

## **CHAPTER 5: ADDING AND SUBTRACTING FRACTIONS AND DECIMALS**

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## 5.1 Adding Like Fractions

### Key Vocabulary 5.2

vertical: \_\_\_\_\_

horizontal: \_\_\_\_\_

### Think 5.1

- Set up fractions to add vertically.
- Keep denominator.
- Add numerators.
- Convert improper Fractions to mixed numbers as needed.
- Simplify by reducing fractions to lowest terms as needed.

$$\begin{array}{r} \frac{1}{4} \\ + \frac{1}{4} \\ \hline \frac{2}{4} = \frac{1}{2} \end{array} \qquad \begin{array}{r} \frac{4}{8} \\ + \frac{6}{8} \\ \hline \frac{10}{8} = 1\frac{2}{8} = 1\frac{1}{4} \end{array}$$

### Try It 5.1

Find the sums. Then convert to mixed number and simplify as needed.

1)  $\frac{1}{3} + \frac{1}{3} = \underline{\hspace{2cm}}$

2)  $\frac{2}{6} + \frac{2}{6} = \underline{\hspace{2cm}}$

3)  $\frac{3}{8} + \frac{1}{8} = \underline{\hspace{2cm}}$

4)  $\frac{3}{6} + \frac{5}{6} = \underline{\hspace{2cm}}$

5)  $\frac{4}{5} + \frac{5}{5} = \underline{\hspace{2cm}}$

6)  $\frac{6}{9} + \frac{2}{9} = \underline{\hspace{2cm}}$

## 5.2 Practice Exercises

Find the sums. Then convert to mixed number and simplify as needed.

1)  $\frac{1}{4} + \frac{2}{4} = \underline{\hspace{2cm}}$

2)  $\frac{2}{3} + \frac{1}{3} = \underline{\hspace{2cm}}$

3)  $\frac{3}{4} + \frac{3}{4} = \underline{\hspace{2cm}}$

4)  $\frac{1}{3} + \frac{2}{3} + \frac{1}{3} = \underline{\hspace{2cm}}$

5)  $\frac{2}{8} + \frac{4}{8} = \underline{\hspace{2cm}}$

6)  $\frac{9}{7} + \frac{3}{7} = \underline{\hspace{2cm}}$

7)  $\frac{1}{12} + \frac{5}{12} + \frac{10}{12} = \underline{\hspace{2cm}}$

8) Jill jogged six tenths of a mile. Abby jogged eight tenths of a mile. How many miles did they jog altogether?  $\underline{\hspace{2cm}}$

9) Henry bought some advertising space in a local magazine. One space cost \$250 for  $\frac{7}{10}$  of a page. The other space cost \$175 for  $\frac{3}{10}$  of a page. What was the combined amount of space Henry bought?  $\underline{\hspace{2cm}}$

10) How much did Henry pay for the ads altogether?  $\underline{\hspace{2cm}}$

## 5.2 Adding Unlike Fractions

### Key Vocabulary 5.2

least common denominator (LCD): \_\_\_\_\_

### Think 5.2

- Set up fractions to add vertically.
- Use common multiples to find the least common denominator (LCD).
- Raise fractions to higher terms.
- Add numerators.
- Convert improper fractions to mixed numbers as needed.
- Simplify by reducing fractions to lowest terms as needed.

$$\begin{array}{r} \frac{1}{3} \times \frac{4}{4} = \frac{4}{12} \\ + \frac{2}{4} \times \frac{3}{3} = \frac{6}{12} \\ \hline \frac{10}{12} = \frac{5}{6} \end{array}$$
$$\begin{array}{r} \frac{3}{6} \times \frac{3}{3} = \frac{9}{18} \\ + \frac{6}{9} \times \frac{2}{2} = \frac{12}{18} \\ \hline \frac{21}{18} = 1 \frac{3}{18} = 1 \frac{1}{6} \end{array}$$

### Try It 5.2

Find the sums and simplify as needed.

1)  $\frac{2}{4} + \frac{3}{5} = \underline{\hspace{2cm}}$

2)  $\frac{4}{6} + \frac{8}{9} = \underline{\hspace{2cm}}$

3)  $\frac{2}{6} + \frac{6}{8} = \underline{\hspace{2cm}}$

4)  $\frac{3}{8} + \frac{5}{12} = \underline{\hspace{2cm}}$

5)  $\frac{2}{3} + \frac{4}{9} = \underline{\hspace{2cm}}$

6)  $\frac{3}{4} + \frac{5}{6} = \underline{\hspace{2cm}}$

## 5.2 Practice Exercises

Add fractions, convert to mixed numbers, and simplify as needed.

1)  $\frac{7}{8} + \frac{3}{4} = \underline{\hspace{2cm}}$

2)  $\frac{1}{2} + \frac{1}{4} = \underline{\hspace{2cm}}$

3)  $\frac{3}{4} + \frac{5}{8} = \underline{\hspace{2cm}}$

4)  $\frac{7}{8} + \frac{1}{2} = \underline{\hspace{2cm}}$

5)  $\frac{5}{6} + \frac{2}{3} = \underline{\hspace{2cm}}$

6)  $\frac{5}{8} + \frac{4}{6} = \underline{\hspace{2cm}}$

7)  $\frac{2}{4} + \frac{2}{8} = \underline{\hspace{2cm}}$

8)  $\frac{2}{3} + \frac{1}{2} = \underline{\hspace{2cm}}$

9) Samantha used  $\frac{1}{6}$  C of sugar,  $\frac{2}{3}$  C of milk, and  $\frac{4}{9}$  C of flour for her pie recipe.

How many cups of ingredients did she use altogether?  $\underline{\hspace{2cm}}$

10) Rene' bought  $\frac{3}{4}$  pounds of pecans,  $\frac{1}{3}$  pound of walnuts, and  $\frac{4}{6}$  pounds of

almonds to make homemade nutritional snacks. How many pounds of nuts did she buy in all?

## 5.3 Adding Mixed Numbers

### Think 5.3

- Line up fractions to add vertically.
- Find least common denominator (LCD) as needed and raise fractions to higher terms.
- Add whole numbers on left side of mixed number.
- Keep denominator and add numerators. on right side of fractions.
- Convert improper fractions to mixed number as needed then combine whole numbers from both sides.
- Simplify as needed.

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

$$\begin{array}{r} 3\frac{2}{4} \times \frac{3}{3} = \frac{6}{12} \\ + 2\frac{5}{6} \times \frac{2}{2} = \frac{10}{12} \\ \hline 5 \quad = \frac{16}{12} = 1\frac{4}{12} = 1\frac{1}{3} \\ + 1 \leftarrow \\ \hline = 6\frac{1}{3} \end{array}$$

### Try It 5.3

- 1)  $1\frac{1}{4} + 2\frac{1}{4} = \underline{\hspace{2cm}}$
- 2)  $12\frac{1}{2} + 2\frac{2}{3} = \underline{\hspace{2cm}}$
- 3)  $4\frac{5}{12} + 2\frac{1}{3} = \underline{\hspace{2cm}}$
- 4)  $6\frac{1}{4} + 2\frac{8}{12} = \underline{\hspace{2cm}}$
- 5)  $3\frac{3}{4} + 2\frac{1}{6} = \underline{\hspace{2cm}}$
- 6)  $8\frac{2}{6} + 3\frac{5}{9} = \underline{\hspace{2cm}}$

## 5.3 Practice Exercises

Find sums. Find least common denominator (LCD), convert improper to mixed number, combine whole numbers, and simplify fractions as needed.

$$1) 7\frac{3}{4} + 6\frac{1}{2} = \underline{\hspace{2cm}}$$

$$2) 12\frac{1}{6} + 4\frac{2}{8} = \underline{\hspace{2cm}}$$

$$3) 10\frac{2}{5} + 3\frac{2}{9} = \underline{\hspace{2cm}}$$

$$4) 4\frac{6}{10} + 3\frac{2}{5} = \underline{\hspace{2cm}}$$

$$5) 8\frac{3}{8} + 6\frac{4}{12} = \underline{\hspace{2cm}}$$

$$6) 5\frac{1}{4} + 7\frac{5}{16} = \underline{\hspace{2cm}}$$

$$7) 10\frac{4}{6} + 8\frac{6}{9} = \underline{\hspace{2cm}}$$

$$8) 4\frac{1}{2} + 3\frac{2}{9} = \underline{\hspace{2cm}}$$

$$9) 10\frac{3}{5} + 8\frac{4}{5} = \underline{\hspace{2cm}}$$

$$10) \quad \text{Ramón is conditioning for a race. He ran } 2\frac{2}{3} \text{ miles Friday, } 1\frac{3}{4} \text{ miles on Saturday,}$$

and  $3\frac{4}{6}$  miles on Sunday. How many miles did he run during the three days.

## 5.4 Subtracting Fractions From Whole Numbers

### Key Vocabulary 5.4

regrouping fractions: \_\_\_\_\_

### Think 5.4

- Set up fractions to subtract vertically.
- Regroup by borrowing 1 from the top whole number using bottom denominator.
- Subtract whole numbers on left side of fraction.
- Subtract numerators of left side of fraction keeping denominator.
- Simplify by reducing fraction to lowest terms as needed.

$$\begin{array}{r} 2 - \frac{3}{4} = \\ \quad \begin{array}{r} \overset{1}{\cancel{2}} \frac{4}{4} \\ - \frac{3}{4} \\ \hline 1 \frac{1}{4} \end{array} \end{array}$$

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

### Try It 5.4

Find the differences. Borrow, regroup, and simplify as needed.

1)  $7 - \frac{3}{10} =$  \_\_\_\_\_

2)  $3 - \frac{2}{4} =$  \_\_\_\_\_

3)  $10 - \frac{6}{16} =$  \_\_\_\_\_

4)  $12 - \frac{3}{9} =$  \_\_\_\_\_

5)  $9 - \frac{2}{8} =$  \_\_\_\_\_

6)  $16 - \frac{4}{10} =$  \_\_\_\_\_



## 5.4 Practice Exercises

Subtract fractions. Borrow, regroup, and simplify fractions by reducing to lowest terms as needed.

Find the differences. Borrow, regroup, and simplify as needed.

1)  $2 - \frac{1}{2} = \underline{\hspace{2cm}}$

2)  $3 - \frac{4}{5} = \underline{\hspace{2cm}}$

3)  $6 - \frac{2}{12} = \underline{\hspace{2cm}}$

4)  $10 - \frac{6}{9} = \underline{\hspace{2cm}}$

5)  $11 - 2\frac{1}{4} = \underline{\hspace{2cm}}$

6)  $12 - 8\frac{2}{14} = \underline{\hspace{2cm}}$

7)  $16 - 7\frac{8}{20} = \underline{\hspace{2cm}}$

8)  $15 - 3\frac{9}{18} = \underline{\hspace{2cm}}$

9)  $9 - 1\frac{5}{15} = \underline{\hspace{2cm}}$

10) Jennifer bought 5 loaves of bread. She used  $2\frac{6}{8}$  loaves at dinner. How much does she have left out of the original loaves?

## 5.5 Subtracting Fractions From Fractions

### Think 5.5

- Find the least common denominator (LCD) and raise fractions to higher terms as needed.
- If top numerator has less value than the bottom denominator, borrow from top whole number.
- Regroup the whole number and add to top fraction.
- Subtract numerators keeping common denominator.
- Simplify as needed by reducing answer to lowest terms.

$$\begin{array}{r}
 10\frac{1}{4} - 2\frac{3}{4} = \\
 \begin{array}{r}
 9\cancel{1}0\frac{\overset{5}{\cancel{4}} + \overset{1}{4}}{4} \\
 - 2\frac{3}{4} \\
 \hline
 7\frac{2}{4} = 7\frac{1}{2}
 \end{array}
 \end{array}$$

### Try It 5.5

Find the differences. Find least common denominators, borrow, regroup, and simplify answers as needed.

1)  $6\frac{1}{4} - 2\frac{2}{4} = \underline{\hspace{2cm}}$

2)  $3\frac{2}{5} - 1\frac{4}{5} = \underline{\hspace{2cm}}$

3)  $10\frac{3}{8} - 2\frac{7}{8} = \underline{\hspace{2cm}}$

4)  $12\frac{2}{12} - 4\frac{2}{3} = \underline{\hspace{2cm}}$

5)  $16\frac{6}{9} - 14\frac{5}{6} = \underline{\hspace{2cm}}$

6)  $8\frac{3}{7} - 4\frac{8}{14} = \underline{\hspace{2cm}}$

## 5.5 Practice Exercises

Find the differences. Find least common denominators, borrow, regroup, and simplify answers as needed.

$$1) 4\frac{4}{6} - 2\frac{4}{6} = \underline{\hspace{2cm}}$$

$$2) 10\frac{1}{3} - 4\frac{2}{3} = \underline{\hspace{2cm}}$$

$$3) 6\frac{2}{8} - 1\frac{4}{8} = \underline{\hspace{2cm}}$$

$$4) 12\frac{2}{6} - 8\frac{4}{6} = \underline{\hspace{2cm}}$$

$$5) 14\frac{3}{15} - 6\frac{8}{15} = \underline{\hspace{2cm}}$$

$$6) 6\frac{1}{4} - 2\frac{8}{12} = \underline{\hspace{2cm}}$$

$$7) 6\frac{1}{4} - 2\frac{2}{4} = \underline{\hspace{2cm}}$$

$$8) 3\frac{2}{5} - 1\frac{4}{5} = \underline{\hspace{2cm}}$$

$$9) 10\frac{3}{8} - 2\frac{7}{8} = \underline{\hspace{2cm}}$$

- 10) Marco bought a rope that was  $16\frac{1}{4}$  feet long. He used  $2\frac{1}{3}$  feet to tie up a tree branch and  $4\frac{1}{6}$  feet to tie down a load of leaves in his truck. How much rope does he have left from the original piece of rope. (Hint: Two step question.)

## 5.6 Adding and Subtracting Decimals

### Think 5.6

- Line up decimals using decimals.
- Place whole numbers on left side of decimal and decimal fractions to right side of decimal.
- Add zeros as placeholders to make decimals share same place value.
- Drop decimal straight down then find sum or difference.

$$2.1 + 3.12 + 4 =$$

| Whole<br>Numbers | Decimal<br>Fractions |                          |
|------------------|----------------------|--------------------------|
| 2                | 1 0                  |                          |
| 3                | 1 2                  | ↖                        |
| + 4              | 0 0                  | ↘                        |
|                  |                      | Insert Zero Placeholders |
| 9 • 2 2          |                      |                          |

### Try It 5.6

Find sums or differences. Line up numbers using decimal points and add zeros as place holders as needed.

(1)  $14.12 + 3.6 =$  \_\_\_\_\_

(2)  $2.345 + 0.14 =$  \_\_\_\_\_

(3)  $13 + 0.368 =$  \_\_\_\_\_

(4)  $10.3 - 0.45 =$  \_\_\_\_\_

(5)  $73 - 14.037 =$  \_\_\_\_\_

(6)  $12.2 - 3.243 =$  \_\_\_\_\_

## 5.6 Practice Exercises

Find sums or differences. Line up numbers using decimal points and add zeros as place holders as needed.

1)  $0.8 + 0.4 =$  \_\_\_\_\_

2)  $13.5 + 6.14 =$  \_\_\_\_\_

3)  $8.34 + 6.257 =$  \_\_\_\_\_

4)  $8 + 0.37 =$  \_\_\_\_\_

5)  $21.3 + 10 + 0.255 =$  \_\_\_\_\_

6)  $0.9 - 0.3 =$  \_\_\_\_\_

7)  $1.35 - 0.675 =$  \_\_\_\_\_

8)  $10.3 - 7.06 =$  \_\_\_\_\_

9)  $16 - 9.32 =$  \_\_\_\_\_

10) Harry biked 13.3 miles. Michael biked 9.37 miles. Saran biked 8 miles. How far did they bike altogether? \_\_\_\_\_

## Chapter 5: Answer Key

### 5.1

- 1)  $\frac{3}{4}$
- 2) 1
- 3)  $1\frac{1}{2}$
- 4)  $1\frac{1}{3}$
- 5)  $\frac{3}{4}$
- 6)  $1\frac{5}{7}$
- 7)  $1\frac{1}{3}$
- 8)  $1\frac{2}{5}$
- 9) 1 page
- 10) \$ 425

### 5.2

- 1)  $1\frac{5}{8}$
- 2)  $\frac{3}{4}$
- 3)  $1\frac{3}{8}$
- 4)  $1\frac{3}{8}$
- 5)  $1\frac{1}{2}$
- 6)  $1\frac{7}{24}$
- 7)  $\frac{3}{4}$
- 8)  $1\frac{1}{6}$
- 9)  $1\frac{5}{18}$
- 10)  $1\frac{3}{4}$

### 5.3

- 1)  $14\frac{1}{4}$
- 2)  $16\frac{5}{12}$
- 3)  $13\frac{28}{45}$
- 4) 8
- 5)  $14\frac{17}{24}$
- 6)  $12\frac{9}{16}$
- 7)  $19\frac{1}{3}$
- 8)  $7\frac{13}{18}$
- 9)  $19\frac{2}{5}$
- 10)  $8\frac{1}{12}$

### 5.4

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

### 5.5

1) 2

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

3)  $4\frac{3}{4}$

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

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

6)  $3\frac{7}{12}$

7)  $3\frac{3}{4}$

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

9)  $7\frac{1}{2}$

10)  $9\frac{3}{4}$  ft. 6  $\frac{1}{2}$  ft

### 5.6

1) 1.2

2) 19.64

3) 14.597

4) 8.37

5) 31.555

6) 0.6

7) 0.675

8) 3.24

9) 6.68

10) 30.67