Lesson 5.1 Adding & Subtracting With Like Denominators

Denominators are called **common** when they share the same number.

To add fractions with like denominators, add the numerators and use the common denominator.

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

To subtract fractions with like denominators, subtract the numerators and use the common denominator.

$$\frac{7}{10} - \frac{3}{10} = \frac{7-3}{10} = \frac{4}{10} = \frac{2}{5}$$

Add or subtract. Write answers in simplest form.

	a	b	c	d
1.	$\frac{2}{5}$ $+\frac{1}{5}$	$\frac{5}{7}$ $-\frac{3}{7}$	$\frac{3}{4}$ $-\frac{1}{4}$	$\frac{5}{8}$ $+\frac{1}{8}$
2.	$\frac{7}{8}$ $-\frac{3}{8}$	$\frac{1}{5}$ $+\frac{3}{5}$	$\frac{3}{8}$ $+\frac{1}{8}$	$\frac{4}{5}$ $-\frac{2}{5}$
3.	$\frac{7}{9}$ $-\frac{1}{9}$	$\frac{2}{9}$ $+\frac{5}{9}$	$\frac{5}{7}$ $+\frac{1}{7}$	$\frac{5}{6}$ $-\frac{1}{6}$
4.	$\frac{1}{10}$ $+\frac{3}{10}$	$\frac{6}{9}$ $-\frac{5}{9}$	$\frac{6}{7}$ $-\frac{1}{7}$	$\frac{5}{9}$ $+\frac{1}{9}$

Lesson 5.2 Adding Fractions with Unlike Denominators

$$\begin{array}{r} \dfrac{1}{7} \times \dfrac{3}{3} = \dfrac{3}{21} \\ + \dfrac{2}{3} \times \dfrac{7}{7} = + \dfrac{14}{21} \\ \hline \dfrac{17}{21} \end{array}$$

To add fractions, the denominators must be the same. When you have unlike denominators, find the least common multiple (LCM) and rename the fractions.

In the example, the denominators are 3 and 7, so find the LCM of 3 and 7.

$$\begin{array}{r} \dfrac{6}{7} \times \dfrac{3}{3} = \dfrac{18}{21} \\ + \dfrac{2}{3} \times \dfrac{7}{7} = + \dfrac{14}{21} \\ \hline \dfrac{32}{21} = 1\dfrac{11}{21} \end{array}$$

Multiples of 3: 3, 6, 9, 12, 15, 18, 21, 24
Multiples of 7: 7, 14, 21, 28

The least common multiple of 3 and 7 is 21. To change each fraction so it has the same denominator, multiply both the numerator and denominator by the same number.

If necessary, change improper fractions to mixed numerals in simplest form.

Add each fraction. Write answers in simplest form.

	a	b	c	d	e
1.	$\dfrac{3}{5}$ $+\dfrac{1}{4}$	$\dfrac{2}{3}$ $+\dfrac{2}{7}$	$\dfrac{1}{5}$ $+\dfrac{1}{7}$	$\dfrac{3}{8}$ $+\dfrac{1}{6}$	$\dfrac{1}{2}$ $+\dfrac{1}{3}$
2.	$\dfrac{2}{9}$ $+\dfrac{5}{8}$	$\dfrac{6}{7}$ $+\dfrac{1}{3}$	$\dfrac{2}{5}$ $+\dfrac{5}{7}$	$\dfrac{7}{10}$ $+\dfrac{1}{3}$	$\dfrac{3}{7}$ $+\dfrac{1}{8}$
3.	$\dfrac{2}{3}$ $+\dfrac{1}{5}$	$\dfrac{4}{7}$ $+\dfrac{5}{9}$	$\dfrac{3}{4}$ $+\dfrac{3}{10}$	$\dfrac{7}{8}$ $+\dfrac{2}{5}$	$\dfrac{8}{9}$ $+\dfrac{6}{7}$

Lesson 5.2 Adding Fractions with Unlike Denominators

Add. Write answers in simplest form.

	a	b	c	d	e
1.	$\frac{1}{2}$ $+\ \frac{3}{4}$	$\frac{3}{3}$ $+\ \frac{1}{10}$	$\frac{5}{6}$ $+\ \frac{3}{4}$	$\frac{1}{3}$ $+\ \frac{5}{6}$	$\frac{2}{3}$ $+\ \frac{1}{12}$
2.	$\frac{3}{8}$ $+\ \frac{1}{4}$	$\frac{2}{3}$ $+\ \frac{5}{9}$	$\frac{5}{12}$ $+\ \frac{7}{8}$	$\frac{1}{2}$ $+\ \frac{7}{10}$	$\frac{3}{4}$ $+\ \frac{5}{6}$
3.	$\frac{5}{7}$ $+\ \frac{4}{14}$	$\frac{1}{6}$ $+\ \frac{7}{8}$	$\frac{9}{10}$ $+\ \frac{5}{8}$	$\frac{2}{9}$ $+\ \frac{11}{12}$	$\frac{5}{6}$ $+\ \frac{8}{9}$
4.	$\frac{3}{5}$ $+\ \frac{1}{10}$	$\frac{3}{5}$ $+\ \frac{9}{10}$	$\frac{1}{4}$ $+\ \frac{5}{6}$	$\frac{3}{8}$ $+\ \frac{1}{12}$	$\frac{2}{5}$ $+\ \frac{2}{7}$

Lesson 5.3 Subtracting Fractions with Unlike Denominators

$\begin{array}{r} \frac{2}{3} \times \frac{7}{7} = \frac{14}{21} \\ -\ \frac{2}{7} \times \frac{3}{3} = -\ \frac{6}{21} \\ \hline \frac{8}{21} \end{array}$

When subtracting fractions that have different denominators, rename fractions to have a common denominator. Then, subtract fractions, and write the difference in simplest form.

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

Subtract. Write answers in simplest form.

	a	b	c	d	e
1.	$\frac{3}{4}$ $-\frac{1}{2}$	$\frac{5}{6}$ $-\frac{1}{3}$	$\frac{9}{10}$ $-\frac{2}{5}$	$\frac{4}{7}$ $-\frac{1}{8}$	$\frac{5}{9}$ $-\frac{1}{3}$
2.	$\frac{2}{5}$ $-\frac{1}{9}$	$\frac{3}{5}$ $-\frac{2}{7}$	$\frac{2}{3}$ $-\frac{3}{8}$	$\frac{5}{6}$ $-\frac{1}{3}$	$\frac{3}{4}$ $-\frac{2}{9}$
3.	$\frac{7}{10}$ $-\frac{3}{6}$	$\frac{8}{9}$ $-\frac{1}{4}$	$\frac{7}{8}$ $-\frac{5}{12}$	$\frac{7}{10}$ $-\frac{1}{4}$	$\frac{4}{5}$ $-\frac{3}{7}$

Lesson 5.3 Subtracting Fractions with Unlike Denominators

Subtract. Write answers in simplest form.

	a	b	c	d

1.

a: $\dfrac{5}{9}$ $-\dfrac{5}{18}$

b: $\dfrac{5}{8}$ $-\dfrac{3}{12}$

c: $\dfrac{7}{18}$ $-\dfrac{3}{9}$

d: $\dfrac{4}{8}$ $-\dfrac{7}{16}$

2.

a: $\dfrac{5}{10}$ $-\dfrac{1}{15}$

b: $\dfrac{9}{18}$ $-\dfrac{2}{15}$

c: $\dfrac{9}{10}$ $-\dfrac{9}{14}$

d: $\dfrac{6}{16}$ $-\dfrac{1}{8}$

3.

a: $\dfrac{5}{8}$ $-\dfrac{1}{9}$

b: $\dfrac{7}{10}$ $-\dfrac{7}{15}$

c: $\dfrac{8}{36}$ $-\dfrac{3}{14}$

d: $\dfrac{13}{36}$ $-\dfrac{9}{35}$

4.

a: $\dfrac{10}{25}$ $-\dfrac{2}{9}$

b: $\dfrac{5}{24}$ $-\dfrac{3}{15}$

c: $\dfrac{1}{8}$ $-\dfrac{3}{26}$

d: $\dfrac{9}{14}$ $-\dfrac{1}{8}$

Lesson 5.4 Adding Mixed Numbers

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

Find the common denominator (8) and rename the fractions.

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

Add the fractions.

$$5\frac{9}{5} = 6\frac{1}{8}$$

Add the whole numbers. Simplify and rename improper fractions.

Add. Write answers in simplest form.

	a	b	c	d
1.	$2\frac{1}{2}$ $+3\frac{2}{5}$	$1\frac{2}{3}$ $+6\frac{1}{5}$	$4\frac{2}{7}$ $+3\frac{3}{4}$	$5\frac{1}{4}$ $+2\frac{1}{5}$
2.	$8\frac{1}{6}$ $+1\frac{4}{7}$	$2\frac{5}{6}$ $+6\frac{3}{5}$	$7\frac{3}{8}$ $+3\frac{1}{3}$	$4\frac{2}{9}$ $+9\frac{1}{2}$
3.	$9\frac{5}{6}$ $+6\frac{5}{8}$	$4\frac{1}{7}$ $+10\frac{2}{3}$	$8\frac{1}{9}$ $+2\frac{6}{7}$	$7\frac{3}{10}$ $+1\frac{5}{6}$

Lesson 5.4 Adding Mixed Numbers

Add. Write answers in simplest form.

	a	b	c	d

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

$$7\frac{3}{8}$$
$$+ \ \frac{3}{4}$$

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

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

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

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

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

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

3.
$$5\frac{7}{10}$$
$$+8\frac{2}{3}$$

$$11\frac{4}{5}$$
$$+2\frac{8}{9}$$

$$6\frac{7}{8}$$
$$+5\frac{1}{6}$$

$$9\frac{5}{7}$$
$$+9\frac{9}{10}$$

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

$$2\frac{3}{8}$$
$$3\frac{1}{4}$$
$$+2\frac{1}{2}$$

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

$$2\frac{3}{8}$$
$$3\frac{1}{2}$$
$$+1\frac{1}{4}$$

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

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

$$3\frac{5}{8}$$
$$2\frac{1}{4}$$
$$+2\frac{1}{2}$$

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

Lesson 5.5 Subtracting Mixed Numbers

$6\frac{5}{7} \times \frac{3}{3} = 6\frac{15}{21}$ Rename fractions to have common denominators.

$-5\frac{1}{3} \times \frac{7}{7} = -5\frac{7}{21}$ Subtract the fractions, then subtract the whole numbers.

$1\frac{8}{21}$ Write the difference in simplest form.

Subtract. Write answers in simplest form.

	a	b	c	d	e
1.	$4\frac{2}{3}$	$7\frac{7}{8}$	$8\frac{9}{10}$	$8\frac{3}{4}$	$3\frac{1}{3}$
	$-2\frac{1}{6}$	$-2\frac{3}{4}$	$-6\frac{2}{5}$	$-4\frac{3}{8}$	$-2\frac{2}{9}$
2.	$6\frac{5}{8}$	$5\frac{1}{2}$	$9\frac{7}{8}$	$9\frac{5}{9}$	$7\frac{7}{10}$
	$-4\frac{3}{7}$	$-1\frac{1}{6}$	$-4\frac{2}{5}$	$-3\frac{1}{3}$	$-4\frac{4}{7}$
3.	$8\frac{8}{12}$	$9\frac{3}{10}$	$8\frac{4}{6}$	$6\frac{6}{7}$	$5\frac{5}{6}$
	$-2\frac{3}{4}$	$-6\frac{1}{8}$	$-5\frac{2}{8}$	$-3\frac{3}{5}$	$-3\frac{1}{12}$

Lesson 5.5 Subtracting Mixed Numbers

Subtract. Write answers in simplest form.

	a	b	c	d

1.

$\begin{array}{r} 4 \\ -\ \frac{3}{8} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 5\frac{5}{6} \\ -1\frac{1}{3} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 8 \\ -3\frac{5}{8} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 4\frac{3}{5} \\ -\ \frac{3}{10} \\ \hline \end{array}$

2.

$\begin{array}{r} 5\frac{3}{4} \\ -4\frac{5}{8} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 8\frac{2}{3} \\ -4\frac{1}{6} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 5\frac{5}{6} \\ -3\frac{3}{4} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 7\frac{4}{5} \\ -2\frac{1}{2} \\ \hline \end{array}$

3.

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

4.

$\begin{array}{r} 4\frac{3}{4} \\ -2\frac{7}{8} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 6\frac{1}{2} \\ -3\frac{2}{3} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 5 \\ -2\frac{3}{3} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 3 \\ -\ \frac{5}{6} \\ \hline \end{array}$

5.

$\begin{array}{r} 2\frac{1}{2} \\ -1\frac{4}{11} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 5\frac{7}{10} \\ -2\frac{3}{8} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 9\frac{7}{8} \\ -8\frac{2}{9} \\ \hline \end{array}$
$\qquad$
$\begin{array}{r} 7\frac{3}{4} \\ -6\frac{7}{12} \\ \hline \end{array}$

Lesson 5.6 Problem Solving

Solve each problem. Write answers in simplest form.

1. Caroline needs $3\frac{1}{7}$ cups of sugar for her first batch of brownies and $2\frac{8}{9}$ cups of sugar for a second batch. How much sugar does she need in all?

   Caroline needs _____ cups of sugar.

2. Robert's gas tank has $5\frac{3}{5}$ gallons of gas in it. If he adds $7\frac{2}{3}$ gallons, how much gas will be in the tank?

   There will be _____ gallons of gas in the tank.

3. A hamburger weighs $\frac{1}{3}$ pound, and an order of french fries weighs $\frac{1}{4}$ pound. How many pounds total will a meal of hamburger and french fries weigh?

   The meal will weigh _____ pounds.

4. John is $5\frac{6}{10}$ feet tall and Jamar is $\frac{5}{8}$ feet taller than John. How tall is Jamar?

   Jamar is _____ feet tall.

5. Mrs. Stevenson has used $4\frac{2}{3}$ inches of string. She needs $1\frac{6}{7}$ inches more. How much string will Mrs. Stevenson have used when she is done?

   Mrs. Stevenson will have used _____ inches of string.

6. It takes Lacy $8\frac{1}{3}$ seconds to climb up the slide and $2\frac{1}{4}$ seconds to go down the slide. How many seconds is Lacy's trip up and down the slide?

   Lacy's trip is _____ seconds long.

1.	2.
3.	4.
5.	6.

Lesson 5.6 Problem Solving

Solve each problem. Write answers in simplest form.

1. Eric needs $\frac{1}{2}$ deck of playing cards for a magic trick. He only has $\frac{2}{7}$ of a deck. What fraction of a deck does Eric still need?

   Eric still needs _____ of a deck.

2. Randy ran $1\frac{3}{4}$ miles. Natasha ran $\frac{9}{10}$ miles. How many more miles did Randy run than Natasha?

   Randy ran _____ miles more than Natasha.

3. A soccer ball weighs 6 ounces when fully inflated. Raymundo has inflated the ball to $4\frac{2}{3}$ ounces. How many more ounces must be added before the ball is fully inflated?

   The ball needs _____ more ounces to be fully inflated.

4. In January, employees at Home Real Estate Company worked $6\frac{3}{4}$ hours a day. In February, employees worked $7\frac{1}{8}$ hours a day. How many more hours did employees work daily during February than during January?

   Employees worked _____ hours more during February.

5. Peter's hat size is $7\frac{3}{8}$ units. Cal's hat size is $6\frac{7}{12}$ units. How many units larger is Peter's hat size than Cals?

   Peter's hat size is _____ units larger than Cal's.

6. Mrs. Anderson uses $3\frac{1}{5}$ cups of apples for her pies. Mrs. Woods uses $4\frac{2}{3}$ cups of apples for her pies. How many more cups of apples does Mrs. Woods use than Mrs. Anderson?

   Mrs. Woods uses _____ more cups of apples.

1.	2.
3.	4.
5.	6.