

# Rounding Fractions and Mixed Numbers

(pages 228–231)

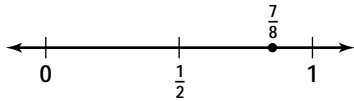


The following guidelines can help you round fractions and mixed numbers to the nearest unit.

<p><b>Rounding Fractions and Mixed Numbers</b></p>	<ul style="list-style-type: none"> <li>• If the numerator is almost as large as the denominator, round the number up to the next whole number.</li> <li>• If the numerator is about half of the denominator, round the fraction to <math>\frac{1}{2}</math>.</li> <li>• If the numerator is much smaller than the denominator, round the number down to the next whole number.</li> <li>• When measuring actual quantities, you may have to round up or down, despite what the rule says, to get useful numbers.</li> </ul>
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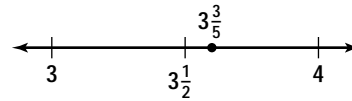
## EXAMPLES

**A** Round  $\frac{7}{8}$  to the nearest half.



The numerator is almost as large as the denominator, so round up. Since  $\frac{7}{8}$  is closer to 1 than  $\frac{1}{2}$ , round up to 1.

**B** Round  $3\frac{3}{5}$  to the nearest half.



The numerator is about half of the denominator. Round the fraction to  $\frac{1}{2}$ . So,  $3\frac{3}{5}$  rounds to  $3\frac{1}{2}$ .

## Try These Together

**Round each number to the nearest half.**

1.  $\frac{2}{5}$  *HINT: The numerator is about half of the denominator.*

2.  $5\frac{1}{8}$  *HINT: The numerator is much smaller than the denominator.*

## PRACTICE

**Round each number to the nearest half.**

3.  $1\frac{5}{8}$

4.  $\frac{7}{12}$

5.  $2\frac{3}{8}$

6.  $8\frac{9}{10}$

7.  $\frac{4}{6}$

8.  $1\frac{2}{9}$



9. **Standardized Test Practice** A hot air balloon can carry 400 pounds of cargo and people. There are four men who want to ride in the balloon. The average weight of the men is 180 pounds. Estimate how many men can ride in the balloon.

**A** 4

**B** 2

**C** 3

**D** 1

Answers: 1.  $\frac{2}{5}$  2. 5 3.  $1\frac{1}{2}$  4.  $\frac{2}{3}$  5.  $2\frac{1}{2}$  6. 9 7.  $\frac{2}{3}$  8. 1 9. B.

# Estimating Sums and Differences

(pages 232–234)



When you add or subtract fractions or mixed numbers, round to estimate the sum or difference.

Estimate the Sum or Difference of Fractions	• Round each fraction to the nearest half, and then add or subtract.
Estimate the Sum or Difference of Mixed Numbers	• Round each mixed number to the nearest whole number, and then add or subtract.

## EXAMPLES

**A** Estimate  $\frac{13}{15} + \frac{9}{16}$ .

$\frac{13}{15}$  rounds to 1 and  $\frac{9}{16}$  rounds to  $\frac{1}{2}$ .

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

$\frac{13}{15} + \frac{9}{16}$  is about  $1\frac{1}{2}$ .

**B** Estimate  $5\frac{7}{8} - 2\frac{2}{5}$ .

$5\frac{7}{8}$  rounds to 6 and  $2\frac{2}{5}$  rounds to 2.

Subtract  $6 - 2 = 4$ .

$5\frac{7}{8} - 2\frac{2}{5}$  is about 4.

## Try These Together

*Estimate.*

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

*HINT: Round to the nearest half.*

2.  $5\frac{1}{8} + 9\frac{3}{5}$

*HINT: Round to the nearest whole number.*

## PRACTICE

*Estimate.*

3.  $\frac{2}{3} + \frac{4}{5}$

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

5.  $\frac{5}{8} + \frac{5}{6}$

6.  $8\frac{3}{4} - 1\frac{3}{16}$

7.  $\frac{1}{10} + \frac{4}{9}$

8.  $\frac{2}{5} + \frac{3}{8}$

9.  $1\frac{1}{7} - \frac{9}{10}$

10.  $1\frac{3}{5} - \frac{1}{5}$

11.  $\frac{7}{8} + \frac{2}{3}$

12. Estimate the sum  $2\frac{1}{3} + \frac{5}{6} + 3\frac{3}{4} + 6\frac{1}{9}$ .

13. Estimate the difference between  $4\frac{1}{5}$  and  $3\frac{2}{3}$ .



**14. Standardized Test Practice** Estimate the following total.

$$\left(\frac{3}{4} + 2\frac{1}{8}\right) - \left(1\frac{1}{5} + 1\frac{3}{5}\right)$$

A 0

B  $\frac{1}{2}$

C 1

D  $1\frac{1}{2}$

14. A  
Answers: Sample answers are given. 1.  $\frac{2}{1}$  2. 15 3.  $1\frac{1}{1}$  4. 1 5.  $1\frac{1}{1}$  6. 8 7.  $\frac{2}{1}$  8. 1 9. 0 10. 2 11.  $1\frac{1}{1}$  12. 13 13. 0

# Adding and Subtracting Fractions with Like Denominators

(pages 238–242)



Fractions with the same denominator are **like fractions**. You add and subtract the numerators of like fractions the same way you add and subtract whole numbers.

<b>Adding Like Fractions</b>	• To add fractions with like denominators, add the numerators. Use the same denominator in the sum.
<b>Subtracting Like Fractions</b>	• To subtract fractions with like denominators, subtract the numerators. Use the same denominator in the difference.

## EXAMPLES

**A** Find the sum of  $\frac{1}{7}$  and  $\frac{3}{7}$ .

*Estimate.*  $0 + \frac{1}{2} = \frac{1}{2}$

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

$$= \frac{4}{7} \quad \text{Compared to the estimate, the answer is reasonable.}$$

**B** Find the difference  $\frac{3}{4} - \frac{1}{4}$ .

*Estimate.*  $1 - \frac{1}{2} = \frac{1}{2}$

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

$$= \frac{2}{4} \text{ or } \frac{1}{2} \quad \text{Compared to the estimate, the answer is reasonable.}$$

## Try These Together

*Add or subtract. Write the answer in simplest form.*

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

*HINT: Add the numerators. Write the sum as a mixed number.*

2.  $\frac{5}{8} - \frac{3}{8}$

*HINT: Subtract the numerators. Write the answer in simplest form.*

## PRACTICE

*Add or subtract. Write the answer in simplest form.*

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

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

5.  $\frac{7}{16} - \frac{3}{16}$

6.  $\frac{9}{10} - \frac{3}{10}$

7.  $\frac{2}{7} + \frac{3}{7}$

8.  $\frac{9}{15} - \frac{6}{15}$

9. How much larger is  $\frac{7}{8}$  than  $\frac{3}{8}$ ?

10. Find the sum of  $\frac{1}{8}$ ,  $\frac{3}{8}$ , and  $\frac{5}{8}$ .



**11. Standardized Test Practice** Find the following total.  $\left(\frac{11}{16} + \frac{5}{16}\right) - \left(\frac{3}{16} + \frac{8}{16}\right)$

A  $\frac{7}{16}$

B  $\frac{1}{2}$

C  $\frac{5}{16}$

D  $1\frac{3}{16}$

Answers: 1.  $1\frac{1}{3}$  2.  $\frac{1}{10}$  3.  $1$  4.  $1\frac{1}{11}$  5.  $\frac{4}{16}$  6.  $\frac{5}{16}$  7.  $\frac{5}{7}$  8.  $1\frac{1}{8}$  9.  $\frac{2}{8}$  10.  $1\frac{1}{8}$  11. C

# Adding and Subtracting Fractions with Unlike Denominators

(pages 243–245)



When you add or subtract fractions, the fractions must have the same denominators. To add or subtract fractions with unlike denominators, rename the fractions using the least common denominator (LCD). Then add or subtract and simplify.

## EXAMPLES

**A** Add  $\frac{1}{2}$  and  $\frac{2}{3}$ .

The LCD for  $\frac{1}{2}$  and  $\frac{2}{3}$  is 6.

$$\frac{1}{2} = \frac{3}{6}, \text{ and } \frac{2}{3} = \frac{4}{6} \quad \text{Rename the fractions.}$$

$$\frac{3}{6} + \frac{4}{6} = \frac{7}{6}, \text{ or } 1\frac{1}{6} \quad \text{Add, then simplify.}$$

**B** Find  $\frac{3}{5} - \frac{1}{4}$ .

The LCD for  $\frac{3}{5}$  and  $\frac{1}{4}$  is 20.

$$\frac{3}{5} = \frac{12}{20}, \text{ and } \frac{1}{4} = \frac{5}{20} \quad \text{Rename the fractions.}$$

$$\frac{12}{20} - \frac{5}{20} = \frac{7}{20} \quad \text{Subtract.}$$

## Try These Together

Add or subtract. Write the answer in simplest form.

1.  $\frac{3}{4} - \frac{1}{6}$

HINT: Find the LCD, then rename the fractions.

2.  $\frac{3}{8} + \frac{5}{12}$

HINT: Find the LCD, then rename the fractions.

## PRACTICE

Add or subtract. Write the answer in simplest form.

3.  $\frac{3}{8} + \frac{1}{4}$

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

5.  $\frac{7}{8} + \frac{1}{2}$

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

7.  $\frac{11}{12} + \frac{5}{6}$

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

9.  $\frac{3}{7} + \frac{1}{2}$

10.  $\frac{8}{11} - \frac{2}{3}$

11.  $\frac{4}{9} - \frac{1}{6}$

12. What is the sum of  $\frac{5}{8}$  and  $\frac{9}{16}$ ?

13. How much is  $\frac{9}{10} - \frac{2}{5}$ ?

14. How much more is  $\frac{11}{16}$  than  $\frac{1}{4}$ ?

15. **Carpentry** You are building a bookcase. The board that makes up the side of the bookcase is  $\frac{1}{2}$  inch thick. If you use  $\frac{7}{8}$ -inch screws to attach the shelves of the bookcase, how far into the shelves do the screws extend?



16. **Standardized Test Practice** What is the sum of  $\frac{1}{6}$ ,  $\frac{3}{4}$ , and  $\frac{9}{12}$ ?

A  $\frac{7}{12}$

B  $\frac{11}{12}$

C  $1\frac{5}{12}$

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

Answers: 1.  $\frac{17}{24}$  2.  $\frac{24}{19}$  3.  $\frac{8}{5}$  4.  $\frac{6}{5}$  5.  $1\frac{3}{8}$  6.  $\frac{15}{11}$  7.  $1\frac{4}{3}$  8.  $\frac{12}{11}$  9.  $\frac{14}{13}$  10.  $\frac{33}{2}$  11.  $\frac{18}{5}$  12.  $1\frac{3}{3}$  13.  $\frac{2}{1}$  14.  $\frac{16}{7}$  15.  $\frac{8}{3}$  inch 16. D

# Adding and Subtracting Mixed Numbers

(pages 246–249)



Use the following rules to add and subtract mixed numbers.

<b>Adding and Subtracting Mixed Numbers</b>	<ul style="list-style-type: none"> <li>• Add or subtract the fractions.</li> <li>• Then add or subtract the whole numbers.</li> <li>• Rename and simplify if necessary.</li> </ul>
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## EXAMPLES

**A** Find  $5\frac{5}{8} + 1\frac{1}{8}$ .

Add the fractions. Add the whole numbers.

$$\begin{array}{r} 5\frac{5}{8} \\ + 1\frac{1}{8} \\ \hline 6\frac{6}{8} \end{array} \rightarrow \begin{array}{r} 5\frac{5}{8} \\ + 1\frac{1}{8} \\ \hline 6\frac{6}{8} \text{ or } 6\frac{3}{4} \end{array} \text{ Simplify.}$$

**B** Find  $3\frac{5}{6} - 2\frac{1}{2}$ .

Subtract the fractions. Subtract the whole numbers.

$$\begin{array}{r} 3\frac{5}{6} \\ - 2\frac{1}{2} \\ \hline 1\frac{2}{6} \end{array} \rightarrow \begin{array}{r} 3\frac{5}{6} \\ - 2\frac{3}{6} \\ \hline 1\frac{2}{6} \end{array} \rightarrow \begin{array}{r} 3\frac{5}{6} \\ - 2\frac{3}{6} \\ \hline 1\frac{2}{6} \text{ or } 1\frac{1}{3} \end{array} \text{ Simplify.}$$

## Try These Together

Add or subtract. Write the answer in simplest form.

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

*HINT: Rename the fractions. Add the fractions. Then add the whole numbers.*

2.  $9\frac{11}{12} - 4\frac{3}{8}$

*HINT: Rename the fractions. Subtract the fractions. Then subtract the whole numbers.*

## PRACTICE

Add or subtract. Write the answer in simplest form.

3.  $2\frac{1}{3} + 5\frac{3}{8}$

4.  $9\frac{3}{5} - 2\frac{3}{15}$

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

6.  $8\frac{1}{3} - 6\frac{1}{4}$

7.  $15\frac{7}{8} - 12\frac{3}{4}$

8.  $8\frac{5}{12} - 2\frac{1}{8}$

9.  $1\frac{7}{10} + 4\frac{1}{3}$

10.  $9\frac{1}{3} + 5\frac{5}{6}$

11.  $4\frac{3}{4} - 2\frac{2}{3}$



- 12. Standardized Test Practice** A bag of potatoes weighs  $5\frac{3}{4}$  pounds. At the first meal,  $1\frac{1}{3}$  pounds of potatoes are eaten. At a later meal,  $2\frac{1}{4}$  pounds of potatoes are eaten. How many pounds of potatoes remain in the bag?

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

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

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

D  $2\frac{2}{3}$

Answer: 1.  $17\frac{2}{3}$  2.  $5\frac{13}{12}$  3.  $7\frac{24}{12}$  4.  $7\frac{5}{2}$  5.  $9\frac{6}{1}$  6.  $2\frac{12}{1}$  7.  $3\frac{8}{1}$  8.  $6\frac{24}{7}$  9.  $6\frac{30}{1}$  10.  $15\frac{6}{1}$  11.  $2\frac{12}{1}$  12. A

# Subtracting Mixed Numbers with Renaming

(pages 250–253)



When you subtract mixed numbers, sometimes the fraction in the number you are subtracting is greater than the fraction in the number you are subtracting from. When this happens, you must rename the first fraction as an improper fraction in order to subtract.

## EXAMPLE

Find  $12\frac{1}{3} - 8\frac{3}{5}$ .

The LCM of 3 and 5 is 15.

Since  $\frac{9}{15}$  is greater than  $\frac{5}{15}$ , rename  $12\frac{5}{15}$  as  $11\frac{20}{15}$ , and then subtract.

$$\begin{array}{r} 12\frac{1}{3} \rightarrow 12\frac{5}{15} \\ -8\frac{3}{5} \rightarrow -8\frac{9}{15} \\ \hline \end{array}$$

$$\begin{array}{r} 11\frac{20}{15} \\ -8\frac{9}{15} \\ \hline 3\frac{11}{15} \end{array}$$

## Try These Together

**Subtract. Write the answer in simplest form.**

1.  $4\frac{3}{10} - 1\frac{7}{10}$

*HINT: Rename the fraction in the first mixed number.*

2.  $8\frac{3}{14} - 5\frac{5}{7}$

*HINT: First find the LCD. Then rename using the LCD. Then, rename the first fraction as an improper fraction.*

## PRACTICE

**Subtract. Write the answer in simplest form.**

3.  $9\frac{5}{12} - 4\frac{11}{12}$

4.  $4\frac{3}{10} - 2\frac{9}{10}$

5.  $7\frac{2}{5} - 6\frac{3}{10}$

6.  $18\frac{3}{4} - 7\frac{7}{8}$

7.  $5\frac{3}{8} - 1\frac{5}{8}$

8.  $9\frac{1}{6} - 7\frac{2}{5}$

9.  $4\frac{3}{4} - 3\frac{1}{8}$

10.  $3\frac{1}{2} - 1\frac{5}{8}$

11.  $18 - \frac{5}{6}$

12. **Algebra** Solve the equation  $m = 9\frac{5}{8} - 6\frac{4}{5}$ . Write the solution in simplest form.



13. **Standardized Test Practice** Sam swam  $2\frac{3}{8}$  hours on Saturday and  $3\frac{1}{3}$  hours on Sunday. How many more hours did he swim on Sunday than on Saturday?

A  $1\frac{1}{24}$

B  $\frac{23}{24}$

C  $1\frac{3}{8}$

D  $1\frac{1}{4}$

Answers: 1.  $2\frac{5}{6}$  2.  $2\frac{2}{3}$  3.  $4\frac{1}{4}$  4.  $1\frac{5}{2}$  5.  $1\frac{1}{10}$  6.  $10\frac{7}{10}$  7.  $3\frac{4}{8}$  8.  $1\frac{30}{24}$  9.  $1\frac{5}{8}$  10.  $1\frac{7}{8}$  11.  $17\frac{1}{6}$  12.  $2\frac{40}{33}$  13. B.

# Adding and Subtracting Measures of Time

(pages 254–257)



You add and subtract measures of time in the same way you add and subtract mixed numbers.

### Adding and Subtracting Measures of Time

- Add or subtract the seconds.
  - Add or subtract the minutes.
  - Finally, add or subtract the hours.
- Rename, if necessary, in each step.

## EXAMPLES

**A** Find  $3\text{ h } 15\text{ min} + 2\text{ h } 20\text{ min}$ .

*First add the minutes.*

$$\begin{array}{r} 3\text{ h } 15\text{ min} \\ + 2\text{ h } 20\text{ min} \\ \hline \end{array}$$

→

*Then add the hours.*

$$\begin{array}{r} 3\text{ h } 15\text{ min} \\ + 2\text{ h } 20\text{ min} \\ \hline 5\text{ h } 35\text{ min} \end{array}$$

**B** Find  $8\text{ h } 12\text{ min} - 6\text{ h } 48\text{ min}$ .

*First rename.*

$$\begin{array}{r} 7\text{ h } 72\text{ min} \\ - 6\text{ h } 48\text{ min} \\ \hline \end{array}$$

→

*Subtract the minutes.*

$$\begin{array}{r} 7\text{ h } 72\text{ min} \\ - 6\text{ h } 48\text{ min} \\ \hline 24\text{ min} \end{array}$$

→

*Subtract the seconds.*

$$\begin{array}{r} 7\text{ h } 72\text{ min} \\ - 6\text{ h } 48\text{ min} \\ \hline 1\text{ h } 24\text{ min} \end{array}$$

## Try These Together

**Add or subtract. Rename if necessary.**

1.  $4\text{ min } 32\text{ s} + 8\text{ min } 41\text{ s}$

*HINT: Add the seconds, and then add the minutes.*

2.  $11\text{ min } 4\text{ s} - 5\text{ min } 12\text{ s}$

*HINT: Rename, subtract the seconds, and then subtract the minutes.*

## PRACTICE

**Complete.**

3.  $3\text{ h } 14\text{ min} = 2\text{ h } \underline{\quad} \text{ min}$

4.  $17\text{ h } 18\text{ min} = 16\text{ hr } \underline{\quad} \text{ min}$

5.  $12\text{ h } 6\text{ min} = 11\text{ hr } \underline{\quad} \text{ min}$

6.  $2\text{ h } 9\text{ min } 62\text{ s} = 2\text{ h } \underline{\quad} \text{ min } 2\text{ s}$

**Add or subtract. Rename if necessary.**

7. 
$$\begin{array}{r} 8\text{ h } 46\text{ min} \\ - 1\text{ h } 52\text{ min} \\ \hline \end{array}$$

8. 
$$\begin{array}{r} 4\text{ h } 36\text{ min} \\ - 3\text{ h } 5\text{ min} \\ \hline \end{array}$$

9. 
$$\begin{array}{r} 6\text{ h } 24\text{ min} \\ + 4\text{ h } 18\text{ min} \\ \hline \end{array}$$

10. 
$$\begin{array}{r} 5\text{ h } 43\text{ min } 21\text{ s} \\ - 2\text{ h } 18\text{ min } 14\text{ s} \\ \hline \end{array}$$

11. 
$$\begin{array}{r} 1\text{ h } 12\text{ min } 36\text{ s} \\ + 8\text{ h } 54\text{ min } 4\text{ s} \\ \hline \end{array}$$

12. 
$$\begin{array}{r} 7\text{ h } 42\text{ min } 16\text{ s} \\ + 1\text{ h } 58\text{ min } 12\text{ s} \\ \hline \end{array}$$



**13. Standardized Test Practice** Margarita is flying from Chicago to Denver. Her  $2\text{ h } 35\text{ min}$  flight leaves Chicago at  $5:55\text{ P.M.}$  What time does the flight arrive in Denver? Hint: The local Chicago time is one hour ahead of the local time in Denver.

**A**  $6:30\text{ P.M.}$

**B**  $5:30\text{ P.M.}$

**C**  $7:30\text{ P.M.}$

**D**  $8:30\text{ P.M.}$

Answers: 1.  $13\text{ min } 13\text{ s}$  2.  $5\text{ min } 52\text{ s}$  3.  $74$  4.  $78$  5.  $66$  6.  $10$  7.  $6\text{ h } 54\text{ min}$  8.  $1\text{ h } 31\text{ min}$  9.  $10\text{ h } 42\text{ min}$  10.  $3\text{ h } 25\text{ min } 7\text{ s}$  11.  $10\text{ h } 6\text{ min } 40\text{ s}$  12.  $9\text{ h } 40\text{ min } 28\text{ s}$  13. **C**

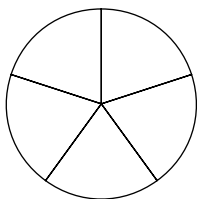
## Chapter 6 Review



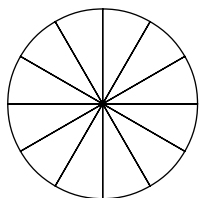
## Pie-Eating Contest

You've just entered a pie-eating contest, but this contest is a little different from most. You must eat the correct amount of pie in each round of the contest to win. The instructions for each round tell you how much pie to eat. Shade the blank pies below to show how much pie you would eat in each round.

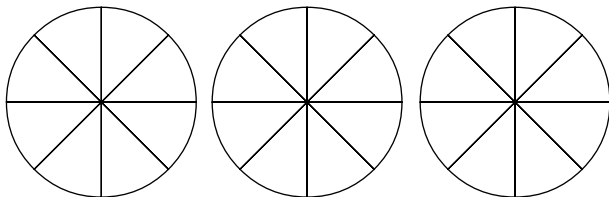
**Round 1:** Eat  $\frac{2}{5} + \frac{1}{5}$  of the pie.



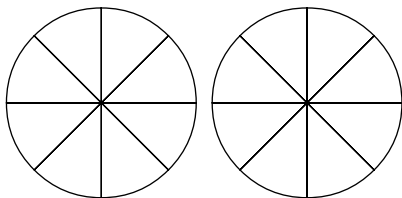
**Round 2:** Eat  $\frac{2}{3} - \frac{1}{4}$  of the pie.



**Round 3:** Eat  $1\frac{1}{2} + 1\frac{3}{8}$  of the pies.



**Round 4:** Eat  $2\frac{1}{4} - 1\frac{7}{8}$  of the pies.



Answers are located on p. 109.