she ate another $\frac{1}{2}$ of the sandwich. Write an addition sentence that shows how much of the sandwich Alice ate. Suppose Alice ate the same total amount of her sandwich at 3 different times instead of 2. Write an addition problem that shows her amount. Show one example.
- Sample answer:** $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$

Also available in print

Leveled Homework

Practice Master

Name _____ Practice 12-10

Decomposing and Composing Fractions Check students' addition problems.

For 1 through 15, add or subtract the fractions. For the addition problems, write another addition problem that has the same sum and uses two or more fractions.

1. $\frac{1}{2} + \frac{1}{2} = 1$ 2. $\frac{1}{3} + \frac{2}{3} = 1$ 3. $\frac{1}{4} + \frac{3}{4} = 1$ 4. $\frac{1}{5} + \frac{4}{5} = 1$ 5. $\frac{1}{6} + \frac{5}{6} = 1$
6. $\frac{1}{7} + \frac{6}{7} = 1$ 7. $\frac{1}{8} + \frac{7}{8} = 1$ 8. $\frac{1}{9} + \frac{8}{9} = 1$ 9. $\frac{1}{10} + \frac{9}{10} = 1$
10. $\frac{1}{11} + \frac{10}{11} = 1$ 11. $\frac{1}{12} + \frac{11}{12} = 1$
12. $\frac{1}{10} + \frac{9}{10} = 1$ 13. $\frac{1}{11} + \frac{10}{11} = 1$ 14. $\frac{1}{12} + \frac{11}{12} = 1$ 15. $\frac{1}{13} + \frac{12}{13} = 1$
16. Jacob is making a stew. The stew calls for $\frac{1}{2}$ cup of rice. If he implies the recipe, how much rice will he need? Write an addition problem to show your answer.
 $\frac{1}{2} + \frac{1}{2} = 1$
17. Which of the following fractions is not an equivalent fraction to $\frac{1}{2}$?
 A $\frac{1}{4}$ B $\frac{1}{3}$ C $\frac{1}{5}$ D $\frac{1}{6}$
18. Writing to Explain Gerry folded $\frac{1}{3}$ of the pile of shirts. Molly folded $\frac{1}{3}$ of the pile of shirts. Together, did they fold more than half the shirts? Explain your answer.
No. They folded exactly one half of the shirts. $\frac{1}{3} + \frac{1}{3} = \frac{2}{3}$ which simplified is $\frac{1}{2}$.

Also available in print

Name _____ Enrichment 12-10

Boxes of Fractions

Complete each fraction box. Start with the fraction in the circle and add or subtract the fraction in the outer box to get the fraction in each outer corner. Write your answers in simplest form. One subtraction in Exercise 1 has been completed for you.

1. $\frac{8}{8} = 1$ $\frac{13}{8} = 1\frac{5}{8}$ $\frac{15}{8}$

2. $\frac{4}{10} = \frac{2}{5}$

3. $\frac{9}{12} = \frac{3}{4}$ $\frac{6}{12} = \frac{1}{2}$ $\frac{7}{12}$

4. $\frac{8}{6} = \frac{4}{3} = 1\frac{1}{3}$ $\frac{11}{6} = 1\frac{5}{6}$ $\frac{1}{6} = \frac{1}{6}$

Also available in print

did Ron give to Patrick and Michelle?

- Have students draw 12 flowers.
- Guide them to circle and count $\frac{1}{2}$ of them. Then label the flowers circled with the label $\frac{1}{2}$.
- Next, have students count the flowers and divide them in 4 equal groups. Have them label each group outside of the $\frac{1}{2}$ they already circled with the label $\frac{1}{4}$.
- Ask students to write an equation showing the problem.

Reaching Higher

Name _____

Problem Solving: Draw a Picture and Write an Equation

Read and Understand

Poppi filled $\frac{1}{4}$ of her own blue storage, $\frac{3}{8}$ of the jar with yellow stones, and $\frac{1}{4}$ of the jar with purple stones. How much of the jar is filled in all?

What do I know? Poppi filled $\frac{1}{4}$ and $\frac{3}{8}$ of a jar. What am I asked to find? How much of the jar is filled with stones?

Draw a picture and write an equation.

Solve

Add the fractions. Simplify if you need to.

$\frac{1}{4} + \frac{3}{8} + \frac{1}{4} = x$

$\frac{2}{8} + \frac{3}{8} + \frac{2}{8} = x$

$\frac{7}{8} = x$

Poppi filled the jar $\frac{7}{8}$ full of stones.

Check students' drawings.

1. John walked $\frac{1}{3}$ of a mile to the store, $\frac{2}{3}$ of a mile to the library, and $\frac{1}{3}$ of a mile to the post office. How far did he walk in all? $\frac{4}{3} + \frac{2}{3} + \frac{1}{3} = x$; $x = \frac{7}{3}$ mile

2. Miguel walked $\frac{1}{4}$ mile on Monday and $\frac{1}{2}$ mile on Tuesday. Let $x =$ how much farther she walked on Monday. How much farther did Miguel walk on Monday? $\frac{1}{4} - \frac{1}{2} = x$; $x = \frac{1}{4}$ mile farther

3. Number Sense Glenda wrote $\frac{3}{4}$ of her paper on Monday, $\frac{2}{5}$ of her paper on Tuesday, and $\frac{1}{10}$ of her paper on Wednesday. She said she wrote more than half of her paper. Is she correct? Why or why not? $\frac{3}{4} + \frac{2}{5} + \frac{1}{10} = x$; $x = \frac{4}{2} > \frac{1}{2}$. Glenda did not write more than half of her paper.

Also available in print

Partner Talk

Choose a, b, c, and d. Change one factor in the problem. Show how you change it. Show how you solve it. Show how you check it.

1. How many more did Ron run than Patrick? $\frac{1}{2} - \frac{1}{4} = x$; $x = \frac{1}{4}$ mile farther

2. How much longer did Santiago practice than what? $\frac{1}{2} - \frac{1}{4} = x$; $x = \frac{1}{4}$ hour

3. How much longer did Santiago practice than what? $\frac{1}{2} - \frac{1}{4} = x$; $x = \frac{1}{4}$ hour

4. How much longer did Santiago practice than what? $\frac{1}{2} - \frac{1}{4} = x$; $x = \frac{1}{4}$ hour

5. How much longer did Santiago practice than what? $\frac{1}{2} - \frac{1}{4} = x$; $x = \frac{1}{4}$ hour

Leveled Homework

Practice Master

Name _____

Problem Solving: Draw a Picture and Write an Equation

Draw a picture and write an equation to solve.

1. James bought $\frac{1}{2}$ pound of wheat flour. He also bought $\frac{1}{4}$ pound of white flour. How much flour did he buy? $\frac{1}{2} + \frac{1}{4} = x$; $x = \frac{3}{4}$ pound

2. Katie is $\frac{1}{3}$ of the way to Grandma's house. Larry is $\frac{1}{6}$ of the way to Grandma's house. How much closer to Grandma's house is Larry? $\frac{1}{3} - \frac{1}{6} = x$; $x = \frac{1}{6}$ of the way

3. Nina practiced the trumpet for $\frac{1}{2}$ hour. Santiago practiced the trumpet for $\frac{1}{4}$ hour. How much longer did Santiago practice than what? $\frac{1}{2} - \frac{1}{4} = x$; $x = \frac{1}{4}$ hour

4. Ned caught $\frac{1}{3}$ pound of fish. Stefan caught $\frac{1}{6}$ pound of fish. Jesse caught $\frac{1}{6}$ pound of fish. Which bar diagram shows how to find how many pounds of fish they caught in all? $\frac{1}{3} + \frac{1}{6} + \frac{1}{6} = x$; $x = \frac{2}{3}$ pound

5. John had $\frac{3}{4}$ of a pizza left after a party. He gave $\frac{1}{4}$ of the pizza to his friend to take home and he kept the rest. Draw a picture showing what fraction of the pizza he has left. $\frac{3}{4} - \frac{1}{4} = x$; $x = \frac{2}{4} = \frac{1}{2}$

Also available in print

Partner Talk

Ask a different question that your team members can answer by using the data in the table.

Patrick	1	2	3
Berry	2	3	4
Henry	3	4	5

1. How much farther did Berry run than Patrick? $3 - 1 = x$; $x = 2$ miles

2. How many more in all did these three students run? $1 + 2 + 3 = x$; $x = 6$ miles

3. How much farther did Henry run than Patrick? $4 - 1 = x$; $x = 3$ miles

4. How much farther did Henry run than Berry? $5 - 3 = x$; $x = 2$ miles

Practice Master

Name _____

Crazy Quilt

The quilt on the right is for a quilt system. Use the clues below to color or label the different squares.

Clue A: $\frac{1}{2}$ of the quilt is colored yellow. It is in the center.

Clue B: $\frac{2}{3}$ of the quilt is purple. It does not touch the blue part.

Clue C: $\frac{1}{4}$ of the quilt is blue. It goes around the yellow section.

Clue D: The green section of the quilt is made of 4 small squares. Write a fraction that tells about the green section. $\frac{4}{16}$ OR $\frac{1}{4}$

Create Your Own: Plan a quilt using the grid on the right. Write a section of the quilt that is a section of the quilt. Write a section of the quilt that is a section of the quilt. Write a section of the quilt that is a section of the quilt.

Clue A: Answers will vary. Make sure all clues contain fractions. Check students' methods.

Clue B: _____

Clue C: _____

Clue D: _____

Also available in print

- strips look the same. Write " $\frac{2}{3}$ " on the board. Draw two $\frac{1}{3}$ fraction strips below it on the board.
- * Pick up one fraction strip. Have students name the fraction [$\frac{1}{3}$]. Write on the board " $\frac{2}{3} = \frac{1}{3} \times \frac{1}{3}$ " so the equation reads " $\frac{2}{3} = \frac{1}{3} \times \frac{1}{3}$ ", and draw one $\frac{1}{3}$ fraction strip below the " $\frac{1}{3}$ ". Pick up two fraction strips. Have students name the fraction. [$\frac{2}{3}$] Write 2 on the line. " $\frac{2}{3} = 2 \times \frac{1}{3}$ ". Repeat for $\frac{4}{3}, \frac{3}{3}, \frac{5}{3}$.

Name _____

Reaching
13-1

Fractions as Multiples of Unit Fractions: Using Models

Ricardo has an apple that is cut into quarters. He wants to eat $\frac{2}{3}$ of the apple. How many $\frac{1}{4}$ pieces does he need to make $\frac{2}{3}$? Use fraction strips and a number line.



Each fraction strip equals $\frac{1}{4}$. There are three $\frac{1}{4}$ fraction strips.

Ricardo needs three $\frac{1}{4}$ pieces to make $\frac{2}{3}$. $\frac{2}{3} = 3 \times \frac{1}{4}$



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Level 1 Homework

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

a	b	c	d	e
f	g	h	i	j

Make your own puzzle with equivalent fractions. Use the letters a through j.

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

a	b	c	d	e
f	g	h	i	j

Make your own puzzle with equivalent fractions. Use the letters a through j.

Name _____

Practice
13-1

Fractions as Multiples of Unit Fractions: Using Models

For 1 through 9, write the fraction as a multiple of a unit fraction. Use fraction strips to help.

- $\frac{2}{3} = 2 \times \frac{1}{3}$ $2 \frac{2}{3} = 2 \times \frac{4}{6}$ $3 \frac{1}{2} = 3 \times \frac{1}{2}$
- $\frac{4}{3} = 3 \times \frac{1}{3}$ $5 \frac{1}{2} = 7 \times \frac{1}{2}$ $6 \frac{1}{2} = 6 \times \frac{1}{2}$
- $\frac{7}{3} = 5 \times \frac{1}{3}$ $8 \frac{1}{2} = 9 \times \frac{1}{2}$ $8 \frac{1}{2} = 8 \times \frac{1}{2}$

10. Use the picture at the right to write a multiplication equation with $\frac{1}{2}$ as a factor. Sample Answer: First I saw that the apples were all $\frac{1}{2}$. Then I wrote $\frac{8}{2} = 8 \times \frac{1}{2}$. The fraction has a numerator of 1.



12. Which equation describes the picture?

A $1 = 3 \times 1$ B $1 = 5 \times 1$ C $3 = 5 \times 1$ D $15 = 5 \times 3$

Also available in print

Name _____

Enrichment
13-1

Fraction Models

Look at the picture. Write the numbers that make the multiplication equation true.

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

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

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

Also available in print

to write and solve a multiplication equation for their fraction strips.

$$3 \times \frac{1}{4} = \frac{3}{4}$$

- Next, have students place six $\frac{1}{4}$ fraction strips in 3 equal groups of two on their desk. Have students work together to write and solve a multiplication equation for the 3 equal groups. $3 \times \frac{2}{4} = \frac{6}{4}$ or $1\frac{1}{2}$.
- Repeat using other equal groups of fraction strips.

Play again!

Game Activity

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

Play again!

Game Activity

<	>	<
>	<	>
=	=	=

Report Back To check understanding, ask a student to repeat and complete this sentence: [Mixed numbers]

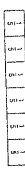
Levelled Homework

Repeating Master

Name _____ Repeating 13-2

Multiplying a Fraction by a Whole Number: Using Models

Write a multiplication equation of a whole number times a fraction to go with the picture.



Find the unit fraction: $\frac{1}{10}$

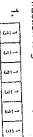
Count the number of unit fractions: 6

Write a multiplication equation to show the number of fractions times the unit fraction: $6 \times \frac{1}{10} = \frac{6}{10}$

Multiply to find the product: $6 \times \frac{1}{10} = \frac{6}{10}$

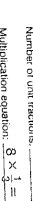
The multiplication equation that goes with the picture is $6 \times \frac{1}{10} = \frac{6}{10}$

In 1-2, write a multiplication equation of a whole number and a fraction to go with the picture.

1.  Unit fraction: $\frac{1}{10}$

Number of unit fractions: 3

Multiplication equation: $3 \times \frac{1}{10} = \frac{3}{10}$

2.  Unit fraction: $\frac{1}{10}$

Number of unit fractions: 9

Multiplication equation: $9 \times \frac{1}{10} = \frac{9}{10}$

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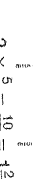
Practice Master

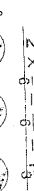
Name _____ Practice 13-2

Multiplying a Fraction by a Whole Number: Using Models

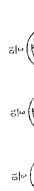
For 1-3, use each model to write a multiplication equation with a whole number and a fraction.

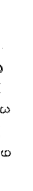
1.  $2 \times \frac{2}{10} = \frac{4}{10}$

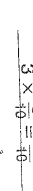
2.  $4 \times \frac{1}{10} = \frac{4}{10}$

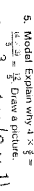
3.  $3 \times \frac{3}{10} = \frac{9}{10}$

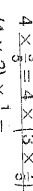
4.  $4 \times \frac{1}{10} = \frac{4}{10}$

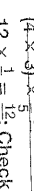
5.  $3 \times \frac{3}{10} = \frac{9}{10}$

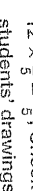
6.  $4 \times \frac{1}{10} = \frac{4}{10}$

7.  $3 \times \frac{3}{10} = \frac{9}{10}$


8.  $4 \times \frac{1}{10} = \frac{4}{10}$

9.  $3 \times \frac{3}{10} = \frac{9}{10}$

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

11.  $3 \times \frac{3}{10} = \frac{9}{10}$

12.  $4 \times \frac{1}{10} = \frac{4}{10}$

13.  $3 \times \frac{3}{10} = \frac{9}{10}$

14.  $4 \times \frac{1}{10} = \frac{4}{10}$

15.  $3 \times \frac{3}{10} = \frac{9}{10}$

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Name _____ Enrichment 13-2

Writing Fraction Equations

Sometimes, you can write more than one multiplication equation of a whole number times a fraction.

The model to the right shows $\frac{6}{10}$.

Possible equations: $6 \times \frac{1}{10} = \frac{6}{10}$

$4 \times \frac{3}{10} = \frac{12}{10}$

$2 \times \frac{3}{10} = \frac{6}{10}$

$3 \times \frac{2}{10} = \frac{6}{10}$

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

$2 \times \frac{3}{10} = \frac{6}{10}$

$3 \times \frac{2}{10} = \frac{6}{10}$

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

$5 \times \frac{1}{10} = \frac{5}{10}$

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

$7 \times \frac{1}{10} = \frac{7}{10}$

$8 \times \frac{1}{10} = \frac{8}{10}$

$9 \times \frac{1}{10} = \frac{9}{10}$

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

$11 \times \frac{1}{10} = \frac{11}{10}$

$12 \times \frac{1}{10} = \frac{12}{10}$

$13 \times \frac{1}{10} = \frac{13}{10}$

$14 \times \frac{1}{10} = \frac{14}{10}$

$15 \times \frac{1}{10} = \frac{15}{10}$

$16 \times \frac{1}{10} = \frac{16}{10}$

$17 \times \frac{1}{10} = \frac{17}{10}$

$18 \times \frac{1}{10} = \frac{18}{10}$

$19 \times \frac{1}{10} = \frac{19}{10}$

$20 \times \frac{1}{10} = \frac{20}{10}$

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should have a problem scenario written on it. For example, "the total amount of mouthwash used in 6 days if $\frac{7}{8}$ oz is used each day"

Have each pair of students write the expression they would use to solve the problem and then solve.

- If more practice is needed, pairs may swap cards and continue.
- Students may draw models to help.

6	64	30	8
15	18	56	64
77	10	11	5
11	56	77	18

You want if you are the first to get four connected rectangles, like $\frac{1}{2} \times \frac{1}{2}$ or $\frac{1}{3} \times \frac{1}{3}$. Play again!

$\frac{1}{2} \times \frac{1}{2}$	$\frac{1}{3} \times \frac{1}{3}$	$\frac{1}{4} \times \frac{1}{4}$	$\frac{1}{5} \times \frac{1}{5}$
$\frac{1}{2} \times \frac{1}{4}$	$\frac{1}{3} \times \frac{1}{4}$	$\frac{1}{4} \times \frac{1}{5}$	$\frac{1}{5} \times \frac{1}{6}$
$\frac{1}{3} \times \frac{1}{2}$	$\frac{1}{4} \times \frac{1}{3}$	$\frac{1}{5} \times \frac{1}{4}$	$\frac{1}{6} \times \frac{1}{5}$
$\frac{1}{4} \times \frac{1}{3}$	$\frac{1}{5} \times \frac{1}{4}$	$\frac{1}{6} \times \frac{1}{5}$	$\frac{1}{7} \times \frac{1}{6}$
$\frac{1}{5} \times \frac{1}{4}$	$\frac{1}{6} \times \frac{1}{5}$	$\frac{1}{7} \times \frac{1}{6}$	$\frac{1}{8} \times \frac{1}{7}$

You want if you are the first to get four connected rectangles, like $\frac{1}{2} \times \frac{1}{2}$ or $\frac{1}{3} \times \frac{1}{3}$. Play again!

Partner Talk Listen for language that describes a procedure. For example, a student might say, "I multiply the whole number by the numerator to find the numerator of the answer."

Levelled Homework

Reasoning Master

Name _____ Reasoning 13-3

Multiplying a Fraction by a Whole Number: Using Symbols

Justin has 4 pieces of rope. Each piece of rope is $\frac{3}{4}$ yard long. How many yards of rope does Justin have? You can think of each piece of rope as a separate group. The size of each group is $\frac{3}{4}$ yard.

Since all of the groups are the same size, you can use multiplication to find the total.

$$4 \times \frac{3}{4} = \frac{4 \times 3}{4} = \frac{12}{4} = 3$$

Justin has 3 yards of rope.

Think: The number of groups times the size of each group.

Solve: Show your work.

1. Mia is painting her room. Her room has 4 walls. Each wall uses $\frac{3}{4}$ gallon of paint. How much paint does she need to paint all of her walls?

$$4 \times \frac{3}{4} = \frac{4 \times 3}{4} = \frac{12}{4} = 3$$

Mia needs 3 gallons of paint.

2. Nat has 5 pieces of string. Each piece is $\frac{2}{3}$ inch long. How many inches of string does Nat have?

$$5 \times \frac{2}{3} = \frac{5 \times 2}{3} = \frac{10}{3} = 3\frac{1}{3}$$

Nat has $3\frac{1}{3}$ inches of string.

3. Candice is making 8 batches of biscuits. Each batch uses $\frac{3}{4}$ cup of flour. How many cups of flour does Candice need?

$$8 \times \frac{3}{4} = \frac{8 \times 3}{4} = \frac{24}{4} = 6$$

Candice needs 6 cups of flour.

Also available in print

Practice Master

Name _____ Practice 13-3

Multiplying a Fraction by a Whole Number: Using Symbols

For 1-6, multiply.

1. $8 \times \frac{3}{4} = 6$

2. $9 \times \frac{1}{2} = 4\frac{1}{2}$

3. $5 \times \frac{2}{3} = 3\frac{1}{3}$

4. $10 \times \frac{1}{4} = 2\frac{1}{2}$

5. $9 \times \frac{2}{5} = 3\frac{4}{5}$

6. $7 \times \frac{1}{3} = 2\frac{1}{3}$

7. $12 \times \frac{1}{4} = 3$

8. $11 \times \frac{1}{2} = 5\frac{1}{2}$

9. Model: Matt is making leaves for his neighbors. It takes him $\frac{1}{2}$ hour to make the leaves in one lawn. How long will it take Matt to make the leaves for 6 neighbors? Write a multiplication sentence to solve.

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

It will take Matt 3 hours to make the leaves for 6 neighbors.

10. Zoey is making bracelets for her friends. Each bracelet takes $\frac{2}{3}$ foot of string. How much string will Zoey need to make 12 bracelets?

$$12 \times \frac{2}{3} = \frac{12 \times 2}{3} = \frac{24}{3} = 8$$

Zoey needs 8 feet of string.

11. Felia takes $\frac{1}{4}$ teaspoon of allergy medicine every day. How much medicine will she take in one week?

A. $1\frac{1}{4}$ teaspoons B. $5\frac{1}{4}$ teaspoons C. $6\frac{1}{4}$ teaspoons D. $7\frac{1}{4}$ teaspoons

12. Writing to Explain: Mia, Nuruz is connecting math tests. She corrects 7 tests each day at school, and 5 tests each night. How many tests does she correct in one week? Explain.

25 tests in all. $12 \times \frac{1}{2} = 6$, $12 \times 1 = 12$, $6 + 12 = 18$

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Name _____ Enrichment 13-3

Turtle Race

The students in Mr. Stevens' class are having a turtle race. The race will last 2 minutes. Find the distance from the start each turtle will be at the end of the race.

Turtle	Speed (in inches per second)	Distance at end of race
Spot	$\frac{1}{2}$	20 feet
Rex	$\frac{1}{3}$	80 feet
Tim	$\frac{1}{4}$	72 feet
Nate	$\frac{1}{5}$	30 feet
Watson	$\frac{1}{6}$	15 feet
Troy	$\frac{1}{7}$	40 feet
Bruno	$\frac{1}{8}$	51 feet
Squiggles	$\frac{1}{9}$	51 feet
Pete	$\frac{1}{10}$	20 feet
Loe	$\frac{1}{11}$	17 feet
Nate	$\frac{1}{12}$	48 feet
Troy	$\frac{1}{13}$	48 feet

1. What is the order of the turtles at the end of the race? Start with the winner.

Rex, Tim, Tiny, Petey, Squiggles, Troy, Bruno, Milo, Lou, Spot, Nate, Watson

2. If the winner had stayed still for the first half minute of the race, how far would it have been from the start at the end of the race? 60 feet

3. What place would it have been in? Tied for second place

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