

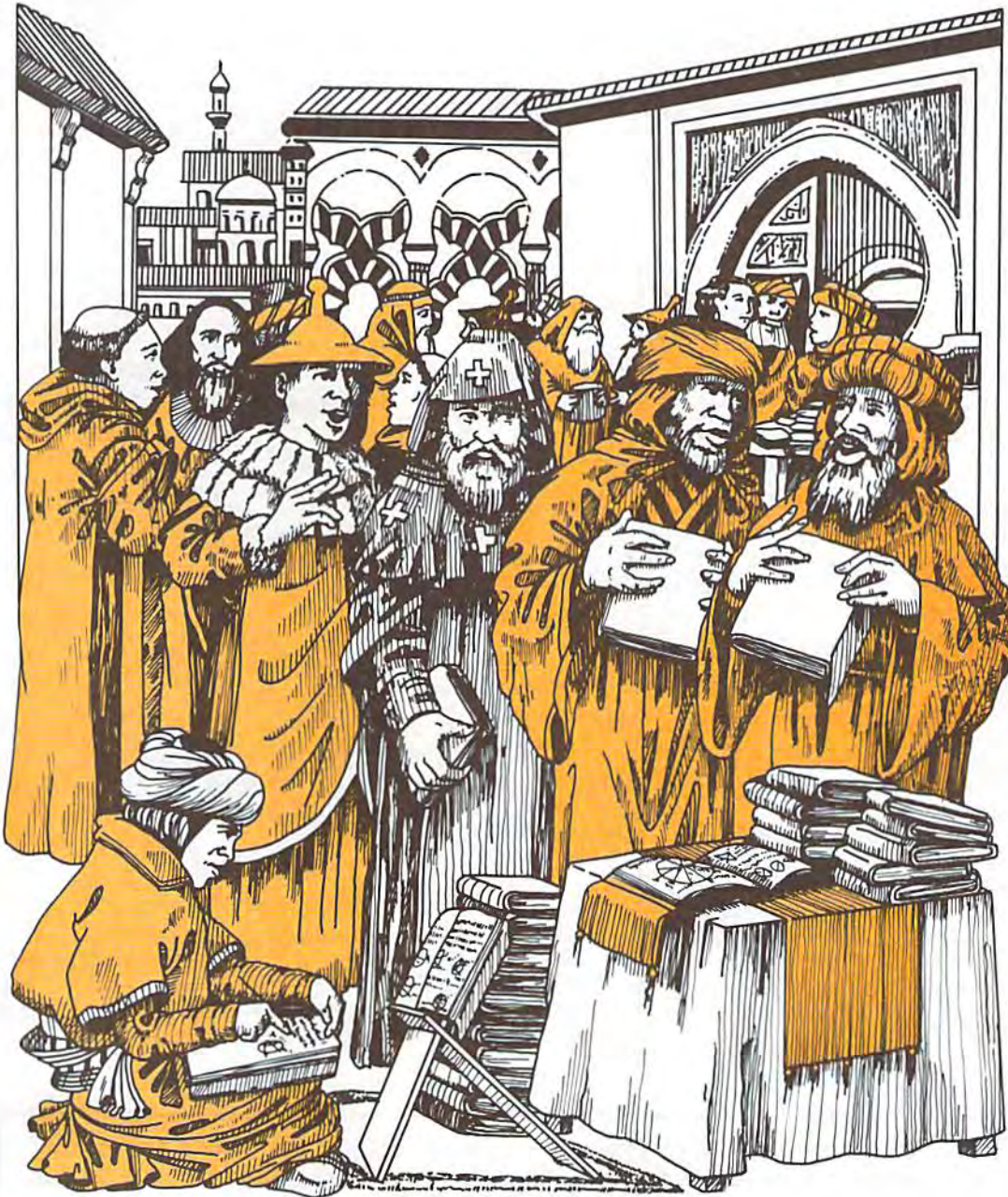
Key to

# Fractions<sup>®</sup>

4

Student  
Workbook

## Mixed Numbers



By Steven Rasmussen

Name

Class

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In the centuries that followed the death of the prophet Mohammed (632 A.D.), Moslem rulers forged an empire that stretched from India to southern Spain. Baghdad, the capital of this vast empire, became the intellectual center of the world. While Europe sank into the Dark Ages, Islamic scholars traveled east to India and west to Alexandria seeking the wisdom of the great Hindu and Greek scientific thinkers. Scholars at Baghdad collected and translated into Arabic the works of Bhaskara, Brahmagupta, Euclid and Archimedes. By 800 A.D. Arabic translations of Euclid and books by Islamic authors describing the Hindu number system had reached Europe and were available in the Islamic cities there. Under Moslem rule, Cordova, Spain became the intellectual capital of the West. Libraries and schools flourished. It was said that the library of one Islamic ruler contained one half million books. From the eleventh to the thirteenth century Christian and Jewish scholars came to Spain to study, collect and translate into Latin Arabic works on astronomy, medicine and mathematics. The scientific heritage of the East, brought to Europe and popularized by Islamic scholars and traders, helped spark Europe's Intellectual Renaissance. The Hindu methods of working with fractions were one part of this Moslem gift to the West.

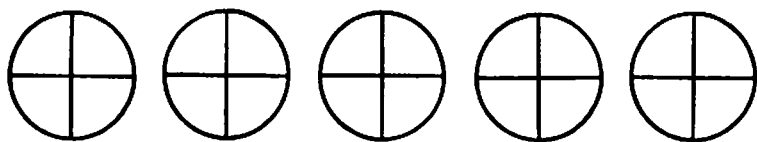


Cover Art by James Dykeman

On the cover of this book Christian, Jewish and Islamic scholars are shopping in Cordova's open air book market. At left a Moslem calligrapher copies a book by Al-Khowarizmi, the most famous of the Arab mathematicians. It was primarily through his works that Europe learned of the Hindu number system.

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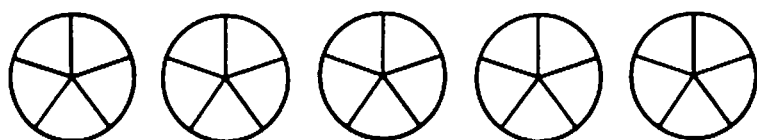
## Mixed Numbers



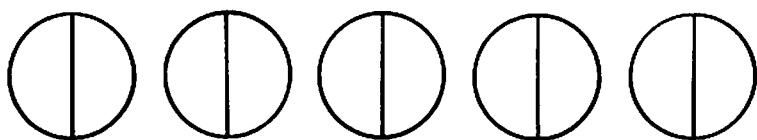
Shade 2 whole circles. Then shade  $\frac{1}{4}$  of another circle.



Shade 3 whole circles and  $\frac{2}{3}$  of another circle.



Shade  $4 + \frac{2}{5}$  circles.



Shade  $2 + \frac{1}{2}$  circles.

 Shade $2\frac{5}{8}$ .	 Shade $3\frac{1}{6}$ .	 Shade $1\frac{3}{4}$ .
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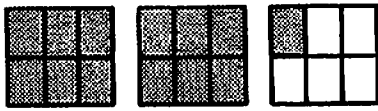
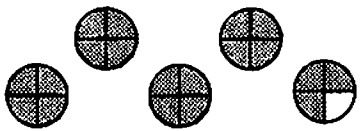

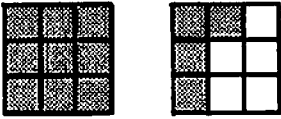


whole number 3 ●●● Whole numbers count units (whole things).

fraction  $\frac{1}{2}$  ◐ Fractions name parts of units.

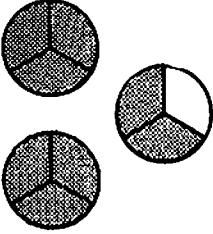
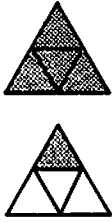
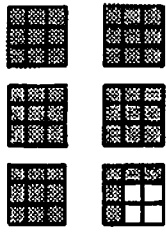
mixed number  $3\frac{1}{2}$  ●●●◐ Mixed numbers combine whole numbers and fractions.

A mixed number names units together with a part of a unit.


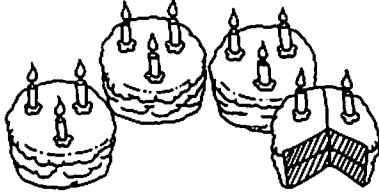
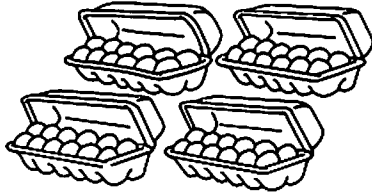



How much is shaded? Circle the correct mixed number.

 <p><math>3\frac{1}{6}</math>   <u><math>2\frac{1}{6}</math></u>   <math>2\frac{13}{18}</math></p>	 <p><math>4\frac{1}{3}</math>   <math>4\frac{1}{4}</math>   <math>4\frac{3}{4}</math></p>	 <p><math>4\frac{2}{4}</math>   <math>3\frac{2}{6}</math>   <math>3\frac{4}{6}</math></p>
 <p><math>1\frac{4}{9}</math>   2   <math>1\frac{13}{18}</math></p>	 <p><math>2\frac{3}{4}</math>   <math>3\frac{1}{4}</math>   <math>2\frac{1}{4}</math></p>	 <p><math>3\frac{3}{2}</math>   <math>5\frac{1}{2}</math>   <math>4\frac{1}{2}</math></p>

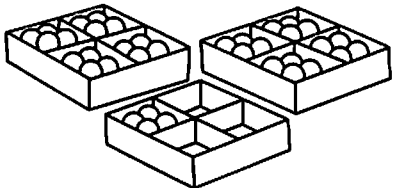
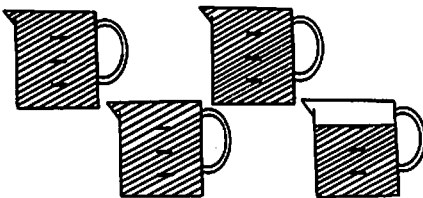

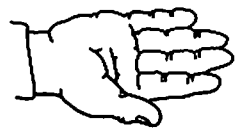
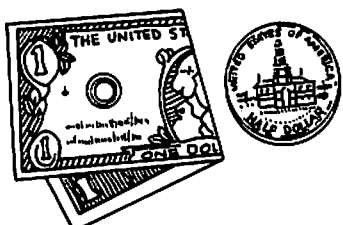
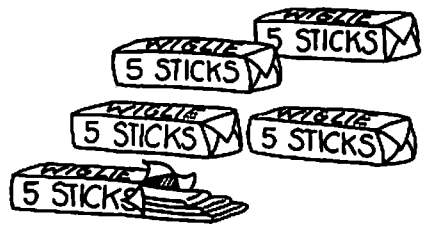
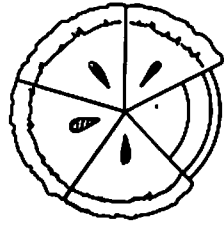
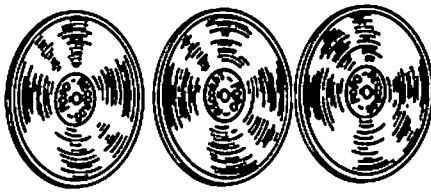
How much is shaded? Write a mixed number.

 <p>_____</p>	 <p>_____</p>	 <p>_____</p>
---	---	---





How many?

 <p>How many cartons of soda?</p> <p><math>\frac{1}{3}</math>   2   <math>2\frac{1}{6}</math></p>	 <p>How many cakes?</p> <p><math>\frac{4}{3}</math>   4   <math>3\frac{2}{3}</math></p>	 <p>How many dozen eggs?</p> <p><math>\frac{4}{12}</math>   4   <math>4\frac{1}{12}</math></p>
 <p>How many hamburgers?</p> <p><math>\frac{1}{2}</math>   1   <math>1\frac{1}{2}</math></p>	 <p>How many people?</p> <p><math>\frac{1}{3}</math>   3   <math>2\frac{1}{2}</math></p>	 <p>How many dollars?</p> <p><math>\frac{3}{4}</math>   3   <math>3\frac{1}{4}</math></p>

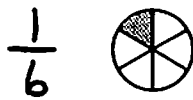
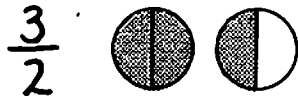
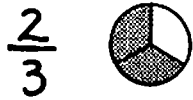
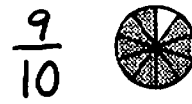
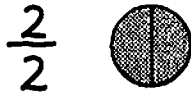
Answer each question with a fraction, a whole number or a mixed number.

 <p>How many boxes of balls? <u>2 <math>\frac{1}{4}</math></u></p>	 <p>How many cups of water? _____</p>	 <p>How many jars of peanut butter? _____</p>																																			
 <p>How many fingers? _____</p>	 <p>How many dollars? _____</p>	<table border="1" data-bbox="1061 623 1428 848"> <tr> <td>S</td> <td>M</td> <td>T</td> <td>W</td> <td>T</td> <td>F</td> <td>S</td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> </tr> <tr> <td>8</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> <td>13</td> <td>14</td> </tr> <tr> <td>15</td> <td>16</td> <td>17</td> <td>18</td> <td>19</td> <td>20</td> <td>21</td> </tr> <tr> <td>22</td> <td>23</td> <td>24</td> <td>25</td> <td>26</td> <td>27</td> <td>28</td> </tr> </table> <p>How many weeks have passed? _____</p>	S	M	T	W	T	F	S	X	X	X	X	X	X	X	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
S	M	T	W	T	F	S																															
X	X	X	X	X	X	X																															
8	9	10	11	12	13	14																															
15	16	17	18	19	20	21																															
22	23	24	25	26	27	28																															
 <p>How many packs of gum? _____</p>	 <p>How many pies? _____</p>	 <p>How many records? _____</p>																																			

Sometimes a picture can be described by both a fraction and a mixed number. Circle one fraction and one mixed number that describe each picture.

 <p><math>\frac{3}{8}</math> <u><math>\frac{8}{3}</math></u> <math>\frac{3}{2}</math>    <math>3\frac{2}{1}</math> <math>1\frac{3}{2}</math> <u><math>2\frac{2}{3}</math></u></p>	 <p><math>\frac{4}{2}</math> <math>\frac{2}{9}</math> <math>\frac{9}{2}</math>    <math>3\frac{1}{2}</math> <math>4\frac{1}{2}</math> <math>4\frac{1}{1}</math></p>
 <p><math>\frac{8}{5}</math> <math>\frac{8}{10}</math> <math>\frac{5}{8}</math>    <math>2\frac{5}{8}</math> <math>1\frac{3}{5}</math> <math>1\frac{2}{5}</math></p>	 <p><math>\frac{13}{16}</math> <math>\frac{13}{4}</math> <math>\frac{1}{4}</math>    <math>3\frac{1}{4}</math> <math>4\frac{1}{3}</math> <math>3\frac{1}{13}</math></p>

## Fractions Less than One, Equal to One and Greater than One



Which fractions above name less than one circle?

Less than one: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The numerators are   
less than  
 equal to   
greater than the denominators.

Which fractions above name exactly one circle?

Exactly one: \_\_\_\_\_, \_\_\_\_\_

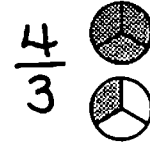
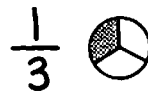
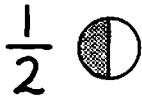
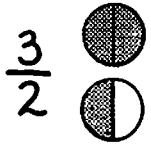
The numerators are   
less than  
 equal to   
greater than the denominators.

Which fractions above name more than one circle?

More than one: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

The numerators are   
less than  
 equal to   
greater than the denominators.

Circle each fraction below that is greater than one or equal to one.



A fraction less than one has a numerator that is less than its denominator.

A fraction equal to one has the same numerator and denominator.

A fraction greater than one has a numerator that is greater than its denominator.

Is each fraction less than one, equal to one, or greater than one?

$\frac{8}{8}$  is equal to one .  $\frac{2}{5}$  is \_\_\_\_\_ .

$\frac{3}{7}$  is \_\_\_\_\_ .  $\frac{5}{2}$  is \_\_\_\_\_ .

$\frac{6}{5}$  is \_\_\_\_\_ .  $\frac{2}{2}$  is \_\_\_\_\_ .

$\frac{3}{10}$  is \_\_\_\_\_ .  $\frac{10}{3}$  is \_\_\_\_\_ .

$\frac{9}{4}$  is \_\_\_\_\_ .  $\frac{17}{15}$  is \_\_\_\_\_ .

A fraction less than one can not be renamed as a mixed or whole number.

A fraction equal to one can be renamed as a whole number.

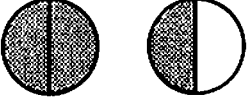


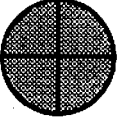
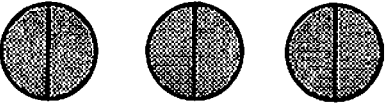
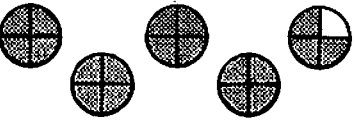
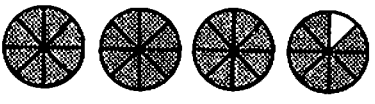
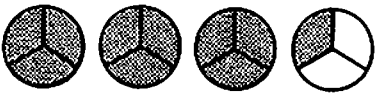
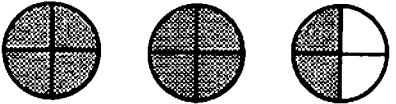

A fraction greater than one can be renamed as a mixed or whole number.

Circle each fraction below that can be renamed as a mixed or whole number.

 $\frac{1}{4}$ 
 $\frac{3}{2}$ 
 $\frac{6}{6}$ 
 $\frac{25}{30}$ 
 $\frac{1}{1}$ 
 $\frac{1}{5}$ 
 $\frac{100}{3}$ 
 $\frac{10}{10}$ 
 $\frac{1}{1}$ 
 $\frac{5}{4}$ 
 $\frac{3}{8}$ 
 $\frac{1}{9}$ 
 $\frac{12}{6}$ 
 $\frac{7}{2}$ 
 $\frac{5}{1}$ 
 $\frac{4}{10}$ 
 $\frac{2}{11}$ 
 $\frac{78}{87}$ 
 $\frac{11}{7}$

## Renaming Fractions as Mixed or Whole Numbers

Below are ten fractions that are greater than one or equal to one. How can each fraction be renamed as a mixed or whole number?

fraction		How many whole circles?	What additional fraction of a circle?	mixed or whole number
$\frac{3}{2}$		1	$+$ $\frac{1}{2}$	$1\frac{1}{2}$
$\frac{5}{3}$			$+$	
$\frac{12}{5}$			$+$	
$\frac{4}{4}$			$+$ none	
$\frac{6}{2}$			$+$	
$\frac{19}{4}$			$+$	
$\frac{31}{8}$			$+$	
$\frac{10}{3}$			$+$	
$\frac{10}{4}$			$+$	
$\frac{10}{5}$			$+$	


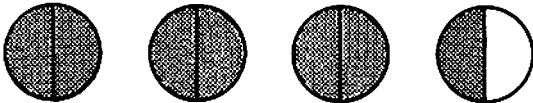








Fractions equal to one can be renamed as the whole number one.

$$\frac{7}{7} = 1 \quad \frac{5}{5} = \quad \frac{30}{30} = \quad \frac{17}{17} = \quad \frac{2}{2} = \quad \frac{8}{8} =$$

Fractions greater than one can be renamed as mixed or whole numbers.

Match each fraction with its picture and then with its mixed or whole number.

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

Using the pictures above, rename each fraction greater than one as a mixed or whole number.

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

$$\frac{7}{5} =$$

$$\frac{9}{8} =$$

$$\frac{7}{2} =$$

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

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

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

$$\frac{11}{6} =$$

Can you divide and show a remainder as a fraction?

Problem	Step 1 Divide.	Step 2 The remainder is the numerator.	Step 3 The divisor is the denominator.
$5 \overline{)23}$	$\begin{array}{r} 4 \\ 5 \overline{)23} \\ \underline{-20} \\ 3 \end{array}$	$\begin{array}{r} 4^3 \\ 5 \overline{)23} \\ \underline{-20} \\ 3 \end{array}$	$\begin{array}{r} 4\frac{3}{5} \\ 5 \overline{)23} \\ \underline{-20} \\ 3 \end{array}$

Divide Show each remainder as a fraction

$$\begin{array}{r} 5\frac{1}{3} \\ 3 \overline{)16} \\ \underline{-15} \\ 1 \end{array}$$

$$8 \overline{)19}$$

$$6 \overline{)23}$$

$$4 \overline{)31}$$

$$2 \overline{)9}$$

$$7 \overline{)46}$$

$$3 \overline{)28}$$

$$8 \overline{)65}$$

$$4 \overline{)21}$$

$$5 \overline{)32}$$

$$10 \overline{)57}$$

$$11 \overline{)74}$$

$$3 \overline{)44}$$

$$9 \overline{)107}$$

$$2 \overline{)45}$$

$$7 \overline{)88}$$

To rename fractions greater than one as mixed or whole numbers, just divide the numerator by the denominator.

$$\frac{7}{3} \quad \begin{array}{r} 2\frac{1}{3} \\ 3 \overline{)7} \\ \underline{-6} \\ 1 \end{array} \quad 2\frac{1}{3}$$

The fraction becomes a mixed number if there is a remainder.

$$\frac{8}{2} \quad \begin{array}{r} 4 \\ 2 \overline{)8} \\ \underline{-8} \\ 0 \end{array} \quad 4$$

The fraction becomes a whole number if there is no remainder.

Use division to rename each fraction below as a mixed or whole number.

$$\frac{15}{4} \quad \begin{array}{r} 4 \overline{)15} \end{array}$$

$$\frac{13}{3} \quad \begin{array}{r} 3 \overline{)13} \end{array}$$

$$\frac{9}{2} \quad \begin{array}{r} 2 \overline{)9} \end{array}$$

$$\frac{24}{4} \quad \begin{array}{r} 4 \overline{)24} \end{array}$$

$$\frac{25}{5} \quad \begin{array}{r} 5 \overline{)25} \end{array}$$

$$\frac{27}{2} \quad \begin{array}{r} 2 \overline{)27} \end{array}$$

Rename each fraction as a mixed or whole number. Show your division work.

$\frac{14}{5} = 2\frac{4}{5}$	Division Work $\begin{array}{r} 2\frac{4}{5} \\ 5 \overline{)14} \\ \underline{-10} \\ 4 \end{array}$	$\frac{11}{2} =$	Division Work
$\frac{32}{7} =$	Division Work $\sqrt{\quad}$	$\frac{14}{9} =$	Division Work
$\frac{17}{3} =$	Division Work	$\frac{5}{1} =$	Division Work

Rename each fraction below as a mixed or whole number. Do your division work on scratch paper.

$\frac{12}{7} =$

$\frac{14}{3} =$

$\frac{17}{4} =$

$\frac{9}{5} =$

$\frac{17}{5} =$

$\frac{25}{4} =$

$\frac{11}{6} =$

$\frac{3}{1} =$

$\frac{12}{3} =$

$\frac{9}{8} =$

$\frac{12}{6} =$

$\frac{14}{11} =$

$\frac{19}{4} =$

$\frac{20}{3} =$

$\frac{13}{6} =$

$\frac{2}{1} =$

## Renaming Answers as Mixed or Whole Numbers

Some fraction problems result in answers that are fractions greater than one or equal to one. You usually rename those answers as mixed or whole numbers.

Problem  $\frac{2}{3} + \frac{2}{3} =$

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

The answer is greater than one.

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

Rename the answer as a mixed number.

Add the fractions below. Each answer is a fraction greater than one or equal to one. Rename each answer as a mixed or whole number.

$$\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1\frac{2}{5}$$

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

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

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

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

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

Add the fractions below. If the answer is less than one, make sure that it is in simplest form. If the answer is greater than one or equal to one, rename it as a mixed or whole number.

$$\frac{5}{7} + \frac{4}{7} = \frac{9}{7} = 1\frac{2}{7}$$

$$\frac{5}{9} + \frac{1}{9} + \frac{5}{9} =$$

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

$$\frac{7}{30} + \frac{1}{30} + \frac{2}{30} =$$

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

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

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

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

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

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

## Adding and Subtracting Mixed Numbers with Common Denominators

To add or subtract mixed numbers with a common denominator, first add or subtract the fractions and then add or subtract the whole numbers.

	Step 1	Step 2
	Add or subtract the fractions.	Add or subtract the whole numbers.
$\begin{array}{r} 3\frac{1}{5} \\ + 4\frac{2}{5} \\ \hline \end{array}$	$\begin{array}{r} 3\frac{1}{5} \\ + 4\frac{2}{5} \\ \hline 7\frac{3}{5} \end{array}$	$\begin{array}{r} 3\frac{1}{5} \\ + 4\frac{2}{5} \\ \hline 7\frac{3}{5} \end{array}$

Add or subtract.

$\begin{array}{r} 5\frac{6}{7} \\ - 1\frac{2}{7} \\ \hline 4\frac{4}{7} \end{array}$	$\begin{array}{r} 8\frac{4}{9} \\ - 3\frac{2}{9} \\ \hline \end{array}$	$\begin{array}{r} 10\frac{1}{3} \\ + 2\frac{1}{3} \\ \hline \end{array}$	$\begin{array}{r} 4\frac{4}{7} \\ + 7\frac{2}{7} \\ \hline \end{array}$
$\begin{array}{r} 1\frac{6}{11} \\ + 4\frac{3}{11} \\ \hline \end{array}$	$\begin{array}{r} 2\frac{2}{5} \\ + 2\frac{2}{5} \\ \hline \end{array}$	$\begin{array}{r} 9\frac{11}{15} \\ - 4\frac{7}{15} \\ \hline \end{array}$	$\begin{array}{r} 25\frac{2}{3} \\ - 17\frac{1}{3} \\ \hline \end{array}$

$$3\frac{8}{9} - 2\frac{4}{9} =$$

$$2\frac{5}{13} + 3\frac{3}{13} + 1\frac{4}{13} =$$

$$3\frac{6}{11} + 2\frac{2}{11} - 4\frac{7}{11} =$$

$$8\frac{6}{7} - 1\frac{3}{7} + 5\frac{2}{7} =$$

Some of the problems on this page are tricky. Be careful!

$$\begin{array}{r} 3\frac{1}{5} \\ + 5 \\ \hline 8\frac{1}{5} \end{array}$$

$$\begin{array}{r} 4\frac{3}{4} \\ + 2 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ + 7\frac{5}{6} \\ \hline \end{array}$$

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

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

$4\frac{1}{7} + 5 + 1\frac{1}{7} =$

$$\begin{array}{r} 4\frac{1}{3} \\ + \frac{1}{3} \\ \hline 4\frac{2}{3} \end{array}$$

$$\begin{array}{r} 1\frac{4}{7} \\ + \frac{2}{7} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{4}{15} \\ + 12\frac{7}{15} \\ \hline \end{array}$$

$3\frac{4}{11} + \frac{5}{11} =$

$\frac{2}{9} + 6\frac{2}{9} =$

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

$$\begin{array}{r} 4\frac{3}{4} \\ - 1 \\ \hline 3\frac{3}{4} \end{array}$$

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

$$\begin{array}{r} 5\frac{3}{5} \\ - \frac{1}{5} \\ \hline \end{array}$$

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

$16\frac{4}{7} - \frac{3}{7} =$

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

$$\begin{array}{r} 10\frac{8}{9} \\ - 10\frac{1}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 3\frac{1}{4} \\ - 3 \\ \hline \end{array}$$

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

$7\frac{1}{4} - 7\frac{1}{4} =$

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

$$\begin{array}{r} 12\frac{3}{8} \\ - 7\frac{3}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 9\frac{1}{2} \\ - \frac{1}{2} \\ \hline \end{array}$$

$4\frac{1}{6} - \frac{1}{6} =$

$8\frac{1}{7} + 2\frac{5}{7} - 5\frac{6}{7} =$

## Simplifying Mixed Numbers

Whenever you add, subtract, multiply or divide and find that the answer is a mixed number, you should find the simplest form for that mixed number. A mixed number in simplest form has its fraction part in simplest form.

The fraction part is in simplest form.

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

<u>not</u> simplest form		
$3\frac{2}{4}$	$1\frac{4}{6}$	$2\frac{8}{10}$
$4\frac{3}{9}$	$5\frac{6}{8}$	$7\frac{5}{10}$

The fraction part is not in simplest form.

Sometimes you must simplify the fraction part of a mixed number to find its simplest form.

Simplify each mixed number below by simplifying its fraction part.

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

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

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

$$4\frac{3}{9} =$$

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

$$7\frac{5}{10} =$$

$$1\frac{8}{12} =$$

$$4\frac{3}{6} =$$

$$3\frac{10}{15} =$$

$$2\frac{9}{15} =$$

$$1\frac{12}{18} =$$

$$4\frac{7}{14} =$$

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

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

$$25\frac{6}{15} =$$

Add or subtract, then simplify.

$$\begin{array}{r} 8\frac{5}{6} \\ - \quad \frac{1}{6} \\ \hline 8\frac{4}{6} = 8\frac{2}{3} \end{array}$$

$$\begin{array}{r} 2\frac{11}{12} \\ - \quad \frac{1}{12} \\ \hline \end{array}$$

$$\begin{array}{r} 3\frac{12}{25} \\ + 3\frac{8}{25} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{5}{9} \\ + 5\frac{1}{9} \\ \hline \end{array}$$



The fraction part of a mixed number in simplest form must be a fraction less than one.

The fraction part is less than one.

simplest form

$$2\frac{2}{3} \quad 3\frac{1}{5} \quad 1\frac{5}{6}$$

not simplest form

$$3\frac{4}{3} \quad 2\frac{7}{2} \quad 5\frac{6}{6}$$

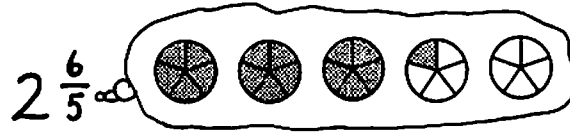
The fraction part is not less than one.

Circle the three mixed numbers in simplest form.

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

$2\frac{6}{5}$  is not in simplest form because  $\frac{6}{5}$  is not less than one. What is the simplest form for  $2\frac{6}{5}$  ?

Shade 2 circles.  
Shade  $\frac{6}{5}$  more.



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

Can you see that  $3\frac{1}{5}$  circles are shaded?

Shade circles to find the simplest form for each mixed number.

Shade 1 circle. Shade  $\frac{5}{2}$  more.

$$1\frac{5}{2} \quad \text{[Diagram: 5 circles, 1 shaded]} \quad 1\frac{5}{2} =$$

Shade 3 circles. Shade  $\frac{4}{3}$  more.

$$3\frac{4}{3} \quad \text{[Diagram: 6 circles, 3 shaded]} \quad 3\frac{4}{3} =$$

Shade 4 circles. Shade  $\frac{3}{3}$  more.

$$4\frac{3}{3} \quad \text{[Diagram: 7 circles, 4 shaded]} \quad 4\frac{3}{3} =$$

Shade 2 circles. Shade  $\frac{7}{4}$  more.

$$2\frac{7}{4} \quad \text{[Diagram: 6 circles, 2 shaded]} \quad 2\frac{7}{4} =$$

Shade 1 circle. Shade  $\frac{9}{4}$  more.

$$1\frac{9}{4} \quad \text{[Diagram: 5 circles, 1 shaded]} \quad 1\frac{9}{4} =$$

Shade 3 circles. Shade  $\frac{15}{8}$  more.

$$3\frac{15}{8} \quad \text{[Diagram: 8 circles, 3 shaded]} \quad 3\frac{15}{8} =$$

Shade 2 circles. Shade  $\frac{8}{5}$  more.

$$2\frac{8}{5} \quad \text{[Diagram: 7 circles, 2 shaded]} \quad 2\frac{8}{5} =$$

Shade 2 circles. Shade  $\frac{13}{6}$  more.

$$2\frac{13}{6} \quad \text{[Diagram: 8 circles, 2 shaded]} \quad 2\frac{13}{6} =$$

$2\frac{6}{5}$  can be simplified without shading circles. Just rename  $\frac{6}{5}$  as the mixed number  $1\frac{1}{5}$  and add it to 2.

$$2\frac{6}{5} = 2 + 1\frac{1}{5} = 3\frac{1}{5} \quad 1\frac{5}{2} = 1 + 2\frac{1}{2} = 3\frac{1}{2} \quad 4\frac{3}{3} = 4 + 1 = 5$$

Simplify each mixed number below. Rename the fraction part as a mixed or whole number. Add what you get to the first whole number.

$$3\frac{4}{3} = 3 + 1\frac{1}{3} = 4\frac{1}{3} \quad 1\frac{3}{2} = \quad 4\frac{5}{5} =$$

$$2\frac{7}{5} = \quad 3\frac{9}{4} = \quad 6\frac{7}{6} =$$

$$1\frac{8}{4} = \quad 10\frac{10}{7} = \quad 1\frac{12}{4} =$$

Simplify each mixed number below. Do the work on scratch paper, just write down the answer.

$$8\frac{5}{3} = 9\frac{2}{3} \quad 4\frac{8}{5} = \quad 5\frac{8}{8} =$$

$$3\frac{5}{2} = \quad 1\frac{4}{3} = \quad 2\frac{7}{4} =$$

$$1\frac{9}{5} = \quad 2\frac{4}{2} = \quad 10\frac{11}{7} =$$

Simplify each mixed number below. First rename the fraction part to make it less than one. (Just like you did above.) Then simplify the fraction part that remains.

$$3\frac{6}{4} = 4\frac{2}{4} = 4\frac{1}{2} \quad 1\frac{8}{6} = \quad 4\frac{15}{12} =$$

$$1\frac{9}{6} = \quad 5\frac{15}{9} = \quad 15\frac{20}{12} =$$

$$9\frac{10}{8} = \quad 4\frac{14}{10} = \quad 2\frac{16}{6} =$$

Add and then simplify.

$$\begin{array}{r} 3\frac{2}{3} \\ + 5\frac{2}{3} \\ \hline 8\frac{4}{3} = 9\frac{1}{3} \end{array}$$

$$\begin{array}{r} 1\frac{4}{5} \\ + 2\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 4\frac{3}{4} \\ + 7\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{6}{7} \\ + \frac{6}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 2\frac{1}{2} \\ + 3\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 4\frac{1}{5} \\ + 1\frac{4}{5} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{5}{9} \\ + 5\frac{5}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 3\frac{9}{11} \\ + 8\frac{7}{11} \\ \hline \end{array}$$

$$\begin{array}{r} 10\frac{3}{8} \\ + 6\frac{7}{8} \\ \hline 16\frac{10}{8} = 17\frac{2}{8} = 17\frac{1}{4} \end{array}$$

$$\begin{array}{r} 3\frac{3}{4} \\ + \frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{9}{10} \\ + \frac{7}{10} \\ \hline \end{array}$$

Add or subtract Simplify when possible.

$$\frac{9}{11} + \frac{7}{11} + \frac{6}{11} =$$

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

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

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

## Adding and Subtracting Mixed Numbers with Different Denominators

To add or subtract mixed numbers that have fractions with different denominators, follow the four steps below.

### Step 1

Find the least common denominator.

LCD is 12.

$$\begin{array}{r} 2\frac{1}{6} \\ + 3\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} \overset{11}{2} \overset{10}{6} \\ + 3\frac{9}{4} \\ \hline \end{array}$$

### Step 2

Copy the whole numbers. Rename the fractions using the LCD.

$$\begin{array}{r} 2\frac{1}{6} = 2\frac{2}{12} \\ + 3\frac{3}{4} = 3\frac{9}{12} \\ \hline \end{array}$$

### Step 3

Find the missing numerators to make equal fractions.

$$\begin{array}{r} 2\frac{1 \times 2}{6 \times 2} = 2\frac{2}{12} \\ + 3\frac{3 \times 3}{4 \times 3} = 3\frac{9}{12} \\ \hline \end{array}$$

### Step 4

Add or subtract mixed numbers with a common denominator.

$$\begin{array}{r} 2\frac{1 \times 2}{6 \times 2} = 2\frac{2}{12} \\ + 3\frac{3 \times 3}{4 \times 3} = 3\frac{9}{12} \\ \hline \end{array}$$

$$5\frac{11}{12}$$

Add or subtract.

$$\begin{array}{r} 5\frac{11 \times 1}{12 \times 1} = 5\frac{11}{12} \\ - 1\frac{1 \times 4}{3 \times 4} = 1\frac{4}{12} \\ \hline 4\frac{7}{12} \end{array}$$

$$\begin{array}{r} 9\frac{2}{3} \\ - 7\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 1\frac{2}{7} \\ + 1\frac{1}{3} \\ \hline \end{array}$$

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

$$\begin{array}{r} 3\frac{1}{4} \\ + 3\frac{1}{6} \\ \hline \end{array}$$

$$\begin{array}{r} 6\frac{1}{4} \\ + 2\frac{1}{2} \\ \hline \end{array}$$

Add or subtract.

$$\begin{array}{r} 5\frac{9 \times 4}{10 \times 4} = 5\frac{36}{40} \\ - \frac{1 \times 5}{8 \times 5} = \frac{5}{40} \\ \hline 5\frac{31}{40} \end{array}$$

$$\begin{array}{r} 2\frac{1}{9} \\ + \frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 8\frac{3}{4} \\ - \frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 3\frac{1}{4} \\ + 2\frac{7}{10} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{3}{20} \\ + 1\frac{2}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 15\frac{1}{2} \\ - 8\frac{2}{7} \\ \hline \end{array}$$

Add or subtract. Simplify each answer.

$$\begin{array}{r} \frac{7 \times 1}{8 \times 1} = \frac{7}{8} \\ + 3\frac{1 \times 4}{2 \times 4} = 3\frac{4}{8} \\ \hline 3\frac{11}{8} = 4\frac{3}{8} \end{array}$$

$$\begin{array}{r} 3\frac{4}{5} \\ + \frac{3}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 7\frac{9}{10} \\ - 3\frac{1}{15} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{2}{3} \\ + \frac{5}{6} \\ \hline \end{array}$$

Add or subtract. Simplify the answer when possible.

$$\begin{array}{r} 5\frac{5}{6} \\ - 4\frac{1}{12} \\ \hline \end{array}$$

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

$$\begin{array}{r} 3\frac{1}{9} \\ + 8\frac{5}{6} \\ \hline \end{array}$$

$$\begin{array}{r} \frac{3}{4} \\ + \frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 5\frac{1}{6} \\ \quad \frac{3}{4} \\ + 2\frac{2}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 2\frac{17}{20} \\ 3\frac{1}{2} \\ + 1\frac{3}{4} \\ \hline \end{array}$$

$$2\frac{9}{10} + 2\frac{1}{2} =$$

$$\frac{1}{2} + \frac{2}{3} + \frac{5}{6} =$$

## Renaming to Subtract Mixed Numbers

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

It's easy to subtract a whole number from a mixed number.

$$\begin{array}{r} - 2 \\ \hline 3\frac{3}{8} \end{array}$$

It's tricky to subtract a mixed number from a whole number.

$$5$$

It's tricky because there's no fraction to take  $\frac{1}{4}$  away from.

$$\begin{array}{r} - 3\frac{1}{4} \\ \hline \end{array}$$

Can you tell the difference between the easy problems and the tricky ones? Do the easy problems below. Circle the tricky ones.

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

$$\begin{array}{r} 4 \\ - 2\frac{1}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - 3\frac{1}{8} \\ \hline \end{array}$$

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

$$\begin{array}{r} 5\frac{5}{6} \\ - 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ - 2\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 5\frac{3}{7} \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7\frac{1}{2} \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ - 1\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ - \frac{1}{10} \\ \hline \end{array}$$

To subtract a mixed number from a whole number you must know how to rename a whole number as a mixed number.

Rename 3 using four fourths.

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

Take one away from three. Express that one as  $\frac{4}{4}$ .

Rename 5 using three thirds.

$$5 =$$

Take one away from five. Express that one as  $\frac{3}{3}$ .

Rename 2 using six sixths.

$$2 =$$

Take one away from two. Express that one as  $\frac{6}{6}$ .

Rename 7 using five fifths.

$$7 =$$

Rename 4 using two halves.

$$4 =$$

Rename 6 using ten tenths.

$$6 =$$

Rename 4 using seven sevenths.

$$4 =$$

Rename 5 using four fourths.

$$5 =$$

Rename 8 using three thirds.

$$8 =$$

To subtract a mixed number from a whole number:

1. Rename the whole number to show a fraction.
2. Copy the mixed number underneath.
3. Subtract.

$$\begin{array}{r} 6 = 5\frac{4}{4} \\ - 3\frac{1}{4} = 3\frac{1}{4} \\ \hline 2\frac{3}{4} \end{array}$$

Rename 6 using four fourths.

$$\begin{array}{r} 5 = \\ - 1\frac{1}{3} = \\ \hline \end{array}$$

Rename 5 using three thirds.

$$\begin{array}{r} 9 = \\ - 3\frac{3}{5} = \\ \hline \end{array}$$

Rename 9 using five fifths.

$$\begin{array}{r} 7 = \\ - 2\frac{5}{6} = \\ \hline \end{array}$$

Rename 7 using \_\_\_\_\_.

You must rename the whole number in each problem below. Rename the whole number to show a fraction with the same denominator as the fraction already in the problem.

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

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

$$\begin{array}{r} 9 \\ - 5\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ - 4\frac{1}{9} \\ \hline \end{array}$$

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

$$\begin{array}{r} 6 \\ - \frac{4}{7} \\ \hline \end{array}$$



$$\begin{array}{r} 4\frac{2}{5} \\ - 1\frac{3}{5} \\ \hline \end{array}$$

Here is another tricky problem. The fraction you are taking away is larger than the fraction you start with. You must rename  $4\frac{2}{5}$  to show five more fifths.

Of the ten problems below, five are easy and five are tricky. The five tricky problems all start with a mixed number whose fraction part is too small. Do the easy problems. Circle the tricky five.

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

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

$$\begin{array}{r} 4\frac{2}{7} \\ - 1\frac{4}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 9\frac{4}{9} \\ - 7\frac{2}{9} \\ \hline \end{array}$$

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

$7\frac{3}{10} - 2\frac{7}{10} =$

$4\frac{3}{7} - \frac{2}{7} =$

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

$5\frac{17}{25} - 5\frac{14}{25} =$

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

To do the tricky problems above you must rename the first mixed number to show a larger fraction part.

Rename  $4\frac{2}{5}$   
using five  
more fifths.

$4\frac{2}{5} = 3\frac{7}{5}$

Take one away from four.  
Think of that one as  $\frac{5}{5}$ .  
Add those  $\frac{5}{5}$  to  $\frac{2}{5}$ .

Rename  $6\frac{1}{8}$   
using eight  
more eighths.

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

Take one away from six.  
Think of that one as  $\frac{8}{8}$ .  
Add those  $\frac{8}{8}$  to  $\frac{1}{8}$ .

Rename  $4\frac{2}{7}$   
using seven  
more sevenths.

$4\frac{2}{7} =$

$$\begin{array}{r} 4-1 \\ \hline 2\frac{2}{7} + \frac{7}{7} \end{array}$$

Rename  $7\frac{3}{10}$   
using ten  
more tenths.

$7\frac{3}{10} =$ 

$$\begin{array}{r} 7-1 \\ \hline 6\frac{3}{10} + \frac{10}{10} \end{array}$$

Rename  $6\frac{1}{3}$   
using three  
more thirds.

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

Rename  $12\frac{1}{4}$   
using four  
more fourths.

$12\frac{1}{4} =$

Rename  $9\frac{3}{7}$   
using seven  
more sevenths.

$9\frac{3}{7} =$

Rename  $5\frac{3}{5}$   
using five  
more fifths.

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

Rename  $15\frac{1}{9}$   
using nine  
more ninths.

$15\frac{1}{9} =$

Rename each mixed number below to show a larger fraction part.

$$3\frac{2}{5} = 2\frac{7}{5}$$

*(Thought bubbles: 3-1 and  $\frac{2}{5} + \frac{5}{5}$ )*

$4\frac{1}{7} =$

$5\frac{4}{9} =$

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

$8\frac{1}{4} =$

$7\frac{1}{3} =$

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

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

$14\frac{2}{3} =$

$9\frac{1}{8} =$

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

$20\frac{3}{4} =$

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

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

$6\frac{3}{20} =$

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

In each problem below you must rename the top mixed number to show a larger fraction part before you subtract.

$$\begin{array}{r} 3\frac{1}{5} = 2\frac{6}{5} \\ - 1\frac{4}{5} = 1\frac{4}{5} \\ \hline 1\frac{2}{5} \end{array}$$

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

$$\begin{array}{r} 5\frac{1}{9} \\ - 3\frac{5}{9} \\ \hline \end{array}$$

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

$$\begin{array}{r} 10\frac{2}{11} \\ - 2\frac{8}{11} \\ \hline \end{array}$$

$$\begin{array}{r} 4\frac{2}{5} \\ - 3\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 6\frac{4}{9} \\ - 4\frac{8}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 2\frac{2}{7} \\ - \frac{5}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 1\frac{1}{3} \\ - \frac{2}{3} \\ \hline \end{array}$$

Below is a variety of problems. You must rename whole or mixed numbers to do some of them. Others you can do without renaming. Simplify your answer when possible.

$$\begin{array}{r} 5\frac{1}{6} = 4\frac{7}{6} \\ - 1\frac{5}{6} = 1\frac{5}{6} \\ \hline 3\frac{2}{6} = 3\frac{1}{3} \end{array}$$

$$\begin{array}{r} 8\frac{1}{4} \\ - 2\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 5\frac{3}{4} \\ - 1\frac{1}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ - 1\frac{1}{2} \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ - 6\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{r} 3\frac{3}{7} \\ - 3\frac{2}{7} \\ \hline \end{array}$$

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

$$\begin{array}{r} 11\frac{7}{10} \\ - 3\frac{1}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ - 2\frac{4}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ - \frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 6\frac{3}{10} \\ - 5\frac{3}{10} \\ \hline \end{array}$$

$$\begin{array}{r} 8\frac{1}{12} \\ - 7\frac{5}{12} \\ \hline \end{array}$$

In some subtraction problems you must rename twice before you can subtract.

Rename so that fractions have a common denominator.

Rename top mixed number to show a larger fraction part.

$$\begin{array}{r} 3\frac{1 \times 4}{5 \times 4} = 3\frac{4}{20} = 2\frac{24}{20} \\ - 1\frac{3 \times 5}{4 \times 5} = 1\frac{15}{20} = 1\frac{15}{20} \\ \hline 1\frac{9}{20} \end{array}$$

Finally write the answer way down here.

Subtract. You must rename twice. Simplify your answer when possible.

$$\begin{array}{r} 5\frac{1 \times 3}{2 \times 3} = 5\frac{3}{6} = 4\frac{9}{6} \\ - 2\frac{5 \times 1}{6 \times 1} = 2\frac{5}{6} = 2\frac{5}{6} \\ \hline 2\frac{4}{6} = 2\frac{2}{3} \end{array}$$

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

$$\begin{array}{r} 6\frac{1}{6} \\ - 1\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 11\frac{1}{3} \\ - 5\frac{7}{12} \\ \hline \end{array}$$

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

$$\begin{array}{r} 1\frac{2}{9} \\ - \frac{5}{6} \\ \hline \end{array}$$

## Multiplying Fractions and Whole Numbers

Rename the fractions below as whole numbers.

$$\frac{5}{1} = 5 \quad \frac{3}{1} = \quad \frac{4}{1} = \quad \frac{2}{1} = \quad \frac{10}{1} =$$

That was easy! Do the problems above in reverse and you will have a way to rename whole numbers as fractions.

$$5 = \frac{5}{1} \quad 3 = \quad 4 = \quad 2 = \quad 10 =$$

Rename each whole number as a fraction.

$$\begin{array}{ccccc} 6 = & 8 = & 5 = & 12 = & 1 = \\ 9 = & 7 = & 25 = & 50 = & 100 = \end{array}$$

To multiply a fraction and a whole number, rename the whole number as a fraction. Then multiply the numerators together and multiply the denominators together.

Problem  $\frac{1}{5} \times 4 =$

Step 1  $\frac{1}{5} \times 4 = \frac{1}{5} \times \frac{4}{1}$

Step 2  $\frac{1}{5} \times 4 = \frac{1}{5} \times \frac{4}{1} = \frac{4}{5}$

Rewrite the problem renaming the whole number as a fraction.

Multiply the numerators together.  
Multiply the denominators together.

Multiply.

$$\frac{1}{7} \times 2 = \frac{1}{7} \times \frac{2}{1} = \frac{2}{7}$$

$$\frac{2}{11} \times 5 =$$

$$\frac{2}{5} \times 2 =$$

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

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

$$\frac{4}{17} \times 3 =$$

Often when you multiply a fraction and a whole number you will have to rename your answer as a mixed or whole number.

Multiply. Rename your answer as a mixed or whole number when possible. Simplify your answer when possible.

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

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

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

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

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

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

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

$$\frac{1}{8} \times 14 =$$

The problems will be easier if you can simplify before you multiply.

$$\frac{1}{6} \times 9 = \frac{1}{\cancel{2}^3} \times \frac{\cancel{9}^3}{1} = \frac{3}{2} = 1\frac{1}{2}$$

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

$$\frac{1}{9} \times 6 =$$

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

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

$$12 \times \frac{1}{3} =$$

$$4 \times \frac{5}{6} =$$

$$8 \times \frac{5}{8} =$$

In many multiplication problems the word "of" replaces the "X" sign.

$$\frac{1}{2} \text{ of } 5 = \frac{1}{2} \times \frac{5}{1} = \frac{5}{2} = 2\frac{1}{2}$$

$$\frac{1}{3} \text{ of } 12 =$$

$$\frac{3}{4} \text{ of } 6 =$$

$$\frac{3}{8} \text{ of } 14 =$$

$$\frac{2}{5} \text{ of } 15 =$$

$$\frac{1}{10} \text{ of } 72 =$$

Word Problems

Terry shared three pizzas with some friends. Terry ate  $\frac{1}{4}$  of them. How much pizza did Terry eat?

Problem:

Answer:

Carmen spent four hours at the Y on Saturday. Two thirds of that time she spent in the gym. How many hours did Carmen spend in the gym?

Problem:

Answer:

Ranko bought two dozen eggs at the store. On the way home Ranko dropped the eggs and broke  $\frac{3}{4}$  of them. How many eggs broke?

Problem:

Answer:

Felicia travelled 7 kilometers to school.  $\frac{1}{10}$  of that time she walked and  $\frac{9}{10}$  of the distance she rode a bus.

Problem: A.

Answer: A.

A. How far did Felicia walk?

B. How far did she ride?

Problem: B.

Answer: B.

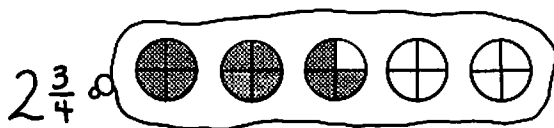
## Renaming Mixed Numbers as Fractions

You have learned how to rename a fraction as a mixed number. To multiply mixed numbers you need to be able to rename a mixed number as a fraction.

How can we rename  $2\frac{3}{4}$  as a fraction? A picture will help.

Shade  $2\frac{3}{4}$  circles.

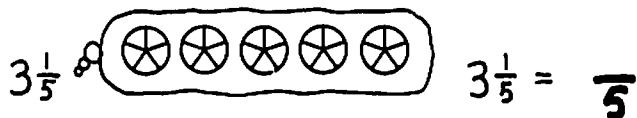
Count fourths.



$$2\frac{3}{4} = \frac{11}{4}$$

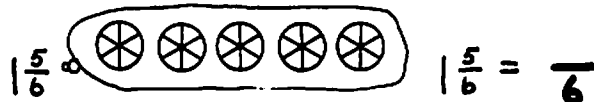
Shade circles to rename each mixed number as a fraction.

Shade  $3\frac{1}{5}$  circles. Count fifths.



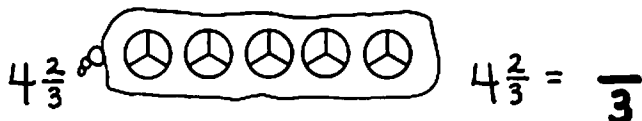
$$3\frac{1}{5} = \frac{16}{5}$$

Shade  $1\frac{5}{6}$  circles. Count sixths.



$$1\frac{5}{6} = \frac{11}{6}$$

Shade  $4\frac{2}{3}$  circles. Count thirds.



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

Shade  $2\frac{3}{8}$  circles. Count eighths.



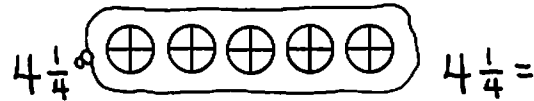
$$2\frac{3}{8} = \frac{19}{8}$$

Shade  $3\frac{1}{2}$  circles. Count halves.



$$3\frac{1}{2} = \frac{7}{2}$$

Shade  $4\frac{1}{4}$  circles. Count fourths.



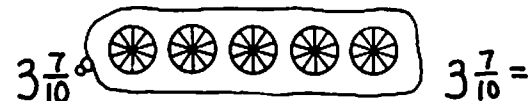
$$4\frac{1}{4} = \frac{17}{4}$$

Shade  $1\frac{6}{7}$  circles. Count sevenths.



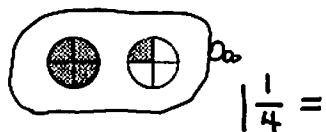
$$1\frac{6}{7} = \frac{13}{7}$$

Shade  $3\frac{7}{10}$  circles. Count tenths.

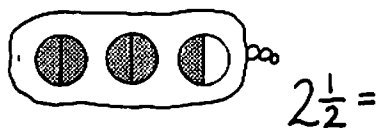


$$3\frac{7}{10} = \frac{37}{10}$$

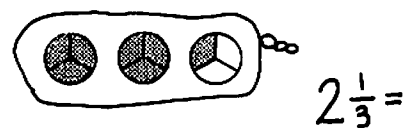
Use the shaded circles to rename each mixed number as a fraction.



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



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



$$2\frac{1}{3} = \frac{7}{3}$$



Here is a shortcut that you can use to rename a mixed number as a fraction.

1. For the numerator of the fraction:

Multiply the whole number by the mixed number's denominator. Then add the numerator.

2. For the denominator of the fraction:

Use the denominator from the mixed number.

$$2\frac{3}{4} = \frac{11}{4}$$

$2 \times 4 + 3$   
Keep the same denominator.

$$4\frac{7}{10} =$$

$4 \times 10 + 7$   
Keep the same denominator.

$$3\frac{1}{5} =$$

$3 \times 5 + 1$   
Keep the same denominator.

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

$8 \times 3 + \square$   
Keep the same denominator.

$$5\frac{4}{9} =$$

$\square \times \square + \square$   
Keep the same denominator.

$$1\frac{5}{7} =$$

$\square \times \square + \square$   
Keep the same denominator.

Do these problems on your own.

$$5\frac{1}{3} = \frac{16}{3}$$

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

$$6\frac{3}{8} =$$

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

$$6\frac{5}{12} =$$

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

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

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

$$7\frac{5}{9} =$$

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

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

$$5\frac{3}{4} =$$

$$1\frac{3}{7} =$$

$$1\frac{4}{7} =$$

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

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

$$3\frac{5}{7} =$$

$$4\frac{5}{7} =$$

Multiplying with Mixed Numbers

To multiply with mixed numbers follow the steps below.

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

Step 1  $2\frac{2}{3} \times \frac{1}{5} = \frac{8}{3} \times \frac{1}{5}$

Step 2  $2\frac{2}{3} \times \frac{1}{5} = \frac{8}{3} \times \frac{1}{5} = \frac{8}{15}$

Rewrite the problem renaming any mixed numbers as fractions.

Multiply the numerators together. Multiply the denominators together.

Multiply.

$$\frac{3}{10} \times 3\frac{2}{7} = \frac{3}{10} \times \frac{23}{7} = \frac{69}{70}$$

$$\frac{1}{3} \times 2\frac{5}{9} =$$

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

$$1\frac{4}{9} \times \frac{2}{5} =$$

$$3\frac{4}{5} \times \frac{1}{4} =$$

$$\frac{1}{7} \times 5\frac{2}{5} =$$

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

$$1\frac{3}{4} \times \frac{5}{9} =$$

Multiply. Simplify when possible.

$$7\frac{1}{2} \times \frac{1}{2} = \frac{15}{2} \times \frac{1}{2} = \frac{15}{4} = 3\frac{3}{4}$$

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

$$5\frac{1}{6} \times \frac{2}{3} =$$

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

$$7\frac{1}{2} \times \frac{1}{4} =$$

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

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

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

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

To multiply a whole number and a mixed number, change both to fractions and multiply. Rewrite your answer as a mixed or whole number and simplify if you can.

$$3 \times 2\frac{3}{5} = \frac{3}{1} \times \frac{13}{5} = \frac{39}{5} = 7\frac{4}{5}$$

$$7 \times 1\frac{1}{2} =$$

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

$$4\frac{1}{3} \times 5 =$$

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

Chia works  $7\frac{1}{2}$  hours a day for five days each week. How many hours does Chia work in a week?

Problem:

Answer:

Micah ran  $4\frac{7}{10}$  kilometers on three different days last week. How far did Micah run last week?

Problem:

Answer:

Danny can pack six boxes in an hour. How many boxes can he pack in  $2\frac{1}{3}$  hours?

Problem:

Answer:

## Dividing with Fractions, Mixed Numbers and Whole Numbers

Do you remember how to divide by a fraction? You have to rewrite the problem as multiplication by the fraction's reciprocal and then multiply.

Try the problems below.

$$\frac{5}{8} \div \frac{2}{3} = \frac{5}{8} \times \frac{3}{2} = \frac{15}{16}$$

$$\frac{3}{11} \div \frac{1}{2} =$$

$$\frac{1}{9} \div \frac{1}{4} =$$

1. Copy the first fraction.
2. Change division to multiplication.
3. Change the second fraction to its reciprocal.
4. Multiply.

To do division problems that combine fractions, mixed numbers and whole numbers, first rename any mixed or whole numbers as fractions. Then follow the steps for division given above. Rename your answer as a mixed or whole number and simplify when possible.



$$3\frac{1}{2} \div \frac{1}{3} = \frac{7}{2} \div \frac{1}{3} = \frac{7}{2} \times \frac{3}{1} = \frac{21}{2} = 10\frac{1}{2}$$

$$4\frac{1}{7} \div \frac{1}{2} =$$

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

$$3\frac{2}{7} \div \frac{3}{7} =$$

$$1\frac{1}{4} \div \frac{1}{2} =$$

$$2 \div \frac{5}{7} =$$

$$6 \div 1\frac{3}{4} =$$

$$\frac{5}{9} \div 1\frac{2}{3} =$$

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

$$3\frac{2}{3} \div 4 =$$

$$4\frac{1}{2} \div 1\frac{1}{2} =$$

$$6\frac{1}{4} \div 3\frac{1}{3} =$$

If it takes  $\frac{1}{4}$  of an hour to type a page, how many pages can be typed in  $3\frac{1}{2}$  hours?

Problem:

Answer:

How many  $\frac{3}{4}$  hour classes can be scheduled in a school day that is  $5\frac{1}{4}$  hours long?

Problem:

Answer:

Jeanette was practicing for a 13 kilometer mini-marathon race. She set up a practice track that was  $2\frac{3}{5}$  kilometers long. How many times must she run around her practice track to run 13 kilometers?

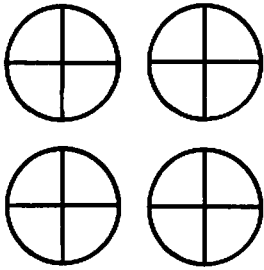
Problem:

Answer:

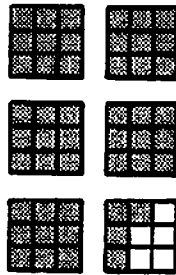
Practice Test - Key To Fractions Book 4

Name \_\_\_\_\_

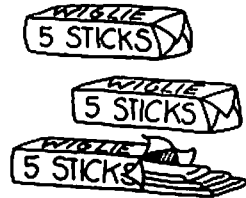
Date \_\_\_\_\_

Shade  $2\frac{3}{4}$ .

How much is shaded?



\_\_\_\_\_



How many packs of gum? \_\_\_\_\_

Is each fraction less than one, equal to one, or greater than one?

 $\frac{5}{3}$  is \_\_\_\_\_ .  $\frac{6}{6}$  is \_\_\_\_\_ . $\frac{1}{5}$  is \_\_\_\_\_ .  $\frac{8}{5}$  is \_\_\_\_\_ .

Rename each fraction as a mixed or whole number.

$\frac{13}{4} =$

$\frac{7}{2} =$

$\frac{12}{3} =$

$\frac{11}{9} =$

Add or subtract.

$$\begin{array}{r} 2\frac{1}{5} \\ + 4\frac{2}{5} \\ \hline \end{array}$$

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

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

$5\frac{3}{11} - 2\frac{2}{11} =$

Simplify each mixed number.

$5\frac{3}{9} =$

$4\frac{7}{5} =$

$3\frac{2}{2} =$

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

## Practice Test - Page 2

Add or subtract, then simplify.

$$\begin{array}{r} 3\frac{1}{8} \\ + 1\frac{3}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 2\frac{7}{9} \\ - 1\frac{1}{9} \\ \hline \end{array}$$

$$\begin{array}{r} 5\frac{3}{4} \\ + 4\frac{3}{4} \\ \hline \end{array}$$

Add or subtract.

$$\begin{array}{r} 2\frac{1}{4} \\ + 6\frac{1}{2} \\ \hline \end{array}$$

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

$$\begin{array}{r} 3\frac{1}{4} \\ + 3\frac{1}{6} \\ \hline \end{array}$$

Subtract.

$$\begin{array}{r} 5 \\ - 3\frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 6\frac{1}{4} \\ - 1\frac{3}{4} \\ \hline \end{array}$$

$$\begin{array}{r} 4\frac{1}{8} \\ - 1\frac{1}{2} \\ \hline \end{array}$$

Rename each whole or mixed number as a fraction.

$2 =$

$5 =$

$1\frac{3}{7} =$

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

Multiply. Rename your answer as a mixed or whole number and simplify when possible.

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

$7 \times \frac{5}{8} =$

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

$2\frac{2}{5} \times 1\frac{3}{4} =$

Divide. Rename your answer as a mixed or whole number and simplify when possible.

$3\frac{1}{2} \div \frac{1}{3} =$

$1\frac{3}{8} \div \frac{1}{4} =$

## Key to Fractions®

Book 1: *Fraction Concepts*

Book 2: *Multiplying and Dividing*

Book 3: *Adding and Subtracting*

Book 4: *Mixed Numbers*

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